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**ESTABLISHING CRITERIA FOR DESCRIPTIONS OF
BUILDING WORK WHICH INCLUDE PRACTICALITY
AND INTRICACY**

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Submitted in partial fulfilment of the requirements of the

degree of Doctor of Philosophy

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DEDICATION

This work is dedicated to my dear wife Pat, who encouraged me to work toward this moment. During the time I was studying, she was always as helpful as she could be, reading things I had written, and trying to interpret my rough notes. After two long bouts of lymphoma and chemotherapy, she died of a stroke on 17th November 2022. She is missed by all, but this shall be my permanent tribute to her.

DECLARATION

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee in February 2019.

I declare that the Word Count of this Thesis is 88,120 words.

Name: Henry John Hussey

Date: 30/06/2023

LIST OF ABBREVIATIONS

a.b	as before	inc	inclu(ded)(ding)
agg	aggregate	in(s)	inch(es)
alt	alternative	int	Internal
ard	around	IOB	Institute of Builders
av	average	jnc	junction
BEC	Building Employers Confederation	jst	joist
bef	before	kps	knot prime and stop
bel	below	Lab	labour
b.i	build(ing) in	Ls	angles
bkk	brickwork	m	metre(s)
b.o.e.	brick on edge or end	mat(s)	material(s)
BQ	bill of quantities	mi(s)	mitre(s)
BR(S.E)	Building Research (Station, Establishmt)	mm	millimetre
bs	both sides	mo	moulding, moulded
B S	British Standard	msd	measured
Bst (s)	basement(s)	mst	measurement
CAWS	Common arrangement of work sections	MTM	Methods-Time Measurement
CIOB	Chartered Institute of Building	n.e.	not exceeding
CIPROS	Construction integrated process & project simulation	NFBTE	National Federation of Building Trades Employers
ct&s	cement and sand	NFBTEGBI	National Federation of Building Trades Employers of Great Britain & Ireland
circ	circular	No	number
CITB	Construction Industry Training Board	opg(s)	opening(s)
conc	concrete	o/slg	oversailing

conn	connect(ion)	para	paragraph
c.o.p.	circular on plan	pbg	plumbing
cos	course	perf	perforate
CoW	Clerk of Works	PERT	Programme evaluation and review technique
c&p	cut and pin	prelim(s)	preliminary(ies)
CPIC	Construction Project Information Committee	prep	prepare
CPM	Critical Path Method	proj	projecting, projection
csg	casing	prov	provisional
c.t.b.	cut tooth and bond	p & s	planking & strutting
cu	cube, cubic	ptg	pointing
cwt	hundredweight	ptn	partition
ddt	deduct(ion)	Q.S.A.	Quantity Surveyors' Association.
desc	describe	qty	quantity
dia	diameter	r.c.	raking cutting
dim(s)	dimension(s)	red	reduced
dist	distance, distemper	rem	remove
DoW	Descriptions of Work	ret	retain(ing)
dp	deep	RIBA	Royal Institute of British Architects
d.p.c	damp proof course	RICS	Royal Institution of Chartered Surveyors
drwg(s)	drawing(s)	roj	rake out joints
edn	edition	rqd	required
enum	enumerate	rtn	return
EO	extra over/only	scaff	scaffolding
etc	and so on	sep	separate
ex	exceeding	sktg	skirting
excn	excavation	soff	soffit
ext	external	sq	square

extg	existing	sup	superficial
fdn	foundation	surf	surface
fcg(s)	facing(s)	t.b.	to be
fin	finished	temp	temporary
ft	foot, feet	veg	vegetable, vegetation
ftd	forward	vert	vertical
gen	general	wl(s)	wall(s)
GL	ground level	wk(g)	work(ing)
hb	half brick	yd(s)	yard(s)
ht	height		
horiz	horizontal		
I.B.S.E	Instit of Building Services Engineers (now Chartered)		

ABSTRACT

In the UK construction industry, descriptions of work are the facilitators for passing of information across a wide spectrum of users. It is thought generally that the descriptions of work produced by quantity surveyors and employed in the contract documentation are sufficient to enable cost information to be transmitted to all participants. Nonetheless, to the contractor, cost is a variable with many different unknowns, but to the client cost is a constant based upon the contractors' legally enforceable prices, subject to such controlled variations as an 'increased cost' clause. The purpose, however, is the same for both parties. Given that situation, it might be thought that it is essential for both parties to be provided with full and accurate information so that the estimate produced can be as near as possible to the final account figure. The producers of building work descriptions are employed by the clients (it was not always so), the information content of descriptions can omit items that are not relevant to clients' costs without having to consider whether contractors' costs are affected, and they are the sole arbiters of what is relevant. The consequence is that descriptions supplied to contractors do not reflect fully the intricacy of the work or the practical needs of those involved in production. This study began because it was realised that descriptions of building works do not describe the physical work of the labour and plant involved, they only describe materials. With this in mind, the study aims to develop criteria for a method of describing building work which reflects production and facilitates feedback, not only of basic costs, but also of the intricacies which cause differences in cost.

This study initially traces the development of the rules for transmitting information supplied to contractors showing how their purpose, and hence their content, has altered during the century of their existence. This was carried out by examining the existing method of measurement (from which current descriptions are derived) by comparing each edition with the next in sequence to discover what is not measured and hence not described. The second phase of the study used a multiple case study method by observing work being carried out on site to see what is and is not measured or described and then reconciling the work carried out on site with the current edition of the Standard Method of

Measurement /New Rules of Measurement. Twelve workpieces (cases) across two construction sites were analysed against relevant clauses and descriptions in order to develop criteria for describing building work.

The study has found, or, rather, confirmed, that current written information-passing methods do not describe physical work, in fact they make every effort not to describe it. The changes in later editions of SMMs have diluted the content to the point where there is little or no thought given to contractors' requirement for information. Furthermore, it is argued that the building needs to be thought of as a large number of pieces of work. Based on this, criteria have been developed that provide a method of describing work which allows for intricacies of the work to be indicated whilst also facilitating feedback of cost-causing data. The newly developed criteria point out the need for the results of work, the workpieces, to be the focus of description, at a fine level of detail rather than the somewhat impressionistic viewpoint of architects' elements. This study challenges the current unstated theory that measurement of materials is the only way to produce accurate building prices, and proposes these criteria for describing building work, with 'workpiece' at the heart of each description.

CHAPTER 1. INTRODUCTION

1.1 Background

This project has its roots in a study set up in establishing the Construction Industry Training Board (CITB), and which saw the need for development of analysis of building operations (Jeanes, 1966, pp 88-89) - 'A detailed assessment of a building operation...requires that at least the following factors are considered:

1. The function being performed
2. The material being used and the form in which it is supplied
3. The operational method
4. The instructions given

At that time, and since, the document credited with supplying information to contractors enabling them to establish the cost of proposed work was the Bill of Quantities (BQ), which in its turn was, and is still, based upon the rules of the Standard Method of Measurement (SMM). The analysis of observations of building work which had been gathered during the 'Building Operatives' Work' (Jeanes, 1966) study was hindered by the lack of a method of describing building work, to the extent that the report's summarising review stresses - 'The ability to analyse building operations in detail is seen as a necessary development toward identifying the full extent of common ground between occupations and their training needs, and in particular toward assessing the relevance of technical education in more meaningful terms than has been possible so far'. It was also considered that 'A detailed study to explore analysis methods is seen as a natural and important next stage of research work'. To that end, a study, 'Analysis of building operations to establish criteria for classification' was commenced in 1968. Unfortunately, other matters became more pressing, and it had to be halted before completion.

Over the succeeding years, it became clear that the subject would still be worth investigation, particularly latterly with the advent of Building Information Modelling and the difficulties of its reconciliation with SMM and the New Rules of Measurement

(NRM2), possibly because their aims are so different that there can be little common ground. BIM sets out to enable ‘a building to be represented by intelligent objects that carry information...’, (Eastman et al, 2011), whilst SMM/NRM2 sets out only to measure the main materials involved in the construction of a building.

That there is an undercurrent of need for change has been demonstrated by Shamsulhadi et al (2014), who examined the shortcomings of SMM/NRM2 as stated by 20 technical authors in a variety of publications, listing 29 areas where the documents did not satisfy the needs of their users.

On a personal level, time became available in which to carry out a study. It was realised that the industry would not be receptive to research by an individual; it would be necessary for such a study to be supported by an organisation which was independent of both contractors and professional bodies. Accordingly, a research project at a university was thought advisable and appropriate.

An examination of SMM to assess whether it could be adapted to suit the information needs of BIM was carried out in 2015-16. It involved considering items measured in all editions of SMM/NRM2 (1922 – 2013) to understand the effects of the rules on the information given. Examples found included: (a) deducting openings rather than measuring around them, which is easier for the measurer but disregards any possible cost significance of narrow widths produced by the openings, (that method also fails to consider the way in which the work must be carried out); (b) aggregation of items which, whilst similar in material and function, were not of the same size; (c) measuring items as “extra over”. Again, the latter is convenient for the measurer, but is not an item of work, involves an additional calculation for the estimator and makes it more difficult to collect feedback since the additional cost involved is not at all distinguishable in terms of work on site.

That work re-affirmed doubts about the suitability of extant descriptions, and the current project came into being late 2017, more than 50 years after the study which sparked it.

1.2 This project

The study began with the recognition that much time and effort is spent, post-contract, on obtaining information about the work to be carried out, the sequence of activities, their duration, their supply of resources, their cost, and how such factors relate to the prices calculated for the contract prior to the start of site work.

Those activities repeat some of the time and effort spent pre-contract by designers, quantity surveyors, estimators and planners in (a) dealing with the functional and aesthetic requirements of the building, (b) obtaining quantities of the materials to be incorporated (c) describing what they see as the elements of the building to be produced, (d) programming the activities involved in order to establish the overall duration of the project, (e) calculating rates for the work (which have to align with the descriptions supplied as in [c] above) in order that various tenders may be compared, or that an individual tender may be placed in context with the general market.

Those pre-tender tasks are carried out by parts of an industry which has often been described as ‘fragmented’; that term however is pejorative, implying disarray and scattering. A less censorious word might be ‘specialised’, most participants being expert in specific fields.

At pre-tender stage these specialist areas include land surveyors, civil and structural engineers, architects, M&E specialists, quantity surveyors, landscape designers, estimators, contract managers and more. Because of the need for communication between them, it would appear sensible to rationalise the information system to ensure that each area can understand the others, and more importantly, can co-operate smoothly in producing the building.

One obstacle to communication is that ‘elements’ of the building, in designers’ terms are not the same as building operations; bills of quantities, schedules of work, etc., are produced by the design team, which measure such elements; they later have to be

dissected and/or reassembled into information about pieces of work as carried out on site or in the workshop on a daily basis by the contractor's site management. Planners, estimators and site supervisors require the information to be 'packaged' in the form of the latter pieces of work and spend much of their time translating and amplifying BQ into units that can be so used on site. Daltry (1971) found that site management were likely to spend between 10 and 15% of their time on technical queries, Munday, (1979) said that construction managers 'spend nearly half their time on transmission of information, whilst Fisher and Yin (1992) believe that 'communication and data handling accounts for 75 to 90% of a project managers time'. It is likely that better communication could lessen the load on site managers and enable the work itself to proceed less erratically, helping to reduce delays and mistakes. There is little doubt that this search for information indicates that data supplied pre-contract is either not sufficient, or in the wrong form, to allow for smooth and efficient use in directing operations on site. Meanwhile, those who produce Bills of Quantities, (BQ), Schedules of Work, Lists of Operations, or whatever other titles are applied to the documents supplied to contractors, are convinced that they are sufficiently informative for the work to proceed and progress without hindrance.

SMM/NRM2 state in every edition that their purpose is to establish an equal base ('level playing field'!) for tendering, a task in which it excels. What it is not able to do is to provide information for contractors to establish true costs of their work, mainly because SMM/NRM2 do not attempt to describe or measure the labour, plant and equipment, nor support the identification of wastage of materials, labour and plant time. However, those who produce the documents believe perhaps that contractors have stores of feedback information from past jobs which enable them to price the descriptions by just looking it up in their 'black book'. As one who has been engaged over long periods in collecting and attempting to collate such feedback, it can be stated here with no fear of any authentic challenge that it just is not so. The feedback is hardly ever in a form which is even similar to BQ descriptions. (There are no references to give for these matters, though Ferry et al (1966) get close). The cry goes up from the multitude 'We don't really use BQ anymore', smugly, as if that is a rational response that kills all argument. The comment is agreed, but if the multitude were to look closely enough, they would find nearly every description of

building work that they examine is couched in the same terms as those found under the rules of SMM. That is because there is no other system known, at least in the UK, but in the course of this research no systems have been found elsewhere that are dissimilar.

There is therefore a requirement for a system which identifies and describes the 'pieces of work', and which can be translated easily into 'architectural elements' if necessary, and vice versa; although in doing so it would identify a far greater number of individual items than those produced for a BQ.

In that connection, Ferry et al (1966) stress that 'It should never be overlooked that the man (person) actually carrying out the work is of fundamental importance, and that if the designer's requirements are to be met, they must be expressed in terms and more especially in format that may easily be followed'. ('by the users' is implied). The current system of description takes no account of the needs of the operative, and in consequence is not only incapable of describing building work but has never intended to do so. The main problem of the study is that SMM/NRM2, although not describing work, providing only information for equality of tendering, (and says that in every edition), is expected by the users of the document (including the clients and their representatives, even those who produce the bills of quantities), to be capable of many more informative processes.

The unusual 'information system' produced by this regime means that the people who have taken it upon themselves to be the sole providers and arbiters of information in the construction industry have decided that (a) only information about materials used can be considered relevant; (b) that it is unnecessary to give information about all materials. They have also decided that the elements of cost that they use in any analysis are functional elements of the building.. That is the 'production of information' aspect of the system.

Users of the system have become accustomed to having information passed to them in this way, and despite occasional eruptions about BQ being unfit for purpose, still stick to a system where they have to return to drawings in order to make sense of the BQ items, and have somehow a feeling that the information is all there if only it were presented better. That makes for calls for change to BQs without consideration of change in the basic rules and of the definition of 'cost elements'.

1.3 Aim and Objectives

The aim of this study is to develop criteria for a method of describing building work which reflects production and facilitates feedback, not only of basic costs, but also of the intricacies which cause differences in cost.

The identification of the criteria will allow a variety of syntheses for other user needs.

This identification is achieved by the following objectives:

1. Examining the rules for producing descriptions, which are all contained in the several editions of SMM/NRM2 and some explanatory documents, to see what is described, what is superfluous, and what is not described but is necessary.
2. Coding the results of each clause so that necessary information categories can be included in descriptions and that following clauses and following documents may all be examined and categorized in the same way.
3. Using the case study method on site, to observe, identify and record work at approximately the same level of detail as contained in the rules of description so that they may be identified in the extant rules to check that the rules are capable of describing work on site whether or not there is a bill of quantities.
4. Validating the results of the case studies by identifying the applicable clauses, sub-clauses, and notes in the current edition of SMM/NRM2 in order to check that all the work observed could be identified under the extant rules.
5. Developing the criteria by amplifying and elucidating descriptions initiated by the codes in order to be able to describe any building work in a full, precise and uniform manner.

The following research methodology is used to fulfil the aim and objectives of this study.

1.4 Research methodology

Because of the different areas to be examined, there were several different methods of research involved:

1. Examination of the literature was a desk exercise, primarily involving examination of all the editions of SMM, and, whilst reading, establishing codes for both the content of the document and for what was not apparent, making comments where necessary. After each edition had been examined. It was necessary to read the next in the sequence, continuing the coding and subsequently comparing the two, that process repeating over several editions
2. Considerable time was spent searching for differing methods of measurement or description in use, but without any success. All other methods found were similar to SMM.
3. Work in progress on sites was the next area to be examined, being recorded by means of photographs and short written description. As a further desk exercise, the photos and descriptions were scrutinised to establish what have been called ‘break points’ in the text.
4. A further desk exercise was to try to reconcile each of the pieces of work from item 3 above with the appropriate clauses in the most recent version of the method of measurement, i.e., NRM2.

1.5 Contribution to knowledge

The contribution to knowledge of this work is in several parts:

1. It points out where the expectations of SMM do not match what it is intended to do, i.e., it is expected to describe the work fully whereas it is only intended to measure what the SMM committee decide are significant portions of the material content.
2. It shows how significant ‘break points’ define ‘pieces of work’.
3. It provides criteria against which the content of descriptions of work can be checked.

4. It establishes the basis for a standard method of description.
5. It defines the sort of information which has to be used for every piece of work, no matter how big or small; the procurement of that information is inherent in every contract, having a cost which the client ultimately has to pay whether aware of the fact or not.

1.6 Organisation of the thesis

The thesis is structured under the following chapters:

Chapter 1: Introduction

Chapter one provides an introduction to the origins of descriptions of work in the UK, and how these are linked to ‘measurement’ rather than to ‘work’. It lays out the case for providing full information pre-contract so that the estimate may reflect true cost.

Chapter 2: Literature Review

Chapter two shows the need for a common information system across the industry, describing how fragmentation and the adversarial way of working impinge upon information, caused by the control of description being in the hands of the client’s representatives, and exacerbated by their working practices.

Chapter 3: Research Methodology

This chapter describes how the project began, the documents involved, the ‘choice’ of research topic, and how a relationship was sought between this and established methods of research. It looks at the way in which existing descriptions are formulated, assumptions made by the building industry, the heresy of questioning SMM/NRM2 , and ways in which the objectives of the study were attained, including the methods used.

Chapter 4: Analysis of the data

Here is the description of the first part of the work, i.e., the examination of each of seven editions of SMM in turn and commenting upon each clause as necessary. Much of the detail will be found in Chapters 5, 6, 7, and the Appendices.

Chapter 5: Case studies and analyses

Deals with a number of case studies from construction sites where individual pieces of work are observed, photographed, analysed and discussed. They show that the coding garnered during examination of documents are equally applicable to work on site. The case studies are also compared with rules of description from NRM2, particularly in regard to ‘deeming’.

Chapter 6: Findings and discussion

This is inevitably the bulkiest chapter of the study, with an overall look at SMM and its move away from trying to measure ‘works’ to concentrating upon the sole task of measurement for the benefit of the client, shrinking its original rôle of providing information to contractors. It includes a list of the criteria.

Chapter 7: Conclusions and recommendations

The final chapter tells how the objectives led to the achievement of the aim of the study, summarises the findings, describing the contribution to theory and to practice, showing its limitations and the need for further research.

1.7 Summary and link

As the introductory chapter of the thesis, this chapter provided an overview of the research including the background of the study and the justification of selection of this particular research area. Having presented the aim and objectives of the study, it provided a summary of the research methodology adopted for the study. Finally, the expected contribution to knowledge was described while outlining the structure of the thesis.

The next chapter presents the literature review and the synthesis, establishing documents other than those under inspection.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

Within the architecture, engineering, and construction (AEC) industries, descriptions of work are presumed to be used to encapsulate the essence of work needed to deliver the product (i.e., the building, infrastructure, project, etc.). Connected by way of the product, these are three industries with a need for a common information system.

The system of descriptions of work in the UK, used as an example by many other countries in the world, is defined by the rules of the Standard Method of Measurement (SMM), together with restrictions imposed by the methods of working of quantity surveyors (q.s.).

The Royal Institution of Chartered Surveyors, the body responsible for both SMM and q.s. methods of working, affirm that ‘...the general and overruling principle to be followed in the preparation of bills of quantities (is) that accurate and adequate information shall be given in order that the estimator shall understand the exact nature of the work to be executed...’ (RICS 1966, 1972). The three prominent words in that statement are ‘accurate’, ‘adequate’ and ‘exact’, and it might be assumed that the proclamation is true. However, the RICS have become the sole arbiters of what is the nature of the work, and whether the information contained in descriptions is accurate, adequate, or exact.

It is imperative to ensure that for a system of description, work of the operatives is faithfully represented, continually cognisant of such issues as cost, procurement, service arrangements, etc., and their need for interlocking information. Extant literature, however, identifies significant challenges, particularly of differing user perceptions, understanding of intricacy and accuracy, and appreciation of descriptions. (Olander, 2007). These challenges are discussed through three core themes, examining their significance, the knowledge gap, which is thereby identified, and consequent need for this work.

2.2 Theme one: Industry ‘fragmentation’

Fragmentation of the industry has been commented upon by several report authors in the industry. Emmerson (1962) indicated that there were 20,000 practising architects, of which three quarters were employed in practices with less than six staff. Egan (1998) points to fragmentation of the industry in terms of contractor size; there being at the time some 163,000 companies listed, most of them employing less than eight people. Fairclough (2002) adds to Egan’s fragmentation concept by referring to the large number of relatively small projects, low barriers to entry, the many disciplines involved, the long and complex supply chains, low profit margins combined with traditional procurement leading to adversarial relationships, all these being exacerbated by the defensive attitude of professional institutions. The adversarial nature of relations in the industry is also influenced by the way in which SMM/NRM2 is structured; the contractor has to accept as a somewhat veiled condition of the contract that the labour of producing the structure is deemed to be included in the tender without a number of cost-influencing factors being described.

Wolstenholme, (2009), criticises the lack of change since the Egan report, fragmentation being mentioned specifically, whilst Hampson and Brandon (2004) identify several areas in the Australian construction sector that are fragmented; research and development are carried out in that manner, the industry structure is adversarial and fragmented, as are occupational safety laws, and there is a fragmented approach to information and communication technology.

Fragmentation impinges directly upon the type and quality of information sent and received (Betts, 1999), which can be often compounded where groups (or differing users) are each fixated upon their own requirements. For example, information supplied often differs from what is required, not only in the manner of presentation but also the type of information and level of detail needed, as with reinforced concrete columns when the quantity surveyor has measured each one, converted to cubic metres, either up to 300mm or over 300 mm thick, (NRM2, 2013), but what the site requires is the quantity of concrete in each column, which has already been calculated by the quantity surveyor and

aggregated, with consequent loss of detail. Similar information is needed by, say, the pre-mixed concrete supplier, for defining the next day's delivery schedule. Considerations of this nature apply to much of the supply chain.

There is also the problem that clients appear to believe that because they are carrying the cost of its production, only information which supplies answers useful to them should be considered necessary at tendering stage; anything more should be provided by contractors themselves. That concept has influenced the content of the documentation increasingly over the years.

The current system causes frustration and challenges, particularly with communication inadequacy and isolation of professionals because of lack of congruence on issues. More importantly, it can create a lack of co-ordination and understanding between design and construction which impacts upon design decisions (Nawi et al, 2014: Arditi et al, 2002), The challenge is considerable as, typically, initial production of information is carried out by the client's advisors to satisfy the early need for 'cost' prediction, necessary for a decision to proceed. Following this, information in more detail is produced to inform the client of future financial commitments, schedules of work, etc.

An assumption is made that the same kind of information will be adequate for the needs of all parties involved in the production stage which follows. The problem here is that, seemingly, little or no attempt is made to translate this into contractors' cost terms - to examine what further information could or should be provided in order to ensure all the necessary work (and attendant costs to the contractor) is included. Nicolini et al (2000) point out that costs, as opposed to prices, are rarely investigated.

Maylor (2010) asserts that a 'work breakdown structure' (WBS) can be carried out in several ways: by activities, by function of elements, by function of spaces, and so on, which is possibly so, but gives no reasons for choice of specific ways or the criteria for each, so provides no means of correlating methods. Pierce (2013) claims that a system of description which works well should include the action, the element involved, and a location identifier, which might usefully be added to Jeanes (1966) list mentioned earlier.

In this paper, the WBS to be developed is that of the contractor, as also is the related Cost Breakdown Structure

It is accepted that the contractor is provided with existing drawings at tendering stage from which he might be able to identify work not included among the information, but time for tendering is necessarily short, (Finch, 2014, states that the Public Contracts Regulations, SI 2006/5, stipulate a maximum of 52 days from preliminary enquiry to tender return) and it should be remembered that the quantity surveyor has already carried out the taking-off in such a manner that much information not included in the final document has been deliberately excluded by the rules and practices of the method of measurement, (NRM2, 2013, 3.3.2., for example).

However, 3.3.2. appears to conflict with the requirements of 3.3.1., i.e., 3.3.1 decrees that: ‘BQ shall fully describe and accurately represent the quantity and quality of the works to be carried out. Where necessary, more detail than is required by these rules shall be given in order to define the precise nature and extent of the required work’, whilst 3.3.2. (2) (c) commands ‘Do not measure separate items for widths not exceeding a stated limit where these widths are caused by voids.’

It is assumed that the word ‘shall’ is used in the document in its legal meaning of ‘must’, so that a quantity surveyor must give more detail where it is felt to be necessary, but if that involves, for example, measuring separate items to point out where work is made more intricate by narrow widths between openings, it cannot be done because of clause 3.3.2. (2) (c). A manufactured dilemma.

The challenge of providing information which accommodates all parties is reflected in methods of measurement worldwide (Bureau of Indian Standards, 1987; Singh and Banjoko, 1990; Rosli et al, 2006; Yuan and Shen (2006); Siglé, et al, 2015; Africa Association of Quantity Surveyors, 2015; World Economic Forum, 2016; Utterback, 2017).

The fragmentation is extreme in the profession of quantity surveying, where some quantity surveyors are employed by clients to give ‘cost’ advice which is primarily concerned with

information obtained by the analysis of contractors' prices. They will be referred to throughout this document as quantity surveyors (q.s.). The others are employed mostly by contractors, and deal mainly with information based upon the analysis of contractors' costs and synthesis of contractors' prices, spoken of variously in this work as site surveyors, contractors' surveyors, measuring surveyors, etc. The education of the two groups is very similar, they use the same methods, documents and language in their daily tasks, but because of the differing requirements of the information they provide and the differing needs of their employers, they often appear to be at war. (Hackett and Hicks, 2007)

Education of both groups is aided by the use of widely recognised textbooks, e.g., Willis's Elements of Quantity Surveying (Lee et al, 2014), first published in 1935, now in its 12th edition. It merits detailed examination, to which end the following quotes are each followed by a comment (in italics):

'Each...edition has been brought up to date', *i.e., conforms to the appropriate SMM/NRM edition – not quite the same meaning.*

'...original guiding principles...as relevant today as...70 years ago'. *There is no questioning by them of the original principles, or of whether those principles have ever been defined, so the documents might well be as irrelevant today as they were 70 years ago.*

'...the skills of measurement are still...required'. *Those skills are not particularly difficult to acquire – they are mainly simple mathematics, need to be used daily in the industry, and not solely by surveyors.*

'(quantity surveyors)...services...cover all aspects of procurement, contractual and project cost management'. *Whilst that applies generally to surveyors as a group, the consultant quantity surveyor, in the main, only has access to contractors' prices, not their costs.*

'...construction...activities...require...measurement so that...a price or cost (can be) established'. *That is not all that is needed. They also require description, including the materials and other inputs. It appears also that the authors are differentiating between*

'price' and 'cost' in some way which is not defined, but perhaps recognises the different nature of the two areas.

'For greater accuracy in pricing it is important to be able to rely consistently on what is included in an element or unit, and this helps to build a more reliable cost database', and later in the section they make the point that 'If a document is used for tender purposes and included in a contract...the contractor needs to know the basis of the measurement and what is to be included or excluded'. It may be inferred from these important statements that the authors are aware of cost information being omitted from descriptions in BQ, but do not understand, or do not wish to mention, that knowing what is omitted is not the same as knowing the quanta of those omissions.

'...if a building is divided... into its constituent parts, and the cost of each ...estimated, an estimate can be obtained for the whole work'. From the contractor's cost point of view, it is necessary that the 'parts' coincide with items of work carried out on site. Unfortunately, consultant surveyors tend to use the architect's elements as the constituent parts, and those elements are aggregations of many pieces of work which are not capable of being sub-divided into the sort of work stages necessary for contractors' use, exacerbated by practices such as deducting openings, extra over, etc., which are discussed at length later. Also, SMM/NRM2 do not measure or describe an unknown proportion of the work because it is deemed to be included.

'The bill must... completely represent the...work so that...discrepancy between actual and estimated cost does not arise'. That statement does not take account of omitted information which ensures that when a BQ is produced (or any other document with descriptions following the rules of SMM), it can never represent the work completely. Almost inevitably there will be a discrepancy between actual and estimated cost.

'Each contractor...is able to price the work on... the same information. This gives...the fairest...competition'. It could be fairer still, particularly to the client, if participants had all the information so that no guesswork is required.

‘...procurement involve(s) quantification of the work...(so) the measurement process continues to be of importance’. All manufacturing needs to quantify the resources used so that cost records can be kept, but in the construction industry only the materials for the work are measured by the quantity surveyor, and only for the client’s purposes. The physical labour is not measured or described in BQ, so the quantities are only of partial use in measuring or describing ‘work’; the physical work is not quantified.

‘Potential exists to generate quantities...from the computer model...however (they) have difficulty in producing quantities in accordance with...standard method’. That does not make a case for alteration to the software programmes to suit the standard methods but could be reason to amend the current measurement practices. It does indicate that a practical system has difficulty in adopting concepts which are not of a practical nature, such as ‘extra over’ or aggregation of differing items.

The above quotes and comments are included, because this book is used in the primary education of quantity surveyors but does not appear to have had much, if any, critical comment since it was first published over 80 years ago.

Current thinking by UK government, the industry’s biggest client, is that the construction process needs to be a collaborative exercise (B.S.I., PAS1192-2-2013). Unfortunately, PAS1192 opts for a continuation of use of the existing documentation, and hence a continuation of the same mistakes and fragmentation. It does not appear to consider that a common language of identification and description that works for all participants is necessary.

In summary, industry fragmentation has created a number of entrenched positions (Egan, 1998; Latham, 1994; Hampson and Brandon, 2004). It has also affected and influenced the way in which stakeholders perceive their engagement in ‘work packages’ and subsequent contractual obligations to undertake the prescribed work. Included are a number of interlinked factors, not least of which are appreciation of risk and holistic understanding of the work required. This impinges not only upon collaborative working and the collective comprehension of what is expressed (through such vehicles as contractual documentation), but more importantly what is actually conveyed and/or

understood by each party in the contract, e.g. the terms ‘cost control’ and ‘cost management’ are used freely in documents such as NRM2 (which states it has been written ‘to provide ...rules that are understandable by anyone involved in a construction project’, and ‘...guidance to all involved in...cost management...’). The drawback is that the document - which is used by contractors as well as quantity surveyors - only deals with the client’s cost management – not the contractor’s. The specific challenge relates to representation and perception – hence the need for a comprehensive and unambiguous method of description.

For that to come about, the very words used in all documentation must mean precisely the same to all parties, particularly the word ‘cost’.

2.3 Theme two: Origins of the rules and practice of measurement

The UK developed a system for establishing an equal basis for tenderers (Kodikara et al, 1992). The system focuses on materials measurement, where the descriptions arising are about the artefacts produced rather than the physical work of producing them.

Originally, quantity surveyors were employed by builders for producing tenders from the drawings supplied and were aware of factors that made for cost differences (Stephenson, [1907], warns ‘Where any excavating has to be done in an existing building, it must be taken as basketed out’, demonstrating that awareness), but it became apparent that it was costly to the client for the same process to be carried out by all tenderers, so quantity surveyors became employed by the client to produce a document for all competing contractors. Quantity surveyors became originators of descriptions, which had the basis for their content embodied in the rules of the method of measurement. (Lee et al, 2011). Because they are now employed by the client, their concern is primarily that of the client’s cost. (International Tutor Machines, 1968).

The quantity surveyor’s practices of measurement have developed from the Standard Method of Measurement of Building Works (Surveyors’ Institution et al, 1922) and

subsequent editions (1927, 1935, 1948, 1963, 1968, 1979, 1988) in the same way that SMM was formed from quantity surveyors' methods of carrying out measurement, and the two are inextricably intertwined. NRM2, the successor to SMM, (RICS, 2013) continues the way building 'works' are measured. A comparable situation appears to exist in Civil Engineering (Institution of Civil Engineers, 1976; Singh and Banjoko, 1990). Intrinsically, Bills of Quantities (BQ), schedules of work and other documents used to describe 'works' in the UK and many other countries have their descriptions based upon both the rules of the Standard Method of Measurement, (SMM/NRM2) and the measurement practices used in applying those rules.

It should be noted particularly that in the formulation of the rules of measurement, the focus changed over the years from (a) surveyors attempting to describe the work to be done, on behalf of the builder who wishes to tender, in whatever form either or both of them found most convenient, to (b) surveyors working to a predetermined set of rules that is not concerned with the individual builders' requirements, but instead with counting 'representations' of the work, i.e. measuring measures. In the former instance, the surveyor would be also the builder's estimator, pricing the work as measurement of materials quantities proceeded. In those circumstances, the tasks of measurement and estimating were very closely linked. When the change came about, measurement became divorced from the estimating process, so that the professional quantity surveyor no longer had involvement with, or access to, contractors' records or methods. That situation continues up to the present day, exacerbated by quantity surveyors apparently wishing to return to having access to contractors' cost records whilst contractors would rather they did not. It becomes apparent in appendices D and E of NRM2, where the contractor is instructed to insert: (a) a percentage for overheads and profit, (b) a percentage for fixed price adjustment, and (c) a percentage (+/-) for directors' adjustment. A very interesting study would be to examine tenders to discover how often those appendices are priced. It is not known what leads the RICS to consider that they have a right to demand that sort or level of information, always regarded hitherto as 'confidential'. It will be noted that the sign '+/-' is included in item (c) and becomes a positive inducement for a company to enter into a contract at or under cost.

Historically, the development of rules of measurement has focussed on making measurement 'simpler' by reducing the number of items measurable (RICS, 2000), whilst also omitting those which are not 'cost significant' to the client. In practice, items similarly described according to the rules, are aggregated, so certain activities which are dissimilar in some practical respects are not independently identified. Similar description does not mean that the items concerned are the same, particularly when considering what is not described. The things which are not described can be different among items which are ostensibly similar. Location based management systems (LBMS) move away in part from that concept by aggregating locations where similar work is performed by the same crew.

The main challenge is that the type of information in BQ (as defined by SMM) is not typically adequate for contractors' use (Ferry and Holes, 1967; Leon, 1970; Benedict, 1972; Waterworth and Weddle, 1978; Jaggar et al, 2001; Baccarini and Davis, 2002; Wood and Kenley, 2004; Hamimah et al, 2011; Olivieri et al, 2018). Among these issues, there are a number of overlapping factors, not least the degree of fit or appropriateness for the task. Another factor is that the estimator's normal function is to determine the contractor's cost for a project (Ashworth and Skitmore, 1983), although Smith (1986) believes that the principal objective of the estimator is to be competitive. Whatever the rights and wrongs of that discussion, there can be little doubt that it is better to have reliable, accurate information than information which uses averages of averages for what it does measure and gives no information whatsoever about important cost areas, deeming them to be included by the contractor.

During the second world war, the estimator's function was altered considerably by the advent of the Schedules of Rates produced by the then Ministry of Works, (Potts, 2009) where standard descriptions were accompanied by standard rates for the items. The task of the estimator was then to quote a percentage rate on or off the schedule.

Literature also indicates that 'work' is not described by SMM, (Griliches, 1998); all editions of SMM and NRM2 support this conclusion, since they all deem that the contractor should include the cost of labour and therefore labour is not 'measured'. In a

number of cases trades are omitted and are rarely measured by quantity surveyors (McCaffrey, 2011) The same kind of challenges exist in re-work (Kodikara et al, 1992). Thus, whilst descriptions produced by the use of SMM provide information for producing ‘works’, (Martinez-Rojas et al, 2013), the rules, practice of measurement, and content of the descriptions need to be fully understood (Razali et al, 2016) in order to cover the requirements of all stakeholders, but particularly those engaged in production, so that work not covered by the descriptions can be allowed for in some currently undefined and unspoken way.

The rules of measurement and their application do not seem to have been examined in detail by any authors except those who produce the rules, and in the case of the study by Ferry and Holes, (1967) for the RICS. They were commissioned to produce a report which looked at some of the possibilities of rationalising the system of measurement, but it appeared to make no difference to editions of SMM which followed it in 1968, 1979 and 1988, or to NRM2 (RICS, 2013).

The Oxford Dictionary (O.U.P., 1998) gives three meanings to the word ‘rationalise’:

1. Attempt to explain, or justify, (one’s own or another’s behaviour or attitude) with logical, plausible reasons, even if these are not true or appropriate.
2. Make (a company, process, or industry) more efficient by reorganising it in such a way as to dispense with personnel or equipment perceived to be unnecessary.
(sub-sense): To reorganise a process or system in such a way as to make it more logical and consistent.
3. (Maths.) Convert (a function or expression) to a rational form.

The sub-sense of the second meaning would have been an appropriate basis for the examination. It appears, however, that the authors of the report have used the first meaning in their consideration of the way in which building work is measured, although the possibility of measuring in a different way was touched upon, mainly by numbering items of work rather than linear, superficial or cubic measure. However, they qualified it by attesting that such a presentation was unsuitable for pricing, ordering and costing purposes.

A check against NRM2 (2013) shows that of 523 clauses, numbering (or 'item', which is similar) is used for 242 of them, i.e., over 46%, meaning that it is the most common of the units of measure, and in actual use it would be possible to have far more than that. It seems that Ferry and Holes' statement would not hold good for more recent circumstances. The method of numbering is also mentioned in Reiss *et al* (2006).

Skoyles (1981) commented that: 'The principles on which measurements are based have received little criticism'.

To examine the rules of measurement and their application there are four areas for inspection:

1. The rules themselves.
2. The way in which the rules are interpreted by the users.
3. The form and content of descriptions arising from use of the rules.
4. The wording of the descriptions.

Dealing with each of the above in turn:

1. **The rules themselves.** These began with the first edition of SMM (1922); the second edition, (1927) was an amendment only to include items of slating and tiling which had not been included in the first edition. Edition 3 followed in 1935, its preface pointing out that the prior edition had been incorporated into the new Form of Contract, (RIBA, 1931). The importance of that statement should not be underestimated, because it means that the way in which the descriptions are worded and the method by which they are formulated, (i.e., SMM), have the force of law behind them. That being so, information is excluded knowingly by the client's representatives (and hence the client). The contractor is obliged to sign the form of contract, thereby agreeing to accept incomplete information, but not being able to discover the scope or content of such data without again carrying out the task the quantity surveyor has already completed, which is usually impractical given the time allowed for tendering. The rules for all editions up to

and including No 6 have been examined for their effect upon descriptions, and the details of those examinations logged partly in the body of this text, (p.74, section 4.2).

One might expect that the sub-divisions of some 'works' in editions of SMM prior to the metric edition of 1968 would have been developed a logical basis, e.g., that the grouping of painting into 3" and under, above 3" and up to 6", above 6" and up to 9" and so on, would be based on cost divisions arrived at by some process which could be justified. This is apparently not so, because the RICS (1968) states: 'Widths previously classified in 4 stages in the series 3, 6, 9, 12 inches are now classified in 3 stages in the series 100, 200, 300 millimetres. The narrowest width (prior to metrication) increased by over 30%, similarly for the second, the third does not now exist, and the fourth is greater than its replacement by only 1.5%. If the stages can be changed arbitrarily in that way, it seems that the original classifications were also completely arbitrary, and merely represented convenient divisions for quantity surveyor to measure. Despite that, they have a considerable influence on prices, if only because estimators consider there should be an increase/decrease in cost at those points simply because SMM curve.

The same document makes the puzzling statement: 'Literal conversions of the figures are not required, but common-sense substitution, e.g., 5 feet (1.524 metres) is a stage in excavations and 1.50 metres is a natural and ready substitute; 11 feet (3.35 metres) is a stage in ceiling heights and 3.50 metres is a more natural substitute'.

That raises the question of why is 5 ft a stage in excavations and 11 ft a stage in ceiling heights? Two possible answers are (i) 'because that is what has been decided by the committee' and (ii) 'because there is an actual increase in cost at that point'. There can be no 'natural' or 'common-sense' substitute for what appears to be an arbitrary figure; furthermore, if there should happen to be an increase in cost at or around a particular point, there can be no good reason for changing a rule just to make it look more 'metric'. The reason for 'staging' in excavations is examined later.

The most recent reincarnation of the SMM is contained in NRM1, 2 and 3, (2013), where maintenance ‘works’ (NRM3) are separated from capital ‘works’, (NRM1 and 2). Until this ‘suite’ of documents, all building works had the same set of rules. NRM1 links the measurement of ‘works’ to three estimating methods: (a) floor area method; (b) functional unit method (e.g. per bed space); (c) elemental method, It is the latter which occupies most of the document. What is notable about the last is that the ‘elements’ listed can be seen to be ‘architectural’ rather than ‘work’ elements. Nevertheless, they are described in the text as ‘cost elements’, thus referring to clients’ costs, which means in turn that there appears to be no direct relationship between clients’ costs based upon such ‘elements’ and contractors’ costs which are based upon ‘pieces of work’.

2. **The ways in which the rules are interpreted by their users and employed in practice.** This usually means that the descriptions produced by quantity surveyors, or obtained from standard lists (e.g., Fletcher and Moore, 1965; Monk and Dunstone, 1965), adhere closely to the language and content of SMM; notwithstanding the note, from the fourth edition onward, to the effect that quantity surveyors should give more detail than required by the rules where necessary to define the nature and extent of the work (NRM2, 3.1.3). It should be noted that the people who decide whether it is necessary are quantity surveyors, the producers rather than the users. If quantity surveyors were on any occasion to follow the advice in that note, they would be admitting that the rules do not define the work that they are attempting to describe. It would also be necessary for them to be able to explain why the rules were not suitable for that particular purpose, so that they could defend their judgement if called upon to do so. Research has found no mention in any of the documents examined or quoted of that situation having occurred.
3. **The form and content of descriptions arising from the use and/or interpretation of the rules.** This area is mentioned by the RICS, (1966, 1972) as follows: ‘The surveyor is at liberty to word his descriptions in any manner he considers appropriate provided that the required information is clearly expressed’.

4. **The wording of descriptions.** The wording has been examined exhaustively in this research.

It is important to recognise that the earliest reason for measurement, and consequently description, in the life of a contract is to establish contractors' cost, a reason which has never changed. That cost is made up of the materials, labour, plant and equipment expected to be deployed in producing the article, and it will usually have profit and overheads added to produce a price to the client. The cost may need to be established of any or all the components at any given time, and for many different purposes. For cost checking, it is essential that feedback information of good quality is available, and that it should be in precisely the same terms as those of the original item.

Descriptions of building work are necessarily ubiquitous in that they must serve a wide variety of purposes, and in so doing they have to remain constant in meaning and content throughout. Unfortunately, the terms of SMM, which were directed only at tendering in the first instance, have over the years removed traces of leaning toward describing anything that is not solely concerned with measurement, and in doing so have changed not only their meaning but also their relevance.

One of the differences between the rules of SMM/NRM2 and the self-imposed rules of quantity surveyors in their practice methods is that the latter might be more amenable to change as they become aware that precision in description leads to more accurate estimating and could thus become a requirement rather than an imposition.

2.4 Theme three: Information management and coordination

Examination of the various editions of SMM/NRM2 (1922 – 2013) presents gradual changes in the meaning of the word 'works', indicating that work is defined by the artefact produced, such that SMM and NRM2 deem labour to be included in the description. The RICS (1962) define the word 'deem' as meaning that such items are not measurable and need not be mentioned in descriptions, which underpins the notion that operatives are not normally provided with descriptions of their work processes (Bertelsen, 2004).

Earlier, it was pointed out that this study is concerned with work as being the physical effort of operatives in construction and has been described as the labour involved in producing artefacts. The New Oxford Dictionary of English (1998) defines work thus:

Work. (noun)

1. Activity involving mental or physical effort done in order to achieve a purpose or result. (In combination or with modifier) ('works') chiefly Brit., operations of building or repair.
2. Such activity as a means of earning income.
3. A task or tasks to be undertaken.
4. Something done or made.

Work (verb)

1. To be engaged in physical or mental activity in order to achieve a purpose or result.
2. (of a machine or system) operate or function.
3. Bring a material to a desired shape or consistency, e.g., work a mixture into a paste'.

The dictionary provides a number of definitions, several of which might be relevant to this study:

1. Of the noun meanings, (1) appears to be applicable because there is clearly mental and physical effort involved, carried out to achieve a purpose or result, but it must be remembered that, this being a noun, is 'a work', 'an activity'.
2. The modified word 'works' applies in the sense of 'roadworks', 'groundworks' and so on.
3. 'Task to be undertaken' (3) is applicable.
4. 'Something done or made' also applies.
5. Of the 'verb' meanings, (1) appears to be defined in much the same way as noun (1), except it seems that in this case, someone can be seen to be involved in doing work; 'he works, she works'. The other meanings appear inapplicable

to the problem under consideration because they are too narrow in their scope, although No 3 is mentioned later in this discussion.

It would appear that in the title ‘Standard Method of Measurement of Building Works’, (1922-1988), (SMM), the word ‘works’ has the meaning of noun (1)(ii), i.e., with the modifying ‘s’ indicating ‘operations of building or repair’.

The most recent version of SMM, New Rules of Measurement 2 (2013), (NRM2), also indicates that it is the noun meaning which is used in descriptions produced by its use. Clause 3.1.3 states ‘Bill of quantities (BQ) are to fully describe and accurately represent the quantity and quality of the works to be carried out’, which, (despite the confusion between singular and plural, and the split infinitive), lists in clause 3.3.3.13 the factors which are deemed to be included in the descriptions arising, which are:

1. Labour and all costs in connection therewith;
2. Materials and goods together with all costs in connection therewith;
3. Assembling, installing, erecting, fixing or fitting materials or goods in position;
4. Plant and all costs in connection therewith;
5. Waste of goods or materials;
6. All rough and fair cutting unless specifically stated otherwise
7. Establishment charges; and
8. Cost of compliance with all legislation in connection with the work measured including health and safety, disposal of waste and the like.’

The word ‘deemed’ means that the contractor must allow for these items whether they are specifically mentioned in a description or not. RICS, (1966) lays down:

‘Where this phrase (*deemed to be included*) is used in the SMM, it is not necessary to mention the items referred to in the bill. The estimator is expected to be familiar with the requirements of the SMM’.

It appears that clause 3.3.3.13 is included to ensure that the contractor can have no redress for failing to include items of cost which are necessary for the construction but might not have been included in the description of the work to be carried out.

Item 7, Establishment charges: This phrase in general refers to the costs of running a business, but in practice has two components – (a) head office running costs such as accountancy, clerical staff, estimating, wages department, staff recruitment, buying department, office cleaning and maintenance, business rates, and so on – (b) individual site costs such as site manager, surveyor, engineer, materials checker, clerical staff, site offices, telephone and computer facilities etc.

Adding to that complexity in NRM2 is clause 2.11, - ‘Overheads and profit’. It does not indicate whether ‘overheads’ are considered to be the same as establishment charges. Under clause 1.6.3 however, is a definition which reads: ‘the contractors costs associated with head office administration, proportioned to each building contract, plus the main contractors return on capital investment’. It does not say whether that proportion should be concerned with the time span, the total cost of the project, or both.

It defines (2.11.1) that ‘overheads and profit’ is a percentage addition to:

1. Preliminaries;
2. Measured work;
3. Risk allowances;
4. Work resulting from the expenditure of provisional sums.

Clause 2.11.2 makes clear that overheads and profit can be treated as separate items.

Clause 2.13.2.1 requires that separate provision is made in the BQ for the contractor to insert a ‘directors adjustment’. Clause 2.13.2.2 enlarges upon the adjustment by stating that it ‘will include adjustment for...such as financing charges, cash flow, opportunities and competition’ and is ‘added to or subtracted from the estimated price to arrive at the tender...’. It has long been the case that such adjustment has been made by contractors and added wherever they wished to put it in the BQ; NRM2 is the first edition that has attempted to make those adjustments apparent rather than concealed. If contractors accede to the clause, it could then become controllable (and negotiable) by the quantity surveyor rather than being solely at the contractors’ risk.

Item 8 of the list appears not to be directly connected with carrying out the work, (unless there is some physical work on site involved, e.g., a requirement to deal with asbestos in a specific manner if discovered on site), and so might not be considered as building work, even though such items are part of the building cost. Such provisions apply also to sub - contractors, including those carting away waste and excavated material, which may cause some difficulties, but should be dealt with under each item where waste is produced, i.e., most items. All the other items on the list need to be included in descriptions of building work which require to be complete for all stakeholders requirements to be satisfied. Not specifically mentioned in that list are the tools and equipment necessary for carrying out the assembly, installation, erecting, fixing and fitting of materials or goods, (which can be deemed to be included in items 1 and 3) but they too will need to be included in the descriptions for completeness, as will a description of the result of that work, (ostensibly covered currently by descriptions arising from the use of NRM2). It should be noted that descriptions based on SMM/NRM2 do not describe the result of work, they describe measures of the results of work, e.g., square metres of slating, cubic metres of concrete, in their final position.

The Health and Safety Executive (2015) define ‘construction work’ at length (Reg. 2):

“construction work” means the carrying out of any building, civil engineering or engineering construction work and includes –

- a) the construction, alteration, conversion, fitting out, commissioning, renovation, repair, upkeep, redecoration or other maintenance (including cleaning which involves the use of water or an abrasive at high pressure, or the use of corrosive or toxic substances), de-commissioning, demolition or dismantling a structure;*
- b) the preparation for an intended structure, including site clearance, exploration, investigation, (but not site survey) and excavation (but not pre-construction archaeological investigations), and the clearance or preparation of the site or structure for use or occupation at its conclusion;*
- c) the assembly on site of prefabricated elements to form a structure or the disassembly on site of the prefabricated elements which, immediately before such disassembly, formed a structure;*

d) *the removal of a structure or of any product or waste resulting from demolition or dismantling of a structure or from disassembly of prefabricated elements which immediately before such disassembly formed such a structure;*

e) *the installation, commissioning, maintenance, repair or removal of mechanical, electrical, gas, compressed air, hydraulic, telecommunications, computer or similar services which are normally fixed within or to a structure;*

but does not include the exploration for, or extraction of, mineral resources, or preparatory activities carried out at a place where such exploration or extraction is carried out.'

The Regulations have been commented upon by Hosking Associates (2015). Since use of the words in the current project lies in transmission of detailed information from designer to client, quantity surveyor, estimator, site manager and eventually the operative, the definitions, whilst being appropriate for the Health and Safety Executive to identify areas of endeavour, are far too broad to be used in this chain of communication.

PAS 1192-2 (British Standards Institute, 2013) is a document which announces that it is a '*Specification for information management of the capital/delivery phase of construction projects using Building Information Modelling*'.

The 'delivery phase of construction projects' includes all the work of constructing a building, therefore it appears that the document should specify the management of information for constructing a building, among other things. Its Introduction states:

'The production of coordinated design and construction information is a task and time-based process...Each task needs to be carried out in a particular order...known as collaborative working...(in which) teams...produce information using standardised processes and agreed standards and methods'

It might be that in an environment where contractors are anticipated to be part of a team producing construction information, the use of standards and methods previously used for other environments will not necessarily produce the required results. Such methods include description of building work arrived at by use of SMM/NRM2. Previously it has

been shown that the measurement method does not supply some items of information, but deems them to be included, and contractors have no redress for failing to include such items when information regarding the extent of that cost is not supplied to them. Consequently, under PAS1192-2 they are forced to be complicit in something which could possibly be detrimental to them.

Ostensibly, such a clause, (if a contract uses SMM/NRM2, albeit vicariously, to produce a BQ/Schedule of Works or similar as a contract document), may contravene the Unfair Contract Terms Act, (Elizabeth II, 1977), which seeks to impose limits upon the extent to which liability for breaches of contract, negligence, or other duty can be avoided by contract terms. In that respect, it should be noted that Part I (1)(4) states ‘It is immaterial...whether the breach was inadvertent or intentional, or whether liability for it arises directly or vicariously’. However, the investigation of this legal aspect is beyond the scope of the current study, so necessarily must be left to others.

Later in the Introduction, PAS1192-2 opines that the use of the Construction Strategy (Cabinet Office, 2011) ‘will address the problem of information that is inaccurate, incomplete and ambiguous’. It is difficult to understand how that can happen if there is a continuation of operation of the documents whose use for a purpose which was never intended helped to cause those failings, i.e., SMM/NRM2.

Documents which purport to deal with information necessary for carrying out construction projects, such as PAS 1192 and NRM2 are inhibited by their perceived need to provide information content directed toward the requirements of the client, and hence consider only architectural elements (BCIS, undated) as the subject of the information. This is pointed out by Björk (BB): ‘The basic concept used in almost all data models is the object or entity’. Ekholm and Fridqvist (2000) speak of: ‘the dilemma of reconciling the material and construction method viewpoint with the space-centred viewpoint’.

The designer produces information in ‘space-centred’ terms, quantity surveyors deal with information in material and sometimes method terms, but there is no inclination to produce information in production work terms. There is not just a dichotomy; there is at least a trichotomy, but in reality, there is no dilemma –whoever produces it and however it

is produced, all the information required to carry out the physical work of construction must be available to the operatives otherwise nothing would be constructed. Cole (2017) recommends:

‘It is critical that there is effective communication of essential design information in an accessible form to tradesmen such as bricklayers working on site’, and also ‘that all relevant information should be fully integrated into a single document’.

It should not be within the power of the designer or quantity surveyor to decide what information is or is not necessary or relevant, particularly as the sequence of many pieces of work is defined by the design. Skoyles, (1968), with reference to BQ (Operational format), explains that: ‘the operations are...a reflection of the dictates (*of*) the design on the sequencing of work’.

Nani *et al* (2008) point out that SMMs have been criticised for their lack of consideration for construction practice. Brook (2004), in his treatise on estimating and tendering, expresses the opinion that the BQ can be used by the contractor for cost control during the contract. That may be true of the client’s cost, but in a situation where the items do not describe the labour involved, control of contractor’s cost needs other measures. The CIOB (2012) recommend that a fully operational cost control system be introduced on all contracts but anticipate that it will continue to be directly allied to the method of measurement.

If all the information needed for constructing the building is extracted, it can be re-assembled in whatever form is required by any stakeholder. Only if the information provided is edited, limited to specific tasks, and directed at a particular stakeholder does any reconciliation appear to be needed. Eckholm and Fridqvist (2000) are positive that: ‘In order to enable communication among actors and computer systems in the construction process, the concepts used in model development have to be formally defined and standardised’.

The trend to deal only with the client’s use of information appears to indicate communication between client, advisors and computer, but not to consider the contractor’s

needs, which appears very much as if powerful forces are combining to limit contractors' access to necessary information, thereby exacerbating an already delicate relationship.

There are ambiguities in specifications and bills of quantities. One notable item is the expression 'make good' which in legal terms can be construed as 'Correcting that which has been done badly', and hence can lead to problems if lawyers unfamiliar with BQ are employed in building contract cases.

Another is the sentence often used in the past, 'Timber must hold up to the sizes shown', can perhaps interpreted by a Clerk of Works as meaning that the timber should be of those sizes as a minimum. The architect might disagree, contending that it means that the timber has to be those sizes precisely. To the contractor it could mean the difference in cost between sawn timber on one hand, planed and thickened timber on the other.

That such widely differing interpretations can exist gives point to the need for descriptions to be unambiguous. What is more, the people who write descriptions seem unaware of their possible ambiguity, perhaps partly because of the use of clauses that have not been checked even for mistakes in transfer, particularly where voice recording are used for dictation. One surveying practice is known which included the instruction that 'all kitchen and bathroom walls and ceilings are to be decorated with anti – fungicidal paint' in its specifications for at least four years, despite the mistake being pointed out regularly.

In the USA, the Project Management Institute (2006) in the PMBOK Guide® defines 'work' as being 'Sustained physical or mental effort, exertion, or exercise of skill to overcome obstacles and achieve an objective', initially appearing that they intend to concentrate upon the labour involved, but later demonstrate that they do not use that definition. This is considered further on in the study.

Over the years there have been many attempts to manage information in the industry; in 1969 BRS (now BRE) carried out an extensive study of coding and data co-ordination (HMSO, 1969), which was perhaps the forerunner of the National Building Specification (NBS), and which produced a number of definitions of the terms in use.

The Project Management Institute (2006, re-affirmed 2011) Work Breakdown Structure: ‘...define(s) the project’s scope of work in terms of deliverables and... further decompose(s)...into components’. A deliverable is further defined as: ‘Any unique and verifiable product, result, or capability to perform a service that must be produced to complete a process, phase, or project’.

Also in USA, Garcia-Lopez and Fischer (2017) propose a model for analysing workflow variability and standardise the ‘activity’ definitions on UNIFORMAT classification (Charette and Marshall 1999), without appearing to question whether those ‘activities’ are completely suitable for the function for which they propose to use them. They are very similar to the architectural elements of ‘Uniclass’ in the UK.

In the UK, the Construction Project Information Committee (CPIC) was formed in 1987 and included representatives from RIBA, RICS, ICE, IBSE, together with representatives of clients and contractors (Finch, R. 2012), to support collaborative information change in the industry. It developed the Common Arrangement of Work Sections (CAWS) classification, which was used in the production of SMM7 and NBS, and CAWS has been incorporated into ‘Uniclass’, another classification system developed by CPIC. Both CAWS and Uniclass are incompatible with this study, however, partly because the word ‘work’ in its name excludes the physical labour of production, and partly because the ‘elements’ as listed are architectural, functional elements rather than conglomerates of tasks or activities as envisaged in this paper. For example, the ‘activities’ section of Uniclass includes ‘eating’, ‘sleeping’, ‘exercise’, etc., so it is classifying functional spaces by the activities performed in them. That means that although the tasks or activities envisaged in this paper can be combined to produce functional elements, the reverse is unlikely to be feasible.

The Building Operatives’ Work report (Jeanes, 1966) did not define ‘work’ but contains the significant sentence: ‘It was decided to study work requirements on site... in order to ensure that ...*(they)* were practical, and so that ...observations of typical operations could be made’, indicating that the ‘work’ being considered was the physical labour of the operatives.

Nelson, (1969) avers that: ‘A building operation involves the performance of a set of tasks on a material...by labour with the assistance of tools, plant or equipment...The outcome of any operation is a workpiece. The three resources – materials, labour and plant – the operational restraints and the resultant workpiece are therefore the main subjects about which information is required’. ‘Workpiece’, as defined by Merriam -Webster (2021), means ‘a piece of work in process of manufacture’, and that is the meaning ascribed to it throughout this paper.

‘Operational restraints’ listed by Nelson (1969) are: time, payment for work, sequence, access and safety precautions; factors which are different for each project so that data for each is unique. What he meant by ‘time’ is shown in context in his Table 1(d), as the subdivisions - ‘earliest start’, ‘latest start’, ‘latest finish’ and ‘duration’.

In addition to operational restraints, he also suggests a hierarchical structure to the contractor’s divisions into ‘manageable parts’, first considering ‘broad stages’ – groundwork, structural frame, cladding, and so on, then breaking these into ‘operations’ such as steel frame, brickwork, finally dividing these into ‘tasks’ for organization of labour.

The BRS report upon a study of Building Operatives’ Work, (Jeanes, 1966), found problems in the analysis of what purported to be descriptions of building work in progress, written by industry- trained observers. The observers, separately, described pieces of building work by reference to previously prepared lists, sometimes at different levels of a seemingly hierarchical structure, depending upon factors which were not obvious. This meant that what might have been similar pieces of work could not be aggregated, and others which might not have been similar could be placed together in analysis, leading to much of the observational work having to be discarded. As a simple example, depending upon which part of the hierarchy an observer is recognising, the driving of a screw may be variously described as:

- * 'Drive screw', which is part of...
- * 'Fix butts', which is part of...
- * 'Hang door', which is part of...
- * 'Carpenters 2nd fix'....

giving a hierarchy starting at a fine level of detail and ending at a very broad level.

The door and its frame may also be regarded as a 'sub-element' of 'wall', thereby establishing a contact with a separate hierarchy of 'design elements', which will be examined later.

The problems led to a study 'Analysis of building operations to establish criteria for classification' being started in 1968, which was halted before completion. A considerable amount of work had been carried out, however, in which it was recognised that the BQ were the main documents for transmission of information throughout the industry and they had drawbacks which did not sit well with computerisation, PERT, CPM and other developing techniques. A comparison may be made with the recent problems of alignment of SMM with BIM.

The fact that observers who all had a background in the industry could describe the same piece of work in several different ways made this an issue for later examination.

The problems found by BRS have not disappeared. They may well have worsened since SMM/NRM2 focussed upon 'cost significance' in SMM6 with a policy of deeming 'cost insignificant' items to be included in the 'measured' items. It must be noted that cost significance of an item in SMM can apply only to clients, because it relates only to their costs, not those of the contractor. If it were not for Building Regulations and similar rules, high 'value'/low 'cost' items (e.g., airbricks) might never be mentioned in b.q.

Odeh *et al* (1991) speak of processes rather than the 'operations' of Nelson (1969) in their introduction of the CIPROS system, which relates project drawings and specifications to process networks and relevant resources. Each process is defined in terms of actions, components, resources, an operation and queue network, and operation functions. The 'actions' in question appear to suggest a hierarchy similar to that of Nelson (1969).

There is no definition of work in leading books on work study, (British Standards Institute, 1959; Geary, R., 1970; Currie, R.M. 1972; Barnes, R.M., 1980; Kanawaty, G., 1992). What is more, an internet search of ‘work study’ discloses that it now seems to mean a programme of work combined with study, rather than specific activities, and is spelt as ‘work-study’. The earlier use of ‘work study’ appears now to have several areas called ‘time study’, ‘work measurement’ and similar. Internet search produced one UK institution that is directly aligned with ‘work measurement’ - the Institute of Management Services, which appears to have evolved from amalgamation of several bodies during 70 + years of existence; several ‘work study’ specialists are advertising on the internet.

Although hierarchies of work seem apparent in some of the publications mentioned above, there appears to be no precise definition or correlation of the terms used. The Glossary of terms in Work Study (British Standards Institute, 1959) explains some and defines others, as follows:

1. Therblig – ‘The name given by F. B. Gilbreth to each of the specific divisions of movement according to the purpose for which it is made’.
2. Element – ‘A distinct part of a specified job selected for convenience of observation, measurement and analysis’.
3. Operation – ‘Indicates the main steps in a process, method or procedure. Usually the part, material, or product concerned is modified or changed during the operation’
4. Movements (minimum) – ‘Movements which, while natural, are the minimum necessary’.
5. Job – ‘All the work carried out by a worker or group of workers in the completion of their prescribed duties and grouped together under one title or description. In work study techniques, it may also denote a part of those duties’

It appears from that ‘therblig’ and ‘movement’ are of a kind, since ‘therblig’ is a specific division of movement. Examples from the accompanying text however (e.g., ‘assemble’, ‘transport’) seem to involve more than one movement, which suggests that a therblig is of

a larger order than movement. However, ‘Movements (minimum) are defined as *‘movements which...are the minimum necessary for the job’*, which leads nowhere. Despite the confusion it is clear that both words are intended to be concerned with the movements made by an operative.

‘Elements’ are defined as ‘part of a job’, which suggests that they are of a kind and related hierarchically. On the other hand, the text reads ‘In work study, ‘job’ may denote a part rather than the whole of a worker’s duties’, which suggests that ‘job’ may be synonymous with ‘element’.

Geary (1970) uses the words ‘operation’, ‘element’, ‘activity’, and ‘job’ in his text, without any precise definition of those terms. At one point in the text, ‘...the operations (referred to as elements) ...’ is stated, which indicates synonymy, but at another it reads ‘...repetitive operation...when breaking it down into very small elements...’ which indicates that ‘operation’ is larger than element. In another instance, he speaks of listing elements of work involved in operations. The general impression given is that ‘operation’ is a combination of elements. ‘Activity’ appears in a ‘Multiple activity chart’, containing a list headed ‘Operations’ leading to the impression that ‘multiple activity’ is synonymous with ‘multiple operation’. Elsewhere, however, ‘activity’ is used describing movement in general – ‘...high level of activity’, in which sense any work of any size or scope is an activity and cannot be compared for level of detail with ‘operation’ or ‘element’. Overall, the impression given is that of: job > operation > element, with activity used to describe any or all levels.

Gane and Woolfenden, P.J., (1965) make a strong point at the beginning of their article: ‘An analysis of training needs must make it clear at all times what level of performance is being discussed. Since a number of terms are used rather loosely at present, we propose to distinguish five levels, defined as follows in Table 2.1:

Table 2.1: Levels of performance (with acknowledgements to Gane and Wolfenden)

Level of Performance	Description
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Act	The basic unit. An action which must be repeated if it is interrupted and cannot be left half-finished. Similar to a therblig in micro motion study.
Element	The basic sequence of acts, the shortest sequence for which an order would be given. Start and end points of the given. Start and end points of the sequence readily identifiable. Similar to an 'element' in a process chart.
Sub-task	The basic sequence of elements. A self-contained sequence which achieves a definite result, but which is usually combined with other sub-tasks. Skilled operative has very little freedom to decide the order in which elements will be performed. Similar to the simplest sequence that would be time studied.
Main task	A self-contained set of sub tasks which achieves a definite result. Skilled operative has some freedom to decide the order in which they will be performed.
Job	The set of tasks and sub-tasks that an operative is expected to do in the course of his/her work. A task portfolio which is hinted at, but not specified, by the job title. This portfolio usually consists of (a) some tasks which the operative is expected to perform regularly and frequently, (b) a larger number of tasks which are expected to be performed when the need arises. The skilled operative often has great freedom to decide the order in which the regular tasks will be performed.

Successive definitions in their document develop from that immediately preceding; the resulting hierarchy is consequently well defined. However, the difference between 'act' and 'element' and their relationship to 'therblig' is not completely clear, e.g., 'hold', 'grasp', 'rest', 'delay', are accepted therblig terms; in this document it seems that both 'act' and 'element' definitions could be applied to those terms. If an element is the shortest sequence of acts for which an order can be given, 'start' and 'stop' are orders,

and ‘grasp’ the act being performed , then ‘grasp’ can be considered to be an element as well as an act.

Williams, (1972) makes the important point that ‘work study data is not usually compatible with the Standard Method of Measurement’. Kinniburgh and Vallance (1948) stress that ‘The term “work” ...refers to human effort and not...as used in the science of mechanics’. Barnes (1980) uses ‘work measurement’ as a synonym for ‘time study’, utilising it ‘for determining the standard time to perform a specific task’. A similar definition is given by Kanawaty, (1992) and repeated by Caragnano and Lavatelli, (2012), who instruct:

‘To set a standard time of a given manual task the following steps are necessary:

-Set a basic time

-Determine the proper time allowance+++

-Add allowances to the basic time to set a standard time’

Several points arise from that statement:

1. In the construction industry there is no precise definition or agreement at present of what constitutes a task, so definition of ‘given manual task’ becomes difficult.
2. In other industries, where machinery is used much more extensively than in construction, production tasks are easier to recognise, and the worker’s time is linked closely to the machine’s production time per unit.
3. There is no definition of ‘proper’ time allowances in the paper, but it can be assumed from the context that these include recovery and comfort break times.
4. The context makes clear that basic time is equivalent to ‘normal performance’, which is established by reference to MTM (Methods-Time Measurement), and they state that ‘MTM normal performance is the most used and best-known performance reference in the world’.

It appears that there is no thought or intention of identifying tasks from the observation of work being carried out. It would seem, however, that such observation would be a more appropriate starting point than assuming that tasks are known and fully justified.

Measurement and descriptions of work are intrinsically linked, (Ferry and Holes,1967), but there is no organisation set up to monitor or co-ordinate the information content of descriptions. 'Information' is deemed to include facts interpreted in a particular context, (Whyte *et al*, 2015), whereas 'data' is seen as unprocessed/unorganised facts (Faucher *et al*, 2008, p. 50).

One of the major problems to be solved is defining the boundaries of what constitutes a piece of work. Skoyles (1967) recognised this problem, and some of the factors involved in defining the boundaries of 'tasks' have been discussed by Nelson, (1969). Currie (1972) emphasised that 'elements of work' were the most important; similar discourse can be seen elsewhere (Lumsden, 1968; CIOB, 1983; Turner, 1993.).

On this theme, Ashworth and Skitmore (1983), noted that many items in the BQ were not priced, therefore had no cost effect (in terms of cost to the client), ignoring the possibility of them having cost significance on the priced items (i.e., cost to the contractor). If an item is not priced, it does not mean that it has not been taken into consideration in the pricing of the major items, nor can it be said that unpriced items can be omitted because the contractor allows for them in the main items. It may be that the ratio of quantity of the item to quantity of the main work is the important consideration, or that the ratio of several minor items to each other is of significance.

The accuracy and completeness of information is important, (Miresco and Ngongang, 1999; Staub-French, 2002; Shamsulhadi, *et al*, 2014; Health and Safety Executive, 2015), particularly in relation to the contractor's requirements. The information requirements of operations are closely linked to workflow, (Liu *et al* 2011); Ballard and Howell (1995) found that productivity improves when workflow is made more predictable. Allen (1985) found '...a strong correlation between employees per establishment and productivity'.

Because of the lack of clear understanding of what constitutes a piece of work, information management and coordination is fragmented, disparate, and somewhat unrepresentative.

Building Information Modelling (BIM) is another area of contention (Wu *et al*, 2013) in that it does not adhere closely to UK practice and standards of measurement. However, BIM is intended to reflect the process of constructing an end product (building); whilst the primary function of SMM is to measure the material content of the building (deeming the physical work of construction to be included), so that modification of NRM – to suit the requirements of BIM – is not examined (Wu *et al*. 2014). This is a particular challenge, especially where design and production processes require seamless exchange of data and information (Khan, *et al*, 2016), an unlikely occurrence if ‘cost’ has different meanings to designers and contractors. Another challenge here is that information management and coordination require not only that the content of information packages be consistent in quality but also pitched at the necessary level of detail needed for each recipient rather than deeming information to be included. Betts (1990) concludes that:

‘For information systems to be more purposefully applied... requires that all data...are included and that the relationship between items... is based on...characteristics rather than...perceptions held by...users or existing in current documentation’.

The ‘perceptions held by users’ are reflected in the statement of the Quantity Surveyors Committee (1983) that ‘The bill of quantities provides the interface between the design and construction management systems’. In a sense, they are correct because surveyors of each kind are trained in the use of SMM/NRM2, so they have a common meeting ground, but it cannot constitute a workable interface if each group have different ideas of cost, or if one group believe that work can be identified and priced by describing only the results of effort and not the effort itself – that is a recipe for argument.

In simple terms, the time taken to perform a work item cannot be predicted with any accuracy by an estimator (or anybody else) unless description of the piece of work tallies precisely with the way in which the work item is produced. In summary, current ‘costing’ practices do not actually provide a good representation of work carried out. (Buchan *et al* 2003; Robson *et al*, 2016). Essentially, the only source of true cost information is the workface. This has been acknowledged to an extent by Al-Hasan *et al* (2006), but they

appear convinced that the lack of a suitable recording system for feedback is the reason for the dearth of such information, rather than that the current system of description does not cater for the collection of feedback data simply because it does not describe the physical work.

Eastman *et al* (2011), in a section headed ‘BIM for contractors’, state:

‘For accurate cost estimating the model must be sufficiently detailed to provide the material quantities needed for cost evaluation’.

In other words, they are saying it must be somewhat similar to BQ, which do not give information to enable labour cost to be evaluated accurately and hence cannot possibly evaluate cost. They go on to adjudge:

‘For 4D CAD schedule analysis a less detailed model is adequate...’

4D BIM is about the 4th dimension – time - so if BIM is considered satisfactory when it gives similar information to that of BQ (which do not give labour information), they believe it can be satisfactory in giving less detailed information than BQ for analysis of time requirements. That is a very strange concept.

What is required is more information that will allow ‘time’ to be assessed. That cannot be done unless the constituents which make for differences in time in carrying out what are ostensibly similar pieces of work under SMM/NRM2 are identified in the model. (Ferry and Holes, 1967). In turn, that means that the ‘elements’ used currently in the BIM model are drawn too broadly – there needs to be a change of level in the hierarchy of things recognised to be pieces of work.

The current system does not describe the intricacy and practicality of construction work. In that connection, Doyle and Hughes (2000) question the use of cost databases which are generally ‘based on the premise that the building’s total cost is equal to the sum of its constituent parts’. They are of the opinion that this ‘...is simply not the case when issues such as buildability and complexity feature on the list of cost determinants’. What they do not mention is that most, if not all, databases are founded on feedback, not of physical

work, but of prices obtained from Bills of Quantities for projects, where there is no way of allowing for the differences between those that have made a profit or a loss for the contractor, those which have over-run their time and those that have not, those which gave rise to substantial claims and those that did not.

In view of the deficiencies inherent in current usage, it becomes counter-productive to attempt to make BIM conform with UK methods and practices, as has been suggested (Wu *et al* 2013, 2014). That would deny BIM the opportunity to show what it can do in a system which is free of the constraints and undisclosed information of the established system.

2.5 Summary and link

Industry fragmentation, the rules and practices of management, and information management/coordination are three central tenets of this challenge.

In summary, whilst these three tenets are inextricably linked, the real issue is to understand and appreciate fully the requirement for a system of describing work which allows estimators and all other stakeholders to have complete information regarding the actual work to be performed. Hence the need to develop criteria which can produce rules to rationalise DoW and reveal process practicality and intricacy. The word ‘intricacy’ is used rather than ‘complexity’ because the latter is often regarded as being synonymous with ‘complicated’ (Wood and Gidado, 2008), and ‘complexity theory’ is an area of study that is not required to be used for this paper. It should also be made clear that this study deals with descriptions of building work which enable the builder’s costs to be established. Without accurate cost information for builders, there is no hope of producing accurate prices, i.e., clients’ costs. In that respect, it is also felt that the construction of a building should be described in the same way as the work has to be carried out if best use is to be made of the descriptions.

Chapter 3 which follows points out that there is currently no theoretical basis for describing building work, the methods used to establish such a basis, and the philosophy with which it is associated.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the way in which the study was carried out, looking at the process from inception to thesis, as follows:

- Identifying the aim, objectives and research questions
- Is the research quantitative or qualitative?
- Identifying the relevant research philosophy, approach and techniques to be used
- Examining the validity and reliability of the research techniques
- Summarising the design as a whole

Remenyi *et al.* (1998) believe it is essential for the researcher to be enthusiastic about the area of research. In this instance, the researcher has been an enthusiast on the subject for many years.

3.2 Starting point. Aim of the study

This study is of an area which is highly under-researched, and no previous studies of this kind have been found, i.e., studies which question using only descriptions of materials as the means of arriving at cost. The aim of the study is to produce criteria which cover not only additional resources such as labour and plant, but also what are considered to be other important cost-related areas: those of intricacy and practicality of the work.

The only data available for research are contained in the documents of the several editions of SMM/NRM2, together with some explanatory papers (e.g., RICS, 1966). That being so, the research is *qualitative* in nature; there are no quantitative aspects to the data or anticipated from the results. Without any previous studies in the field, it might be thought that the researcher has a blank canvas to work with, but that is not so. The documents have been in use for a century, and their use has led to assumptions about them, such as that they quantify the work, which they do not, (NRM2 clause 1.6.3) and that they provide a

source of cost information that is reliable (NRM2 clause 2.3.1), which is also incorrect, so the canvas has been defaced somewhat. The traditions, *mores*, and institutional behaviour evident in the field have made identification of a ‘relevant research philosophy’ considerably more difficult than it might otherwise have been, and their examination has been of a highly exploratory nature.

Academic students appear to be more accustomed to choosing research areas, rather than having problems thrust upon them, consequently revelling in the luxury of following a path that has been previously well trodden. The vague questions seem to belong more to the astrophysicist, or sub-atomic particle researcher. That being so, reading books about methodology is more akin to Jackson Pollock than blank canvas. The second chapter of Saunders *et al* (2019) is headed ‘Choosing a research topic...’ What joy, to be able to choose.

This study is not like that. Gray (2009) was consulted for examples of ‘research in the real world’ and appears to be saying that this sort of research project may be ‘organisational research concerned with building a theory’. Then he says that a theory is a ‘body of knowledge written by acknowledged experts’, and a search finds that the only ‘acknowledged experts’ in this field are the people who wrote the documents and their successors. *Quel dommage*. This leaves the researcher in the condition of being up the proverbial creek without a framework on which to cling. However, the researcher’s 70-year involvement with the industry, particularly in the fields of valuation of variations, claims, and arbitration, leads to the conviction that there must be an easier, fairer, more logical way of describing work, a way which responds to differing costs, and that the research must be carried out without being deterred by such obstacles. The methods used depend upon the form of the data being examined – trying to establish a method before considering the data seems to be analogous to planning the means of getting from A to B without finding out whether A and B have airports, railway lines, rivers or roads within reach. This may well be the nature of research, but it seems unnatural to one who has spent a working life solving problems by having to juggle only known facts and available resources rather than speculate in that manner.

3.3 Possible research frameworks

‘Research methodology is the procedural framework within which the research is conducted.’ (Remenyi *et al*, 1998). Research is often considered to be of two kinds; empirical, which is based upon observation and/or experiment, and theoretical which is based upon studying the writings or thoughts of others and forming a view of the subject under investigation. This work has been hampered to an extent by there having been no previous research found upon the subject, but that fact has prompted more thought to be given to changes in objective of the committees producing SMM/NRM2.

Long before the introduction of SMM, quantity surveyors were known as measurers, working directly for builders, and probably pricing the work as they went. Until the 1820s, there were no contractors and ‘builders’ tended to be single-trades companies working directly for architects. With that situation, surveyors would most likely have priced the items as they measured, so the detail of each item was in their mind and there was no requirement to describe the detail to anybody else, so only the material quantities needed to be established. That situation has been inbuilt to SMM/NRM2 despite the fact that the contact with building companies and the likelihood of authentic feedback has disappeared. The view taken in this study is that whoever or whatever is pricing building work requires all the information necessary, not just that regarding materials.

The subject under investigation in this case has three aspects. One is the solid reality of the work of constructing a building, which can be directly observed and recorded, to provide an empirical ontological study. That aspect has been satisfied by observing, photographing and commenting upon pieces of work on site. The process required that the researcher had no effect upon the way in which the work was carried out or the final result.

The second aspect is that building work is currently described in terms of a hypothetical construct postulating that work can be defined by measuring the artefact concerned and according to a set of rules. It has therefore been necessary to relate the work observations to the rules which exist, in order to see whether and how they apply. Accordingly, each of the case studies has been ‘described’ as far as possible according to NRM2. That is a

theoretical study, the description having been produced by reference to those rules, and epistemological because it deals with areas that have long been accepted in the industry as ‘knowledge’.

The third aspect is in examining the measurement rules that exist to see where and why they have changed over the years in the various editions, and whether they could be considered to be rational, fair, etc., in dealing with cost or some other criterion. It is also a theoretical study.

Because of the need to understand the meaning and application of rules and procedures developed over a long period that used to influence or control the way of thinking of a body of people engaged upon similar tasks, there is a connection with both the science of hermeneutics, which is concerned with the interpretation and explanation of written material, and with neo-institutionalism. The roots of institutionalism can be traced back to ‘writings of Max Weber on legitimacy and authority; the perspective originated in the 1950s and 1970s, subsequently underwent a cognitive turn in the 1970’s with an emphasis on taken-for-granted habits and assumptions...’ (David *et al*, 2019), then becoming known as neo-institutionalism. More recently, its focus has shifted to institutional change.

3.3.1. Research philosophy

The philosophy of this research is here looked at in relation to its epistemology, ontology and axiology, exploring the possibilities of each.

Epistemology is ‘the study...of the nature and grounds of knowledge...its limits and validity’ (Remenyi *et al* 1998), and the ‘assumptions made about knowledge’ (Saunders *et al* 2019). This study has made assumptions about the industry’s view of SMM, partly based on what other researchers have found (e.g., Shamsulhadi *et al*, 2014); partly upon *a priori* experience. The fact that SMM rules exist and have survived for a century, have made it, in all its editions, part of building industry ‘knowledge’, and those who use SMM have no reason to question its validity regarding the things that it chooses to include, or not, in those rules: i.e., it is assumed that there is nothing for the users to query about the

information being provided. That applies to both those who provide the information and the recipients; there is no deceitful intent when SMM is used.

Despite that, the results of its use can appear to contractors as if the intent were deceitful – the other party feels strongly that what has been done has been perfectly straightforward and within the rules. Both are correct. The first party is deceived, but not by intent of the other. The second party cannot see why the first has any grounds for discontent. That provides a foundation for a poor relationship, both sides trying to justify their position. The fact that SMM has been in use for a century is not a guarantee that it constitutes ‘knowledge’. It is merely the result of a group of people attempting to find a method of standardising the way in which building works were measured. They were not experts in the subject when they began, and they were only expert in the area which they decided to explore when they finished. Subsequent editions changed both the content and the qualities of the information provided. This study looks at assumptions made about SMM, and it is expected that the criteria developed will assist descriptions in defining the reality.

Ontology deals with assumptions about the nature of reality or being (Saunders *et al* 2019). In this instance it is the way in which measurement of building works affects the way that such works are described. The nature of building descriptions is that they are currently decided by the conventions of SMM/NRM2, are socially constructed and relatively chaotic in that the same rules do not necessarily apply to all items having similarities, with no reason given: i.e., they are subjective (Saunders *et al*, 2019) [1]. This study hopes for change so that the reality of building work is expressed, is not constructed by a power group, and is orderly; hence its view would be objectivist.

[1] It is noted that recent use of the word ‘ontology’ treats it as if it were to mean ‘an established arrangement of ideas’, a system, a kind of taxonomy, or synonymous with ‘vocabulary’, rather than an association with assumptions, e.g. Peroni *et al* (2012) speak of ‘a large number of ontologies [that] have...comprehensive web pages describing the features of their developed entities,’ whilst Lee *et al* (2014) conducted a case study where ‘...an ontology was established based on the type of brick, bond, thickness...etc.’. It is felt that such an idea could be applied to the work of this paper, but that to call the result an ontology would be imbuing it with a mysticism which does not sit well either with the Saunders *et al* (2019) definition or with the sheer practicality of what is being presented.

Axiology, the area of values and ethics within the research process (Saunders *et al*, 2019) denotes the extent to which it is desired to regard one's own values and beliefs as a positive thing in the research. In this research, the view taken is that the present system of describing works is unfair; not deliberately, but through a gradual change in attitude toward the use and content of descriptions supplied to contractors over the course of the century of existence of SMM. Contractors have tacitly accepted, albeit grudgingly, that all the work of construction is legalistically included in the BQ and cannot gain a contract under the rules of SMM/NRM2 unless they sign to agree the contract terms. The researcher believes it has also had the effect of taking away from quantity surveyors the impartiality with which they operated in the earlier days of SMM, replacing it with a view that their foremost duty is to the client, and that it is in the client's interest to reduce information transmission to the contractor as far as possible by deeming many items to be included which are not cost significant to clients. The view taken in this work is that clients do not fully understand that the information supplied can make a great deal of difference to the prices applied to the items. Omitting or simplifying descriptions on one hand, and not supplying information which would enable true cost of production to be established on the other, ensures that the true cost of projects is not established at an early stage, to the client's detriment.

In this study, the ethical position with regard to the people with whom the researcher has been in contact is relatively simple. Because the research is mainly centred upon documents, any interview is focussed upon the use of those documents and/or descriptions of work, so there are few problems regarding ethics. Some interviews were thought to be necessary during the early stages of the study, but Covid 19 rules altered that thinking – people tended to shy away from any contact whatsoever. The study is partly concerned with operatives' use of descriptions which are used in their everyday work, so the researcher's involvement with individuals on the subject was minimal once they consented to being interviewed or observed. The alternative would be to use a postal or internet survey, and although the material is quite suited to that method, the likelihood of a large, or any, response, particularly under Covid 19, is relatively low. The operatives were each told about the research at their site induction, that they might be asked questions, and it was explained that they were completely anonymous, that the questions would only be

about the information required for their work, that the results would not be retained, and that they could withdraw their permission at any time or refuse to answer any specific question. The site managers were initially interviewed informally, the study explained, and permission obtained from them to roam the sites to observe and photograph work in progress.

Saunders *et al*, (2019) compare and contrast five philosophies (positivism, critical realism, interpretivism, post-modernism and pragmatism) indicating that the reasoning behind research depends upon the research philosophy. They do not say whether the reverse can also apply; that the research method can define the research philosophy, but there seems to be no reason why it should not. From their perspective, this research project is in the main a mixture of critical realism and pragmatism. Saunders *et al*, (2019), contend that critical realists subscribe to epistemological relativism, a ‘mildly’ subjectivist approach, which recognises that knowledge of reality results from social conditioning/cultural experience; our knowledge of the reality of describing building work is that it is derived from the rules of SMM/NRM2, which have been used in the education of generations of surveyors and can be regarded as part of their social conditioning. The pragmatist starts with a problem and tries to find practical solutions, the process being driven by the feeling that something is wrong – which corresponds with the background to the present study.

3.4 Development of a theory

The word ‘theory’ has several meanings: an explanation or system; an exposition of abstract principles of a science or art; an unproved idea or explanation; a conjecture, etc. (Chambers, 1993). Strauss and Corbin (1998) describe it as ‘A set of ... concepts... which together constitute a framework that can ... explain or predict phenomena,’ a description which appears to mesh with this study.

Theories arise mainly from two opposing approaches, deductive and inductive. In the deductive, theory is formulated early and tested against what is found; Bryman and Bell, (2003) identify six stages of a deductive study: theory, hypothesis, data collection, hypothesis confirmed or rejected, and revision of the theory if necessary. This study is not

of that nature: the initial data is contained in the historic documents to be examined. Site operations were observed and photographed in order to record the situations. These were later compared with the data contained within the documents. The theory is built from information uncovered by the research and ‘an inductive strategy of linking data to theory is typically associated with a qualitative research approach’ (Bryman and Bell, 2003).

The lack of existing theory in the field led to the thought that the process could be similar to that of grounded theory (Glaser and Strauss, 1967), which was constructed by the theory arising from the research. They made the point that methods of social research concentrated on verifying theories, and that in doing so missed the first step of finding what concepts and hypotheses are appropriate for the research to be conducted. That struck a chord. There is no previous theory of how building descriptions ought to be formulated. SMM/NRM2 do not provide such a theory; they are the result of a group of people writing out a set of rules which they already used. This research is breaking new ground in attempting to:

- Discover what existing descriptions are intended to do.
- Look at the purposes for which those descriptions are used, in order to
 - find out what is expected of descriptions, and
 - see what needs to be added to existing descriptions to make them suitable for the uses expected of them.

Thus, the research falls squarely into the realm of grounded theory – the theory arises from the research, and as such there is no preconceived idea of what will result. There is no method to state prior to the event – it develops almost as trial and error. Additionally, there is no merit in adopting a particular line of thought or action in order to justify one’s research method; in this instance it is hoped that the end justifies the means.

Traditional grounded theory advises that ‘there is a need not to review any of the literature in the substantive area under study’ (Glaser, 1992, p.31) because of the possibility of interference with the researcher’s neutral stance. Whilst appreciating his caution, that dictum would have prevented this study being carried out in the way it has, because the literature is the subject of the study and constitutes the entire area, since there are no other

standard methods. Corbin and Strauss (1998) disagree with Glaser's viewpoint, with much referral to the literature in carrying out research using evolved grounded theory in the belief that it can 'stimulate...thinking about properties or dimensions that we can then use to examine the data...'. Their stance appears similar to the way in which work on the current project has proceeded. On the other hand, Glaser, (1992) argues that if the researcher adopts Strauss's ideas on coding, the emerging grounded theory is thereby 'preconceived and derailed'. Glaser's thinking is that the analyst cannot follow that line – 'he (she) must code for whatever category emerges on whatever unit in the data.' That is what also has happened in this research; the codes are not of a kind and cannot be used to compare items in terms of their frequency or relative importance. It can be seen that the attitude adopted in this study is neither completely Glazerian nor Straussian but has adapted parts of each one's thinking.

Another phenomenon appertaining to grounded theory is that of 'saturation' of the codes, which appears to be an inappropriate expression, since neither the codes nor the items to which they are applied are 'saturated' in the sense that as many coding as possible have been utilised. In use, the expression copes with circumstances where no more codes are distinguished by the researcher, so it is thought that a more appropriate word to suit that condition could be 'satiated', the state of having satisfied the requirements of a situation to the full. Corbin and Strauss (2008) make the point that although saturation is usually thought of as 'when no new data are emerging', it also refers to the development of categories. In the current instance, the categories are the codes, and it was found quite early on that no new codes were required. Here the theory is developed through inductive reasoning.

To summarise the above, this study is necessarily qualitative because the main thrust of the work is in looking at documents to understand their purpose and the results of their use in conveying information to contractors, initially for tendering but later being used by clients to calculate payment. The research is empirical where it concerns observing and analysing physical work, having an objectivist stance, and theoretical when it deals with the meanings and effects of different clauses in the documents. It is phenomenological in dealing with the hypothetical constructs that constitute SMM/NRM2.

That different methods are used makes it a mixed methods study. Because the documents examined spanned nearly a century, it is considered to be longitudinal; although the time taken to carry out the study was relatively short, in no way could it be considered to be a snapshot, but on the other hand the site observations can be regarded as cross-sectional.

3.5 Designing the research

3.5.1. The problem

Remenyi *et al*, (1998) consider that the starting point of research is in establishing a novel research problem. Gill and Johnson (2002) believe there are two main ways of establishing a research topic, (a) by analysing the literature; (b) by using a more open-ended approach such as action research or qualitative approaches. Those authors, among many, are tending to think of research as the basis for finding problems to solve, i.e., an intention to carry out research exists before a problem is defined, as with a group of students who each require a topic to research.

In the world outside academia, it is more usual for problems to present themselves, which then become the basis for research of one kind or another. This study is of such a problem; long standing and accepted as the norm. It is no less of a problem through being unseen or disregarded, in fact that is one of the difficulties of the study – to demonstrate that there is a problem.

The problem in hand is that despite SMM/NRM2's consistent statements in its various editions (a) that they are intended to be used as a tool for tendering (no other purpose is stated), and (b) that they do not describe labour, plant or wastage, the users of the documents have a belief that they should do so. They do not express it in that way however, possibly because, collectively, they have been using the method for a century without making any strong moves against it (and also possibly because they have never quite understood it). The problem is exacerbated by the RICS, as principal producers of the rules, not presenting an argument against the misuse, possibly because it is not in their interest to do so.

3.5.2. Aim and objectives

The aim

The aim is to establish criteria for descriptions of building work for the transmission and understanding of information, cognisant of the needs of all stakeholders. The ‘needs of stakeholders’ infers that the criteria will be practical and can deal with the intricacy of the work.

The study is necessary because there is no comprehensive system of describing work obtaining in the UK which deals with its intricacy. What does exist is a method of measurement used as an exemplar in many parts of the world, which has led to the development of standard methods of measurement, giving rise to a variety of descriptions, but no systematic way of describing completely the way in which building work has to be carried out, or identifying any different levels of intricacy and difficulty which may occur. Without such a system the problems of having no general method of cost feedback, because of the differences between the existing system and one which takes all recognised cost factors into consideration, will continue.

The fact that there is no standard system of description has not prevented contractors, governments, and others from using the method of measurement as if it were a method of description for use in planning, programming, valuations, final accounts, etc. Because the method of measurement has been used in that way and for a considerable time, there is little or no incentive to develop a different method. As far as this study has been able to ascertain, there has never been any previous attempt to check whether SMM/NRM2 is capable of coping with the processes asked of it, despite some of the questions to be asked having been answered by the documents themselves, e.g. ‘Does it describe the labour of construction?’. The answer is virtually the same in the first edition (Preliminaries 1, ‘The description given ... shall be held to include...all labour...’), as in NRM2 (3.3.3.13 ‘...each building component shall be deemed to include...labour and all costs in connection...’). The phrases ‘held to include’ and ‘deemed to include’ are synonymous, and the RICS have defined that the contractor has to ‘include’ (the cost of) such items without stating how that is to be achieved. It instructs that some other items which have a

decided effect upon cost – plant and wastage among them – are also deemed to be included. Indeed, the RICS have defined that ‘deemed’ means that such items need not be mentioned in the descriptions in BQ which arise from the use of SMM/NRM2. The documents do not give any direct answer to the question, but it is clearly and decidedly ‘No’. That is not satisfactory and needs to be addressed by the production of necessary criteria which will include labour, plant and wastage along with other important issues.

Objectives of the study

The objectives of the study are:

1. Examining the rules for producing descriptions, which are all contained in the several editions of SMM/NRM2 and some explanatory documents, to see what is described, what is superfluous, and what is not described but is necessary.
2. Coding the results of each clause so that necessary information categories can be included in descriptions and that following clauses and following documents may all be examined and categorized in the same way.
3. Using the case study method on site, to observe, identify and record work at approximately the same level of detail as contained in the rules of description so that they may be identified in the extant rules to check that the rules are capable of describing work on site whether or not there is a bill of quantities.
4. Validating the results of the case studies by identifying the applicable clauses, sub-clauses and notes in the current edition of SMM/NRM2 in order to check that all the work observed could be identified under the extant rules.
5. Developing the criteria by amplifying and elucidating descriptions initiated by the codes in order to be able to describe any building work in a full, precise and uniform manner.

The research questions which require to be answered:

1. What do users anticipate from descriptions of building work?

This is relating to objectives (a) and (c). The question has been asked prior to this study. Shamsulhadi *et al*, (2014) produced a summary of the efforts of 22 technical authors in establishing what BQ did not do, which will be addressed later. The areas of contractors' work, listed as stages and activities, are provided in Table 3.1.

Table 3.1: Stages and activities (source: Shamsulhadi et al, 2014).

STAGE	DEPARTMENT	ACTIVITY
Tender	Estimating	Materials enquiries to suppliers
		Quotations from sub-contractors
		Synthesis of rates for builders' work
	Planning	Identifying tasks/activities
		Planning construction method
		Programming tasks
		Drafting method statement
Pre-contract	Purchasing	Identify materials requirements
		Prepare schedules of materials
		Recruit labour
	Planning	Prepare detailed work programme
	Site management	Planning allocation of materials
		Planning allocation of plant
		Planning allocation of labour
Construction	Purchasing	Place materials orders
		Purchase/hire plant
		Place sub-contracts
		Schedule sub-contractors' work
	Planning	Off-site component manufacture

		Site component manufacture
	Site management	Record materials usage
		Record plant usage
		Record labour usage
	Surveying/finance	Interim valuations
		Variation orders
		Sub-contractors' valuations
		Payments to sub-contractors
		Cost/value comparisons
Post-contract	Surveying/finance	Final valuation
		Final account

It can be assumed from this wide-ranging list that most uses anticipated by the users have been covered. It is clear that information is required for contractors to be able to deal with all the activities listed. Although not stated in detail, this study ensures through the criteria that those requirements of the users are considered.

2. Do current descriptions completely satisfy the requirements of the users?

This question is closely connected with the previous – if users anticipate that descriptions should satisfy their requirements, there is a need to discover not only what those requirements are, but in what way and to what degree those needs are not satisfied. A different method of description, taking more factors than materials into account, has to consider the requirements of the users. It is clear that current descriptions cannot satisfy all requirements of all users, because they are based upon satisfying only the requirements of the client.

3. If current descriptions do not completely satisfy the requirements, how should they be constructed in order to rectify the situation?

This question is connected with objectives (c) and (d). The criteria for the content of descriptions have been established in this study, (see chapter 6, section 10) but work of development will be necessary to be able to establish an order and format for the satisfaction of those criteria in a logical and easily comprehensible way, and to allow for subsequent changes and development. The structured nature of the information is very important.

4. What is the rôle of RICS and why is SMM/NRM2 unsuitable for describing work

This is also connected to objectives (c) and (d). The rôle assumed by the RICS is not that which users other than the client require, one of the aspects of the production of information which needs to be altered. SMM/NRM2 is unsuitable for describing ‘work’ because it says so. It has always described ‘works’ – the artefacts produced by work rather than the physical labour of production. Every edition of SMM/NRM2 has stated that labour, plant, wastage and other items are ‘deemed to be included’ or similar wording, i.e., that the contractor will be expected to have included these cost items in the rates without them having been specifically mentioned in the descriptions of ‘works’.

5. What are the intricacies in building work and how can they be included in descriptions?

This is associated with objectives (c) and (d) also. The intricacies in building work take many forms, and these are discussed later in the study.

6. How do current standards fail to describe intricacy?

Again, this is associated with objectives (c) and (d). It is not only current standards which fail to describe intricacy – it has always been so throughout the history of SMM, and comes about because there is no attempt to define work – there are only totals of units of measurement of materials.

3.6 Methods

3.6.1 Data collection methods

Documentary and archival research

Early on in the study, it was thought of as being ‘archival research’, defined by N., Pam M.S., (2013) thus: ‘Archival research refers to using extant data sets for the purpose of making inferences’, but York University (2006), state that ‘Archives contain records, not books.’ They point out that the difference between archives and libraries is that archives contain unpublished material; libraries do not. Because all the documents used in this project are published and widely used, the research must be seen in consequence as ‘documentary’ rather than archival. If minutes of the SMM committees had been available, they would have constituted an archival source.

However, documentary research is often considered synonymous with archival research (AERA, 2020) in that it frequently deals with issues regarding the role and use of documents, which is precisely the concern of the current research. Scott (1990) gives a general definition of a document as ‘an artefact which has as its central feature an inscribed text,’ later adding to that, ‘they may be regarded as physically embodied texts, where the containment of the text is the primary purpose of the physical medium.’ He found it necessary to add the latter because of the wide range of media that now may be used in creating a document – from stone tablet to e-mail. Bailey (1987) points out that ‘documentary research method refers to the analysis of documents that contain information about the phenomenon we wish to study.’ Ahmed (2010) avers that ‘this research method is just as good as and sometimes even more cost effective than the social survey, in-depth interview or participant observation.’ Bowen (2009) states ‘document analysis requires that data be examined and interpreted in order to elicit meaning, gain understanding and develop empirical knowledge.’

For documentary research, there are two foci that are interdependent – documents may be used as resources, or as a topic for the research (Scott, 1990). In the first instance, the

usefulness of the documents is queried with regard to their success in handling the subject matter under consideration; in the second, they are the subject of an investigation aiming to demonstrate that they do not carry out the job they originally intended. In this research, both avenues are explored – the stated objective of the documents is examined, and their uses studied on the one hand, whilst the meanings, implications and effects of their use are subject to close scrutiny on the other.

The quality criteria in research from documentary sources (Scott, 1990) are the same as for any other research: authenticity, credibility, representativeness and meaning.

‘Authenticity’, according to the New Oxford Illustrated Dictionary (1978), is the state of being ‘reliable, trustworthy, of undisputed origin’; whether or not the data is genuine and from a reputable source. The source in this case is the RICS, whose reputation in their publications is impeccable. Copies of the documents have been compulsory reading for many generations of building students, making it difficult for any different version to be published. SMM/NRM2 is a set of rules which although being changed in some way at each edition, can be relied upon to present those rules with similar emphasis and consistency, being thereby trustworthy in the manner of its approach to the subject, particularly as the originators of the document are the sole arbiters of what procedures, presentation and content is acceptable of descriptions. Their origin is in no doubt, since development is quite well described in the preface to each edition, showing the constituent members of each committee. Those members have all been nominated as representatives by the various institutions and organisations with which they are concerned, signifying the regard in which they are held by their peers.

‘Credibility’, from the same source is a noun which concerns believing or being worthy of belief. Is the data typical of its kind? Does the document or the data represent the totality? The documents have been in constant use for a century, so there is little doubt that users of the documents have a belief in them, using them for a variety of purposes including a quasi-legal role in arbitrations and other disputes, so their credentials are beyond question. That does not mean that every word contained therein is necessarily true, factual, or incommutable. Examination of successive editions implies that the meaning ascribed to the word ‘works’ has changed over time, from the original meaning

of ‘a product’ to the current meaning (if any thought at all is given to the meaning by the users) of ‘the plural of work’, i.e., many pieces of work.

‘Representativeness’, again from the same reference, is a noun describing the condition of being representative, i.e., being a sample representing a group, body, collection, etc. The definition has two aspects; first that the documents may be representative of a larger group, i.e., that they are a sample of ‘Standard Methods of Measurement’; or secondly that the documents represent the views of their inaugurators. In the first instance, the SMM of 1922 was unique in the world; later editions have followed its general line of thinking, and many other countries have used various editions as an exemplar for their own Standard Methods, which makes it representative in the sense that it led, and still leads, a movement toward its way of thinking. The second aspect is that it represents the acquired views of the several committees, which strove to keep pace with changes of technique, materials and plant in the industry by means of revised editions. Either or both viewpoints confirm that SMM/NRM2 are representative. However, ‘representative’ should not be thought to be synonymous with ‘correct’ or ‘equitable’. As committees changed over the years, the emphasis also changed considerably; it is known from the preface to the first edition that there was initially an intention to improve the information supplied to estimators, which has metamorphosed over the years into a concentration upon the client’s supposed needs. The word ‘supposed’ is used deliberately – it is felt that client bodies are not aware of the cost to them of constructors having to seek out information at urgent stages of need, which could possibly lead to delays, when much of that information has been previously extracted by their own consultants in producing BQ, schedules of work, etc., and then discarded because their imposed system has no further use for it.

The last of Scott’s (1990) four criteria is ‘meaning’. Is the data clear and understandable? He writes that ‘The ultimate purpose of examining documents...is to understand...the meaning and significance of what they contain.’ More significantly, he adds that ‘it is necessary to decipher the script and translate the language...’ into current forms. It is their meaning that is the subject of the research, and although some of the words used are technical and not necessarily clear to the layman, the words used keep, in the main, their ‘everyday’ meaning. It is believed that the word ‘works’ has changed its normal meaning

over time, but it is the entirety of meaning of complete sentences and their effect upon users that is open to question. Throughout this study, the meaning of each of the many clauses has been examined and questioned when it has been thought necessary (this being a qualitative study, the researcher’s viewpoint is not only required, but essential).

It should be noted that the comments above apply to the research data: similar criteria have to be applied to the research itself, and this can be found in section 3.6.2.4. ‘Validity and reliability.’

3.6.1.1 Examination of SMM editions

One part of the research was to carry out a thorough examination of the relevant parts of the documents. This was required in order to discover what is described, how it is described and what ought to be described. Necessarily, the areas examined have had to be restricted so that the research is not overburdened. The areas chosen are excavation, concreting and masonry, because together they take up a large portion of construction time, start at a relatively early stage when not all problems have been discovered or smoothed out, and often continue when later trades are also working on site; apply to most contracts, and are perhaps among the most widely familiar and recognisable in the industry. The documents examined are shown in Table 3.2.

Table 3.2: Documents examined.

Document	Publisher		Agreed with	Pp.
	Pub’d			
SMM1	1922	SI & NFBTE	QSA & IOB	73
SMM2	1927	SI & NFBTE	QSA & IOB	74
SMM3	1935	CSI & NFBTE	IOB	100*
SMM4	1948	RICS & NFBTE		76
Comparison between SMM4 & 5	1962	RICS & NFBTE		67
SMM5	1963	RICS & NFBTE		109
SMM5 (metric)	1968	RICS & NFBTE		110

Notes on SMM5 (m)	1968	RICS & NFBTE	8
Comments & clarifications, SMM5(m)	1972	RICS & NFBTE	29
SMM6	1979	RICS & NFBTE	128
SMM6 Brief introductory guide	1978	RICS & NFBTE	8
SMM7	1988	RICS & BEC	190
NRM2	2013	RICS	298 **

Notes to Table 3.2

1. Abbreviations: BEC = Building Employers Confederation

CSI = Chartered Surveyors Institution

IOB = Institute of Builders

NFBTE = National Federation of Building Trades Employers

NRM2 = New Rules of Measurement 2

Pb'd = Published

Pp. = pages

QSA = Quantity Surveyors Association

RICS = Royal Institution of Chartered Surveyors

SI = Surveyors Institution

SMM = Standard Method of Measurement of Building Works

2. Symbols: * = includes 19 pages of questions and answers.

** = previous editions have included small works, repairs and maintenance etc. This 'suite of documents' has a separate volume (NRM3) of 576 pages (paperback) for maintenance works only.

3. Subsidiary: Only the main working documents have been examined and commented upon in detail. The subsidiary items of comments, notes, comparison and guide were examined, but it was found

that the comments made were similar to those made of the main documents, so there was nothing to be gained by repetition.

Examination of the documents consists of reading and comprehending what is written, so a technical background is required of the researcher. Also necessary is a constant awareness of what the operatives carrying out the work involved in each item would need to know, thus putting the researcher in much the same position as an estimator pricing the item.

The only data available for examination were the several editions of SMM/NRM2, plus some explanatory documents, e.g., RICS (1966) 'Comments and clarifications on SMM5.' It should be noted that there is no quantitative content to those documents, (though they have a quantitative purpose), so the study is entirely qualitative. Word counts cannot look at meaning, and meaning is often highly subjective, so the researcher must be able to justify the meaning ascribed to any of the items examined.

Because the documents were prepared by others, for purposes different to those of this study, they are regarded as being secondary data.

3.6.1.2 Case study design - site observations

The second moiety of the study consisted of a number of case studies on two sites. The sites are not the subject of the case studies; the pieces of work are. Yin (2003) suggests that the case study strategy seeks to answer questions of 'how?' or 'why?'; in this instance the cases looked at how work on site was carried out, seeking also to discover how the same work could be described by NRM2, which would lead to establishing what was not described by NRM2. The answer to why it was not described could then be better understood.

The research sets out to find the criteria for descriptions of building work which take account of the intricacy and practicality existing for different kinds of work. As far as can be ascertained, no previous research has been carried out in this field, so that no

‘established methods’ of carrying out such work come readily to hand as examples. There is no standard method of description of building work.

It had been hoped that scrutiny of bills of quantities for work on sites obtained for observation would be available, but enquiries sent to contractors by e-mail over a period of several weeks failed to produce any sites. It is thought that the reluctance to become involved stemmed mainly from the Covid 19 outbreak.

Because of the lack of response to the e-mails, driving around the city to find sites became the next method of approach, in which, when a site which seemed suitable, (i.e., was in its early stages and so was likely to yield the desired areas of groundwork, concreting and masonry) was discovered, the site manager was contacted by entering the site and asking where the office was. This was always treated very politely by the managers, but despite carrying out the exercise on five or six sites, none were forthcoming, even with a follow-up call to each. Travelling one morning to carry out the same routine, a site was spotted with early work under way, and there was a parking space nearby, so the first indications were positive. The site manager was friendly and helpful, and, after having had the study described to him, telephoned his head office to see whether there was any objection. The only possible problem was the age of the researcher, but he was able to reassure them that an apparently fit and able enough person stood before him. It was arranged that observations could begin on the following Monday morning; there would be a form to sign, and appropriate protective clothing was necessary, which was obtained the same day. At 7.30 on Monday 27th July 2020, the first site was entered for observation. The site manager explained that there were no BQs, and that the flats were ‘affordable housing’, built for a local association.

An informal interview with the site manager revealed that the contractor was working on a ‘design and build’ basis, the construction was mainly prefabricated timber framed, with a brick outer skin, the ground floor of the smaller block of two was steel framed, the labour was mostly sub-let, and they had detailed drawings of the construction on A4 sheets which could be seen by any of the operatives. If there were any queries, the site manager dealt with them, having dealt with similar construction previously.

Before any observations were begun on either site, the site managers were asked if the observer could photograph, take notes and ask questions of operatives, permission for which was immediately given.

Observation of the work processes was carried out in the belief that whilst BQ or similar documents may be useful for tendering, they do not affect the work that has to be done. This is one of the main tenets of this study – that SMM does not describe or measure work; it only describes the result of work, and in addition, SMM/NRM2 should be able to cope with the measurement of the works being carried out on any site as they have appeared to have done for a century. Although not concerned with the measurements, it should be possible for an observer to associate what is seen with the clauses of (in this instance) NRM2. The site manager was asked for permission to observe the work and take photographs as a record, and had no objection; in fact, he sent further photos by e-mail after visits to the site had ended. A further site visit was obtained later – that was an estate of houses built for sale, and it also, had no BQ, so the same general conditions applied. It was obtained by reason of its contractor being an associate company of the previous. The construction of the external walls was prefabricated timber panels and a brick outer skin, as in the previous site; the roof of prefabricated timber trusses with a traditional tiled covering. The work being carried out during the time that the observer spent there was mainly groundwork, particularly piling (which had not been possible to observe on the previous site) and diverting an underground stream, together with the construction of site roads. Work for the observer on that site was terminated after a relatively short time due to the insistence of one director that, because of age considerations, one of the site staff should act as escort during visits. This was tedious for the staff in question, but also made it untenable to hold any conversation whatever with the operatives in view of the need for confidentiality and anonymity.

The observation and photographing of items of work being carried out and describing them was no different on these sites than it would have been on sites which had BQ. These two areas are considered to be primary data, because they are the observer's record of what happened at the time.

Some assumptions had to be made before carrying out examinations and observations. The main ones were that the contractor was representative of the population, the workforce represents the norm, the material and plant deliveries were normal, the site had no different problems than might be considered normal for its circumstances, etc. Then along came Covid 19 so that nothing was normal. That situation had to be accepted – quantitative aspects such as labour and material delivery reliability, repairs to plant, productivity, progress, and so on would no doubt have been badly affected, but it is difficult to imagine that the information required to carry out the work would have been influenced in any major way.

The sites and selected case studies are outlined in table 3.3 below. These have been selected from some 260 photographs encompassing perhaps 40 or so separate case studies, each of which could be used for further study if thought necessary.

Table 3.3: Site and case study details.

<i>SITE A DESCRIPTION</i>		
<p>Site A. An inner-city site at a road junction, with tenement blocks, shops and two schools nearby, providing 48 flats on 4/5 floors (2 blocks) with some shop and office space. The site was previously a van hire depot with repair facilities, so the ground is contaminated to an extent. Old mine workings make piling and gas proofing necessary. Space on site for materials storage and movement is limited; access for large plant (mobile cranes, concrete pumps etc) difficult because roads are relatively narrow, and parking allowed on both sides. External walls: Block A, prefabricated timber frame with facing brick outer skin. Internal walls to common parts: concrete block. Common stairs and landings: precast concrete. Roof: timber prefab mono-pitch trusses, covered with plastic membrane. Block B, ground floor has steel frame clad with concrete block and facing brick cavity walls, upper floors, and roof as Block A.</p>		
NRM2 section	Case study work observed	Collection of data
NRM2. Excavating and filling	Case E1. Bed of sand to receive methane barrier.	Observation and photos E.1 to 4. Check on Drwg. A
	Case E2. Methane barrier laying.	Observation and photos E2.1 to 6.

NRM2	Case C.1. Reinforcement cage for ground beams.	Observation and photos C.1. to 6.
NRM2	Case C.2. Shuttering to ground beams.	Observation and photo C.2.1.
NRM2	Case C.3. Holding down bolts for steelwork.	Observation and photos C.3.1 to 11.
NRM2	Case C.4. Shuttering to edge of ground floor concrete slab.	Observation and photos C.4.1 to 4.
NRM2	Case M.1 Blockwork in internal walls.	Observation and photos M.1.1 to 7.
NRM2	Case M.2. Brick outer skin of cavity wall (1), showing also access and working space.	Observation and photos M.2.1 and 2.
NRM2	Case M3. Brick outer skin of cavity wall (1), showing many break points in one small area.	Observation and photo M.3.1.
NRM2	Case M4. Brick outer skin of cavity wall (2), similar to case M3, but showing more horizontal break points in addition to vertical.	Observation and photo M4. 1.
<p><i>SITE B DESCRIPTION</i></p> <p>Site B. A site on city fringe, adjacent to a country park. Virgin ground, easy to access, 100 m from major dual carriageway, shopping centre ¼ mile away. Development of 49 detached and semi-detached houses, 3 and 4 beds, for sale.</p> <p>External walls, prefabricated timber panels with facing brick outer skin, internal walls of prefab panels and concrete blocks, trussed timber roof covered with tiles.</p>		
NRM2 section	Case study work observed	Collection of data
NRM2 piling	Case E3 precast concrete driven piles to receive ground beams, showing access, moving plant to position, working space.	Observations and photos.

NRM	Case E4 forming a major culvert to divert underground stream, showing access, moving plant to position, difficulties of setting out, etc.	Observations and photos.
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Each operative on each site was introduced to the observer, mainly at site induction meetings. This gave the opportunity to explain the project to them, to let them know that there might be a need to ask some questions about the work they were doing; that they need not reply unless they wished, and could stop at any time; that all their responses were confidential and anonymous, and that any information obtained from them would be destroyed after it had been analysed. They were also invited to ask questions of the observer.

3.6.2. Data analysis methods

3.6.2.1. Reading SMM/NRM2

Several subject areas are available for examination of the documents:

- a. Reading SMM/NRM2 documents to understand what each clause means.
- b. Obtaining general headings from that examination (coding).
- c. Visualising the physical work involved in each item, commenting upon what information is provided and what is necessary.
- d. Visualising the product that is being described in each item (the piece of work) to establish how it might be better described in order to include all facets.
- e. Examining the measures, to see if there are any relevant questions to be asked.

Examination of early editions of SMM has shown what was described; examination of later editions shows how what was described has changed, and in what way. This can be regarded as ‘content analysis’.

That early reading of SMM1 showed that it was necessary to use codes to indicate the various aspects of items – what would be essential to use in a description, what should not be included and so on. In order to simplify the content, intention, or even what was missing from the items, in a general way, 32 codes were applied as examination of the document proceeded. These are listed and explained in Table 3.4. below. The same codes were used for later editions of SMM/NRM2, except that as further versions were examined, it was found that three additional codes were required, and they have been added to the list, totalling 35.

Table 3.4: List of codings

Code	Meaning	Explanation
Acc	Access	Refers to situations where plant access is required, i.e. by use of plant -ladders, hop-ups, abseils, bandstands, etc., or where there could be difficulties such as low bridges on high vehicle routes, hump-backed bridges on low-loader routes, and turning circles for long vehicles. Where access is open, nothing need be stated.
Ad	Adverse conditions	Not only weather conditions, but work in compressed air, underwater, confined spaces, etc.
Add	Additional operation	Where an additional item is necessary but has not been mentioned in the description given. This was later replaced with O to avoid confusion with ‘Ad’.
Alt	Alternative	This is more a comment on the structure of SMM than a proper coding. It has been used when SMM gives an alternative method of measurement. It appears incongruous that a standard method of measurement should have an alternative method of measurement for some items.

C	Convenience for measurement	These items are not 'pieces of work' but are constructs or techniques to enable q.s. work to be simplified, e.g., 'E.O.', or measuring on centre lines.
Cl	Clarity needed	Where description is unclear, e.g., SMM4, Bricklayer 18(b), concerns oversailing or receding courses, measured in feet run, but says nothing about the thickness of the wall. This is necessary in order to know whether bricks are to be cut and how many. There could be a cost difference for different thicknesses. Whether the back face of the wall is fair also needs to be known.
CU	Classification unnecessary	Most classifications are unnecessary, e.g. SMM5 Concretor, 1.f. classifies reinforced concrete members as (i) n.e. 36 ins. sect. area; (ii) ex. 36 n.e. 72; (iii) ex. 72 n.e. 144; and (iv) over 144. These are shown in the BQ or schedule in yds cu., but the site manager needs to know how much concrete is in each column for ordering purposes avoiding wastage.
Cut	Cutting required	Every cut in a material indicates a break in the continuity of the work, however short.
D	Dimensions	Dimensions of materials and plant are nearly always required, including those of packaging, e.g., pallets of bricks.
DW	Different Workpiece	SMM often has pieces of work included in an item who cannot be done at the same time, e.g., SMM1, Bricklayer clause 50; 'Fair face of brickwork shall be measured on all exposed faces, the pointing described...' The pointing is a separate item from brickwork because the bricklayer has to wait until

		the mortar has taken its first set before attempting to point.
Enu	Enumerate	Ferry and Holes (1963) made the point that 'Measurement which is to give complete information about building work (section B, 8.3) must identify every piece of work and would therefore consist of numbered items only (Section B, 9.1).
EO	Extra over	Extra over' is not an item of work, it is a measuring tool which enables them to use the quantities of one piece of work for another, without having fully to describe the other.
Extg	Existing work	The existing work needs often to be described, firstly for parts of existing buildings being worked upon e.g., in rendering and pebble-dashing (harling) existing buildings; secondly in working upon newly constructed parts of a building, e.g. A mortice in concrete could later have had poured into it to hold metalwork. They have to be independent operations.
F	Face treatment	This is not intended to deal with applied coatings, such as paint, plaster, creosote etc. But with such items as wire broom finish to concrete, scabbling, brushing surfaces to expose aggregate, etc.
IW	Incremental working	Closing cavities vertically at reveals is of his nature. A bricklayer placing a brick at a reveal is constructing a cavity, but it is also the first brick of a course which may have a further 30, 40, or 50 bricks to lay before he/she returns to the first reveal. Closing the cavity is incremental and should be part of a course of bricks. The course should be

		enumerated rather than measuring the reveal vertically.
Loc	Location	The location of a piece of work on a site is necessary in every case.
Ls	Angles, mitres etc.	Angles, mitres and similar work should not be deemed to be included with the main item because the relationship is so variable. They should be treated as starting or stopping points for a piece of work.
M	Method	One of the unwritten rules of SMM is that a q.s. should not dictate the choice of method to contractor. There are items in several editions which breach this, e.g., SMM4 Excavator 9(a) reads: 'Excavation to form cuttings shall be given separately and the mode of its execution described'. 'Mode' is synonymous with method.
MsA	Measure around	SMM deducts openings, but they are not built in that way; they are built around. If the system is to represent the way in which buildings are built, openings must be measured around so that true costs may be established.
N	Measurement always net	In sheet piling, SMM3, Concretor 47(a) 'all laps shall be added to the superficial measurement', but in Joiner 2(a) 'Floors shall be measured the dimensions after laying' – i.e., no allowance for tongues. This outlines a different approach for different trades.
O	Operation additional	This is much like 'include(d)' above, and perhaps should be amalgamated with that code.

Pat	Laid (fixed, placed) to a pattern	Many materials, from paving slabs to wallpaper, have to be laid to a pattern, whether regular or random. This ensures that the cost is considered.
PP	Plant positioned	The position of plant is the key to successful working; some items such as tower cranes and batching plant can be in the same position for the whole of their work; others need to move from point to point as an essential part of constructing a workpiece, e.g., piling rigs, excavators digging trenches, pipe or cable-laying machines.
R	Rake or slope	The angle of rake or slope always needs to be stated, with reference to whether the angle is with the vertical or the horizontal.
Rad	Radius	Similar to the last, radii must always be stated; there is no place for 'quick and slow sweeps'.
Sep	Separate(d)	<p>The first word, 'separate' means that more than one item is included where they should be separate, e.g., SMM5, E8 (c) states 'withdrawing piling shall be given in the description of driving'. Whilst it may be convenient for measuring, it does not happen like that. The two operations may be months apart, and this research is concerned with practicality.</p> <p>'Separated' means the opposite; operations have been separated which have to be carried out together, e.g., SMM5, F8(a) states that concrete in walls 'shall be measured between attached piers'. It is highly improbable that concreting to an attached pier will be carried out at a different time to that of the main wall. Some other 'break point' will need to</p>

		be looked for in order to establish the extent of the item, e.g., day joint, expansion joint.
Sh	Shape	For many pieces of work, the shape needs to be stated, e.g., it is not known currently whether the cost of concreting a triangular slab is the same as the cost of a similar quantity in a rectangular slab.
SL	Starting level	It is possible that the cost of an item of work is affected by its height above ground or other significant level.
T	Temporary item.	Temporary work cannot be treated differently to any other work. It usually also has to be removed some time after the permanent work with which it is associated has been completed so it often has two separate stages which need to be programmed.
Tpt	Transport	Material and personnel need to be moved around the site, generating a cost.
U	Unfair, inequitable	SMM6, D15 orders 'Earthwork support shall not be measured to the face of any additional excavation resulting from the measurement of working space.' Working space appears to be regarded as a handout, and the committee do not see why they should 'give' the contractor any more in supporting the earthwork around the working space. As in some other areas of this study, it is felt that judgement upon such a subject does not come within the q.s. field of expertise, and hence might be regarded as inequitable.

W	Working space	Working space is a requirement for every operation involved in a building; anything less means working in a confined space, a field for claims.
Wp	Workpiece	Workpieces and their definition are among the problems to be solved in incorporating the description criteria into a new system, because of their heterogeneity, leading to the thought that Boolean algebra might be involved in a solution, and that the co-operation of a programming specialist should be sought for that purpose.
Wt	Weight	The weight of materials is a major item to be considered in descriptions of work, with a need to distinguish between handling bulk packages of common materials, e.g., pallets of bricks, or individual pieces of the same material.

Since some readers may be seeking to discover the frequency of the codings, these have been shown in table 3.5. below.

Table 3.5: Frequencies of codes for SMM editions.

Code		SMM Edition						
		1	2	3	4	5	5M	6
1	Acc	215	215	226	210	244	244	276
2	Ad	9	9	8	10	12	12	9
3	Alt	5	5	5	6	6	6	6
4	C	5	5	5	3	5	5	-
5	Cl	2	2	1	1	1	1	-
6	Cu	-	-	-	15	71	71	53
7	Cut	65	65	70	63	79	79	75

8	D	221	221	233	220	300	300	352
9	DW	7	7	13	16	34	34	13
10	Enu	107	107	219	213	286	286	361
11	EO	4	4	3	5	16	16	25
12	Inc	13	13	11	15	17	17	29
13	IW	16	16	16	19	14	14	28
14	Loc	107	107	221	209	272	272	345
15	Ls	45	45	42	40	30	30	7
16	MsA	1	1	1	5	5	5	3
17	N	2	2	1	2	2	2	12
18	O	22	22	24	32	27	27	29
19	Pat	10	10	11	7	6	6	35
20	PP	1	1	1	-	-	-	-
21	Rad	-	-	1	11	16	16	20
22	R	20	20	23	21	55	55	34
23	Sep	-	-	-	8	10	10	-
24	SL	194	194	198	206	255	255	285
25	Sh	52	52	49	53	54	54	26
26	T	167	167	175	120	165	165	188
27	Tpt	52	52	55	92	121	121	25
28	U	4	4	1	2	3	3	1
29	W	205	205	222	208	261	261	342
30	Wp	212	212	225	220	274	274	343
31	Wt	10	10	9	13	17	17	5

Totals	<u>1773</u>	<u>1773</u>	<u>2069</u>	<u>2045</u>	<u>2658</u>	<u>2658</u>	<u>2927</u>
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It cannot be stressed too strongly that no one coding is more important than another. There is no point in ranking their frequency because they are all equal in that respect. They are not parts of a whole, they are separate ‘ideas’. It is as if they came from a child’s pocket: two marbles, three toffees, one handkerchief, one small frog, a mouth organ, and so on. There appears to be little or no connection between any of them, so there is no ranking that can be done on inspection, (although the child may recognise connections, e.g., five marbles swapped for the frog).

Because of this, it has been decided to list the codes in their alphabetical order, and to place the various editions side by side in a table. The meaning of each code has been shown elsewhere, so only the codes are listed. It is possible that the only aspect that will be demonstrated by this method is the researcher’s uniformity, or lack of same. It is also possible that another researcher can see connections.

It must be noted that because the SMM sections examined (Earthwork, Concreting and Masonry) are exactly the same for SMM2 as SMM1 (differences being in Slater and Tiler section), the figures for SMM2 are duplicates of SMM1. A similar situation arises with SMM5 and SMM5(metric). The clauses examined have precisely the same content, so that the codings should be the same.

3.6.2.2. Content analysis

Content analysis, according to Harwood and Garry (2003), was first used in the late 19th century for analysing hymns, articles in newspapers, speeches and the like, and so has a long history. It is known as a method of analysing documents, allowing the researcher to test theoretical issues to enhance understanding of the data (Elo and Kyngäs, 2007), drawing inferences from the statements made therein.

Three different types of content analysis are recognised: conventional, directed and summative (Crossman, 2020). With the conventional method, categories of coding are derived from the text under examination; in the directed method, coding starts from a theory or previous research results; for the summative, keywords or concepts are counted

and compared prior to interpretation. This study is of the conventional kind. ‘During conventional analysis, researchers avoid using fixed categories. (Instead)...they let the categories as well as their designated labels flow from the literature. In addition, researchers usually engage themselves in the data in order to allow new observations to develop.’ (Profiletree, accessed 03/05/20.) Hsieh and Shannon (2005) aver that this type of study design ‘is usually appropriate when existing theory or research literature on a phenomenon is limited’, as is certainly the case with this study. ‘None of the forms of content analysis are linked to any particular science’ (Bengtsson, M., 2016); ‘in consequence there are no specific conceptions of meaning, and the concepts used are universal,’

‘Content analysis is used to develop objective inferences about a subject of interest in any type of communication.’ (Kondracki *et al*, 2002). In this instance, the medium of communication is SMM/NRM2, in all its editions; the subject of interest is the examination of the rules of the document, the inferences developed are with regard to the effect upon content of descriptions produced by adherence to those rules. Included in those inferences are the negative effect of those rules upon information which is not considered by their authors to be a necessary part of the content. McCulloch (2004) asserts that ‘documents need also to be understood with reference to their authors and what they were seeking to achieve’ – the research in hand demonstrates a high awareness that the authors of the documents were constrained by having to focus upon measurement as an end, rather than as a means of communicating information. In essence, SMM is tied rigidly to a requirement that it is only about the measurement of materials, so must necessarily exclude labour and plant, but why it also excludes wastage of materials is puzzling.

For the documents under examination, ‘the authors’ are a variety of committees set up for the purpose, initially by an amalgamation of the Surveyors Institution and the Quantity Surveyors Association, later becoming the Royal Institution of Chartered Surveyors, assisted by some contractors and their associations. It is noticeable that throughout the entire series of committees the surveyors have mostly outnumbered the contractors, except in the preparation of SMM5 (metric) when, probably, specialist help was needed. There is

also a slight sense of dynasty in the composition of the surveyor members, at least for earlier editions (see table 3.6 below).

Remarks and comments are made about many of the items in the various editions of SMM (the raw data); these qualify as interpreted or survey data (Emerald Group, 2020). The remarks reflect the researcher's thoughts in examining the various clauses a number of times rather than a single inspection. The appropriate sections of each edition have been read in order to become familiar with the subject area. They are re-read for the coding process, and, for each edition after SMM1/2, read once more to compare with the previous edition. They are read again when the next edition is compared. At each stage it is possible that notes and additions were made. A sample of clauses and comments is given below (Table 3.7).

Table 3.6: Constitution of SMM committees.

Committees responsible for SMM editions						
SMM 1 & 2, 1922 and 1928	SMM 3 1935	SMM4 1948	SMM5 1963	SMM5 (Metric) 1968	SMM6 1979	SMM7 1988
Surveyors, Architects:						
F.H.A. Hardcastle	R.H. Francis	R.H. Francis	R.H. Francis	S.H. Francis	P. Graham	P. Graham (p)
T.E. Bare	S.L. Porter	L.E. Henderson	L.E. Henderson	M.C. Hill	M.C. Hill	M.C. Hill
R.C. Glead	R.W. Glead	J.K. Stephens	J.G. Osborne	J.G. Osborne	A.M. Harrison	A.M. Harrison (p)
W. Lawrence	P.F. Glead	M.H. Thackray	M.H. Thackray (p) (d)	R.D. Budd	D.J.O. Ferry (p)	E.J. Bowman
A.E. Harris	E.C. Harris	E.C. Harris	E.N. Harris	V.B. Evans	V.B. Evans	N. Malcolm
W.E. Davis (p)	H. Vale	G.P. Vale	G.P. Vale	V.B. Johnson	V.B. Johnson	S. Boyd
A.G. Cross (p)	A.G. Cross	A.J. Willis	H.W. Gooding	P.H. Dunstone	C.J. Willis	C.J. Willis
J.E. Drower (p)		P.T. Walters	P.T. Walters	S. Monahan	K. Linsdell	E.H. Urquhart
H. Riley (p)		J.M. Theobald	G.L. Coates	F. Palmer	J. Rainer	K.W. Bailey
M.H. Young			W.F. Young	C.J. Phillips	M.J.T. Webb	M.J.T. Webb
			D.C. Carter (p)	M.A. Rainbird	M.A. Rainbird	M.A. Rainbird
			G.D. Walford (p)	E.T. Brown	E.T. Brown	E.T. Brown (p)
				D.R. Male	D.R. Male	R.C. Allan
					L. Fletcher (p)	J. Bennett
					M. Barnes	M. Barnes (p)
						T. Allott
						R.E.N. McGill
						P. Kelly (p)
						P.J. Gilkes
						M.G. Smith
Contractors:						
R. Friend	R.L. Roberts	F.J. Gayer	G.F. Beard	G.F. Beard	G.F. Beard	G.F. Beard
S. Miller	R. Bennett	R. Bennett	R. Carlyle	A. Sim	M.J. Raven	B. Ball
W. Lacey	W. Lacey	N.F. Harding	S.T. Firth	S.T. Firth	A.J. Costelloe	A.J. Costelloe

R. Woods	R. Woods	R. Woods	K.C.F. Foster	K.C.F. Foster	K.G. Ellis	K.G. Ellis
W. Lawrence (p)	G. Elvins	B.T. Rice-Pile	T. McKee	R.H. Hamilton	R.H. Hamilton	J.E. Fisher
		W.W. Sapsote	W.W. Sapsote (p) (d)	J.J. Hodge	J.J. Hodge	C.M. Ford
		L.A. Walden	L.A. Walden	L.A. Walden	J.A. Harrison	R.H. Inglis
			G.E. Westerman	G.E. Westerman	G.E. Westerman	T.J. Parkinson
			J.M. Reilly (p) (d)	G.L. Orchard	G.L. Orchard (p)	D.J. Rimmer
			E.T. Sermon	E.T. Sermon	R.J. Hooker	R.J. Hooker
			R.H. Woolliams (p) (d)	W.L. Tyson		J.M. Allen
				W.S. Chapman (a)	P.G. Jordan	P.G. Jordan
Unknown discipline:						
				N.R. Wheatley	N.R. Wheatley	N.R. Wheatley
					G. Renton	A.R. Miller (p)
					P.A. Corby	P.D. Morrell (p)
					M.J. Havart (p)	R.A. Barrow (p)
					J.R. Illingworth (p)	
					P.H. Morris (p)	

Notes to table 3.1

- Names highlighted in green have served on more than one committee, so have previous experience.
- Names highlighted in grey have direct relatives on other committees.
- It is not known whether there are other relationships, e.g., by marriage, or business partnership, included above.
- The names W. Lawrence and W. Lawrence do not have a typing error.
- NRM2 is not included, there was no contractors' organisation represented on the committee of that edition, though three contractors seemed to represent themselves.
- There are two members of NRM2 from Gleds Cost Management Ltd., the forerunners of which company were also named in SMM 1,2, and 3.
- There is one member from MDA (Monk and Dunstone Associates); P.H. Dunstone was included in the committee of SMM5 (Metric)
- There is one member of NRM2 from the firm of V.B. Johnson, a name which appears on the committees of SMM 5 (Metric) and SMM6; Tony Allott (National Building Specification) was on the committee of SMM 7 and also NRM2.
- The use of (d) after a name indicates that the member died whilst in office.
- The use of (p) after a name indicates that the member did not serve for the full term of preparation of the edition.

Table 3.7: Examples of comments upon SMM1.

Section	Clause	Comments
Excavator	Clause 11, para. 2	<p>‘P&S mst to b.s. of trenches in yds sup stating depth and whether surface trenches or below basement.’ <i>The work involved in P&S does not depend solely on the area to be supported; strutting and propping will vary according to the depth and width of the trench and type of soil to be upheld. There are cost and weight differences for props of different sizes, in whatever material, affecting storage, loading and unloading, cartage, insurance and maintenance, which have to be taken into account when pricing earthwork support. What is more, ‘corners’ require separate consideration for strutting. More information than given by descriptions based on SMM1 would have to be given or obtained for P&S to be priced accurately.</i></p>
Concretor	Clause 28, para 4, sentence 2	<p>‘Laps added to superficial measurement’ (of sheet piles). <i>This is an example of the inconsistency of treatment between trades. Sheet piling in those days was carried out by specialist sub-contractors, who had strong trade associations, and worked only under their own rules. There is little practical difference between the joints in sheet piling and those in tongued and grooved boarding, but the boarding was always measured net. In any event, the distinction would be unnecessary if the tiles were measured by number.</i></p>
Bricklayer	Clause 38, para. 3.	<p>‘Where cavity closed at opgs, ends, etc., closing given in ft run and mat desc.’ <i>Measuring the closure of a cavity vertically when the work is done horizontally makes no sense in practical terms. When a brick, or part of a brick has been laid to close a section of a cavity, it will be</i></p>

some time before the next piece is laid above it, possibly even the next day or week.

Berg (1998) considers that ‘content components may be words, themes, characters, items, paragraphs, concepts or other characteristics.’ A number of words, phrases, and mandatory processes have been identified in this paper as being significant in their effect upon the composition of descriptions and have been subjected to scrutiny in the notes. These include such phrases as ‘deemed to be included’, ‘extra over’, ‘so described’, ‘shall be given’, etc.

Mandatory processes that have been inspected include the deduction of openings, measuring on centre lines and allocating categories on an entirely arbitrary basis.

3.6.2.3. Site observations – case study analysis

The analysis of case study data according to Yin (2003) consists of examining, categorising, tabulating, and testing ...evidence to address the initial propositions of a study. The data in this instance consists of an observer’s photographs of the work that was taking place. The evidence is therefore permanent and can be re-examined by anybody. Examining the data can only consist of looking at the photographs, while categorising and tabulating must consist of the scrutineer making a record of everything that he/she can observe to be happening with regard to the work in question. It is therefore best if the observer who took the photos, or was there when they were taken, is the person to be the scrutineer, if only to ensure that the work being examined is the same as that intended to be photographed.

Observations took place from shortly before starting time each day, when the site manager gave a briefing to his key personnel on what was intended to happen that day. The observer then walked the site, looking for an operation that was due to start. Having found one, the observer took photos at what were considered to be either typical or significantly different points.

If it became apparent that the sequence of actions being performed was going to be repetitive, there was no point in continuing to observe, so it was thought more productive to walk around the site looking for different activity. In that way, selection of activities or workpieces was random. If necessary, rough notes were taken on the spot, but in the main the photos provided sufficient information to be able to write them up after leaving the site each day, and remained as evidence of what had happened previously when it was necessary to identify a prolonged process (see cases C.1. and C.3.). There was no coding of the observations at any time. There were occasions when things which had been carefully thought out went wrong through somebody's lack of information or carelessness, e.g., the prefabricated wall and floor panels for the first floor of the first site should have been loaded onto the vehicle in reverse order of placing. When the ground floor external wall units, and load-bearing internal wall units had been placed and temporarily strutted, ready for the floor panels which would tie them together, the first delivery of floor panels arrived, and it was found that they had been loaded in the wrong order, i.e., panel no. 1 for fixing was at the bottom of the load. That meant unloading and stacking the entire load on the ground in order to reach the first. That was the only panel which was off-loaded and immediately placed in position by the hired crane, so an additional day's hire of the mobile crane was entailed. A second load could have been dealt with in the time spent on double handling, and the fixing gang lost half a day of production, possibly at the cost of an extra night's subsistence. The first of the floor panels to be fixed can be seen in photo M.1.6., at the farthest east corner of Block 1 (drawing A).

Coding of the work shown in the photographs would have been an unnecessary exercise. The codings used earlier in the study were established in order to find out what facets were necessary to consider for formulating information transmission in the industry, and they have done that job – each of the codes can be thought of as a shorthand method of indicating a rule to be followed, a criterion. The criteria are stated in a more formal way in a later chapter. It is clear that not every facet will be necessary for every item of work, e.g., 'Adverse conditions' only applies in a minority of cases, whereas 'Starting level' will apply to most. The code requirements were 'satiated', i.e., no more were apparent, so it can be fairly certain that most aspects likely to be needed in representations of building

work have been covered. That is not to say that additional facets will not be found to be necessary in the future.

3.6.2.4. Comparison and reconciliation of site observations with current practice

In order to demonstrate which items observed would be measured for a BQ, it was necessary to describe each case study as it would be anticipated to be presented by use of the rules. This also involved checking that ancillary work not described was deemed to be included, so that all work observed had been taken into account. Each case study has been described in plain terms, not necessarily the language of BQ, and then the result compared with NRM2 to establish what could be the likely resulting description. (NRM2 is the current measurement document and successor to SMM, as it states in its foreword.)

‘Extra over’, ‘deemed to be included’ and similar items in NRM2 were checked against pieces of work which had been photographed and described, but no main item found in the document. In that way it is believed that all items concerned found coverage in NRM2. An example is E.2., where the appropriate NRM items are:

‘5. Excavation and filling’

‘Membranes’

‘Drawings that must accompany this section of measurement’

‘1. Site plan showing all major excavations’*

‘Mandatory information to be provided’

‘1. Location of works...’

‘4. Ground water levels’

‘5. Nature of any known hazardous contamination...’

‘6. Starting level...’

‘Item of work to be measured’

‘15. Methane barrier’

‘Unit’

‘m²’

‘Level one’

‘2. Over 500 mm wide, thickness or gauge stated’

‘Level two’

‘1. Horizontal’

‘Level three’

‘1. Protective fleeces or boards, type stated’

‘2. Method of anchoring stated’

‘Notes, comments and glossary’

‘1. All turnups, turndowns, laps and joints deemed included’

‘2. Forming holes deemed included’

Such comparisons have been carried out to the case studies in tabular form plus commentary in Chapter 5, section 5.3.

3.7. Summary and link.

This chapter has listed the documents used as data, the methods used in examination of those documents: the way in which observations were carried out on site and how photographs were used as data to be examined, together with the way in which that examination was carried out. The codes used were listed and enlarged upon. Relationship of the study with a variety of philosophical positions was examined, finally considering that grounded theory was probably the most appropriate.

The next chapter deals with analysis of the different data arising from the two sources – the documents and the work on site.

CHAPTER 4. ANALYSIS OF THE SMM EDITIONS

4.1. Introduction

Analysis for this study has two avenues of approach, the first being ‘documentary’, using as its data the various editions of SMM/NRM2 which are spread across nearly a century. At no point during that time has its conceptual basis been challenged, as far as can be established. Furthermore, the researcher has been informed by the RICS library that no minutes exist of meetings of the committees which produced the documents. It is not possible to say whether that is due to no minutes having been kept, which seems unlikely in such an organisation, or through wartime exigencies, which is the most plausible. It is not possible to discover the way in which the members of those committees went about their task, whether the atmosphere was grimly formal or relatively convivial. It must therefore be assumed that everything in the documents, the words used, their meaning and context has been carefully considered by the committees. Mistakes there may be, but in the main the intended meaning should be apparent, so that each sentence can be taken at its face value. It is with that understanding that this research has been carried out. This is a thorough examination of the documents to establish what their original intention was, if and how that changed in successive editions.

The second part of the analysis is concerned with ‘case studies’, where it was thought necessary to observe work being carried out in situations not able to be controlled by the observer, to link that work to BQ descriptions based on NRM2 in order to discover whether those descriptions coped with site operations, whether they covered fully the work done. The situations on site were photographed, and a desk exercise carried out to describe each one as fully as possible, so that any area where information was not given was illuminated. Because of the volume of analysis of SMM editions, the analysis of case studies has been described in Chapter 5.

4.2. Examination and analysis of SMM editions

4.2.1. Generally

Analysis of SMM also consists of two parts; the reading of each edition to establish the coding that will point to the criteria which are required, and reading the same items to examine the detail of each to see if, where, and why they should be changed. The first is relatively straightforward but tedious, the second is slow and concentrated, demonstrating rigour in the process.

One reason for carrying out an inspection of successive editions of SMM is to obtain a list of 'subjects' that are likely to be useful in the establishment of criteria for descriptions. It is not possible to start with a list, the subjects have to be raised by the examination. When obtained, the subjects are identified by a code for convenience in later use. Such codes are not statistics and have no significance other than as a shorthand. However, because no predictions can be made regarding the usefulness of any information, it was thought prudent to retain and publish the figures pertaining to the codes.

It should be noted that the codes are not 'of a kind', they represent a variety of comments. There is no significance in their frequency – this is not a ranking of their importance – it should be clear that description of, say, adverse conditions cannot be ranked against information regarding location. The object is to determine criteria for the content of descriptions. Several of the items might apply to every piece of work, e.g., Location, working space, dimensions, access, despite some being mentioned comparatively rarely.

Establishing the codes, it was at first believed, meant reading through every item of the sections chosen, for all editions of SMM/NRM2. Reading them meant also visualising carrying out each piece of work, which may be considered to be similar to the way in which estimators used to have to operate.

Note: The descriptions which follow are of the way in which the codes were reached. They are merely the thoughts provoked by a reading. Each clause can have any number of

codes: there is no reason to believe that individual clauses should bring forth individual codes. Clauses or parts of clauses producing ‘new’ codes are included below.

4.2.2. Establishing the codes (codes in red)

‘Excavator’ section of SMM1 begins with a note requiring all work in or under water to be given separately, stating whether canal, river or sea water. These are difficult working conditions, but there are others such as extreme heat or cold, work in compressed air, etc., so the item was given a broad coding of ‘Adverse conditions’ (Ad).

The note does not mention relatively still water such as lakes or reservoirs, so a coding ‘Error’, (E), to cover errors of omission or inaccuracies was given.

Clause 1 states ‘where practicable, the nature of the soil shall be described’. The nature of the soil is not controllable by either client or contractor. The only soil condition described is ‘rock’, which is measured separately. What happens when it is not practicable to describe the nature of the soil? Presumably, apart from ‘rock’, the soil conditions are then at the contractor’s risk. The clause also states that increase in bulk after excavating should be allowed by the contractor. The site is usually owned or controlled by the client, the proposed works have been designed against either known or assumed soil conditions, measurement of the quantities has been carried out before the contractor is asked to tender. The design assumptions could be passed to the contractor as the basis of tender as being entirely provisional, and adjustment made for actual conditions found. There seems no basic reason why the contractor should carry the risk of the client’s choice of site in respect of soil conditions. This thinking resulted in a coding of ‘Unfair or inequitable’ (U).

True measurement of some excavation items, e.g., cart away, is defined by the bulking of those materials, ruled by site soil conditions. If soil details are not known, the items subject to bulking should be ‘Provisional’, (P). It would be as easy for the q.s. to apply bulking percentages as for the contractor. One reason why that is not so is that in the process of taking-off, ‘cart away’ is ampersanded to excavation items, making it a ‘Convenience for measurement’, (C), and ensuring that the dimensions are ‘in the solid’. There is no basic reason why the abstractor could not be instructed to apply a bulking

multiplier, which is then shown in the BQ. Contractors would not then be competing on the basis of guessed bulking percentages.

Paragraphs 3 and 4 of Clause 1 deal with disposal of spoil to a place on or off site, leading to two codes, 'Location', (**Loc**) and 'Access' (**Acc**), for both the work and the shoot, and was a timely reminder that 'Transport', (**Tpt**) is a necessity for many items.

Clause 1, para 5, 'Excavating where it is impracticable to form a wheeling gangway shall be described as 'basketed out''. Since BQ are prepared before the contractor is invited to tender, the person likely to have made the judgement of impracticability is the q.s. The question arises as to whether the q.s. in taking off would be able to judge when that situation exists, or indeed where hand digging might be required. It is possible these items cannot be recognised until work has started on the site. They are coded as 'Quantity surveyor's judgement', (**Q**)

Clause 1, para 6 instructs that excavations shall be given in depths of 5 ft., starting thoughts of how the stages were established, a much-misunderstood area. Two diagrams in Buchan *et al* (2003) purport to demonstrate the way in which hand dig is carried out to show why these 'ergonomically selected stages' are as they are but does not explain how its second situation is arrived at from the first. Figure 4.1 below shows the way in which it is carried out, in its simplest form (struts will be usually near the top and bottom of poling boards rather than central because of the danger of collapse if the supported sides become dislodged by water or traffic movement).

Soil can be excavated by hand to a depth of approximately 1.5 m, about 5 ft., i.e., level D in the diagram, before it starts to slip off the shovel too early, so a staging is necessary. There is no point in putting the staging level with the top of the trench, because no advantage is gained, nor does it make any sense to put it at the bottom of the trench, which Buchan *et al*, (2003) imply; it would only impede the operative excavating, with nowhere to receive the spoil. A reasonable place for it is halfway between the two (level B) so that the operative at the bottom can throw on to it, and the operative on the staging can throw out comfortably. Struts or props are fixed there, and a staging formed of boards or ply sheet. The operative at the bottom of the trench can then dig a further 0.75m (2' 6"),

before he reaches the limit of 1.5 m *below the first staging* (level E) when another staging is necessary. It can be seen that to conform with the practical situation, depth stages of hand digging are approximately: 1.5 m., 0.75m., 0.75m., and so on with further 0.75 m. stages, (these are ‘ergonomic’). The way in which the work is described does not reflect the differing sections of trench excavation, so the code is ‘Different workpiece’, (DW).

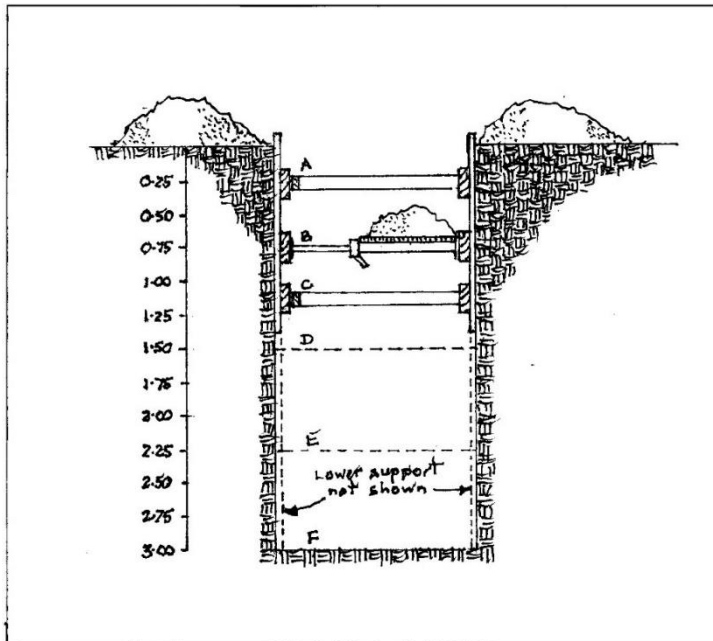


Figure 4.1: Staging

Consideration of the above facets served as a reminder that ‘Dimensions’ (D), were a necessary code in most items.

Clause 1, paragraph 7 is about trimming excavations to batter, levelling, forming slopes and ramming. These represent different workpieces with separate techniques, so the ‘Workpiece’ (Wp) being defined and described separately in every instance is important, as is a statement of the actual ‘Rake or slope’ (R), required. Location and dimensions required, (Loc), (D).

Clause 5 para 1 refers to carting away or return fill and ram (RFR) to excavations. The quantities measured are in the solid for both cart away and RFR, but the picture is confused, first by the ‘bulking’ or expansion of excavated material, secondly by the fact that even when rammed, soil does not return to its original bulk. It may take months or years before the weather completes the process, leaving a sinking on previously rammed

surfaces. If this happens before the end of the maintenance period, the contractor may be required to carry out more RFR. This would be an ‘Additional operation’, (O)

Clause 5, para 2 refers to forming embankments or terraces with excavated material, stating whether direct from excavation or from spoil heap. This should only occur if an earlier item has specified that selected spoil has to be placed on a spoil heap for re-use. There should hence be a connection between the items – the spoil heap is a ‘Temporary item’, (T), in the construction of such embankments or terraces, and should be treated as a separate workpiece.

Clause 7, para 1, gives an allowance of 3ft width from the face of a wall to be underpinned. This is presumably a working space allowance for a delicate technical task. However, working space is required for all pieces of work – it was only influential specialists who had ‘working space’ (W), granted as of right at the time of SMM1.

Clause 7, para 2. ‘Cutting off projecting footings given in feet run stating the number of courses’ Many items have ‘Cutting required’ (C). This cannot always be known before the work is carried out, so should then also be ‘Provisional’, (P).

Clause 9, para 1. ‘Exc’n to form cuttings given sep in yds cu and the mode of its execution described’. What is the mode? Chambers Dictionary, (1993) gives: ‘n. a way or manner of acting, doing, happening or existing; kind; form; manifestation’ The meaning appears much the same as ‘method’, so the client’s advisors may have decided the method at an early stage. ‘Clarity’ (Cl) is required of the clause. ‘Shape’ (Sh) needs to be stated with all its dimensions given, and construction ‘Method’, (M) described where a specific method is required.

Clause 9, para 2. ‘Excavation in tunnelling given separately in yds cu and the length width and height of tunnel stated’. If the shape of the tunnel had been described, the item could have read ‘Excavate 1 No tunnel...’ The tunnel will tend to be excavated in short lengths at its face, so that it could then be ‘Incremental working’ (IW).

Clause 11, para 6, sentence 3. ‘Cross lengths of P&S in underpin shall be taken for the width and depth at avg 4 ft apart and desc as P&S in short lengths across trenches’. The item is difficult to understand, but it is thought that cross lengths referred to are the cross

section where a previous length of underpinning has been carried out and backfilled, i.e., the backfilling also requires P&S. Because the underpinning is carried out in sections, each division between adjoining sections must have P&S measured twice. That is correct if the previous sentence allows for the first cross sections, but it is worded 'The planking and strutting shall be measured around the complete trench and shall be described as planking and strutting in short or necessary lengths in underpinning'. Since it speaks only of 'complete' trench, rather than each trench, it could be possible for the q.s. to measure around the entire perimeter once, omitting the cross P&S. This appears to be an 'Error' (E) of wording to be added. The wording was similar until the 5th edition in 1963.

Concretor section, clause 16, para 1. 'Conc beds n.e. 1 ft thick in yds sup, thickness stated, mode of surface treatment described'. Treatment in this case is not an applied finish but finishing the concrete surface whilst still wet or partially set, e.g., spade face, tamped, wire broom; a 'Face' (F), treatment.

Clause 22, sentence 4. 'Openings shall be dtd, enum, and desc.' Openings in walls, floors and roofs should not necessarily be treated in the same manner. Forming an opening in a concrete floor is not like constructing the same size opening in a concrete wall. It is agreed it should be 'Enumerated' (Enu). An opening is not part of a building, mostly it is a location where another part is to be placed. Sometimes that part should be 'Included' (Inc) with another item.

Clause 28, para 3, sentence 2. 'The price for driving (piles) shall inc all staging, driving apparatus and shifting to required positions'. This could be a precedent for movement of machinery to appropriate positions, e.g., in foundation trench excavation a major component of cost can be the number of times the excavator takes up a new position. Coding is 'Plant to position' (PP).

Bricklayer section, clause 31, para 1, phrase 3. 'No deducts for ends of lintels, steps and sills in walls'. Those are the beginnings of other pieces of work, so no deductions should ever be necessary. To describe the brickwork correctly (perhaps necessary for BIM) requires that accurate information and dimensions are given. 'Measurements always net' (N).

Clause 36, para 1. ‘Height’ of commencement of brickwork in raising. Originally coded as ‘Height’, (Ht), but later changed to ‘Starting level’ (SL), because the latter is more appropriate.

Clause 39, para 1. ‘Bkk c.o.p msd mean length of wl. 6 ft radius and under classified as quick sweep, over 6ft desc as flat sweep’. Where there are walls c.o.p. on a site, establishing whether to quick or flat sweep means that the radius has to be measured first, so the ‘Radius’ (R) might as well be noted. The only reason for flat or quick sweep is for convenience of the measurer, not wishing to have many categories – aggregating as many items as possible.

Clause 39, para 3. ‘Polygonal walls msd mean length and squints and birdsmouths measured as clause 49’. In a system which does not count a number of standard measures but describes them fully, giving the number of workpieces, ‘Deficiency of information’ (Def) regarding the number of sides of the polygon will not happen; the number and size of all ‘Angles, internal and external’, (Ls), inc squints, birdsmouths and fair cuts will be given.

Clause 62, para 1, sentence 2, phrase 1. ‘Setting stoves, grates and ranges...’ These articles would have been cast iron and of considerable ‘Weight’ (Wt), but also brittle, needing care in lifting and moving.

Clause 65, sentence 1. ‘Extra over’ (EO), is a concept which makes measurement easier but interferes with communication of information regarding the work to be carried out.

No further codes were apparent for SMM1. Differences in SMM2 were confined to the trades of Slater and Tiler, so no further examination was necessary of the repeats from SMM1, making SMM3 the next edition to be examined.

The first new code to be recognised in SMM3 was at Concretor, clause 10, which instructs that concrete casings to beams lintels and stanchions shall each be given separately. Since lintels are individual beams over openings, the reason for distinction was in question, and

it was thought that ‘Classification unnecessary’, (CU), was appropriate where full information is given in the description.

Clause 34(c) in the section headed ‘Patent Fire Resisting Floors etc.,’ reads ‘Deductions shall be made for all openings exceeding 1 yd sup’, and led to the thought that deductions are not pieces of work, they are usually for openings, and that openings are breaks in continuity of construction, whatever their size. For uniformity of measurement method, and to allow for the discontinuity, it is much better to ‘Measure around’ (MsA) openings than to deduct them. Even where considered as a functional unit, one wall function is to prevent access of weather or people, so that an opening is still a discontinuity (of function).

Clause 36 in the same section states ‘Where floors are interrupted by fixing of steel joists in the depth of the floor, an item shall be given in feet run of extra labour cutting and waste against both sides of steel joists’. This is strongly connected to the previous item in that it demonstrates the understanding by the committee of the discontinuity caused by the steels. That is to their credit, but what is not registered is the fact that the steels have subdivided what would have been one piece of work into several ‘Different workpieces’ (DW).

It was not until clause 35(a) of ‘Bricklayer’ that the next code came to light, and that was indirectly. The clause reads ‘For brick pavings see Pavior...’, a reminder that brick pavings are frequently ‘Laid to pattern’ (Pat), as are roof slates and tiles, wall tiles, wood block flooring, brick walling, glazing, wallpapers, even some leadwork and plaster finishes.

No more codes emerged from SMM3; SMM4 was next examined, and a different code was thought necessary for the situation found in Concrete, clause 1(g), ‘Concrete, formwork, and reinforcement shall each be given separately unless otherwise herein provided’, which raised the thought that these items which are connected in many R.C. products have been ‘Separated’ (Sep) in SMM for no apparent reason except perhaps for the convenience of being able to aggregate them into different groups. The hierarchical nature of the items is clear; although each may be shown initially as a separate workpiece,

there is another workpiece or workpieces arising from their combination. In a system of description set up from the criteria of this study, such relationships have necessarily to be recognised.

That was the only code extracted from SMM4. SMM5 was examined with no result, SMM5 Metric) was not examined because only the units of measure were changed, then SMM6 was found to have no further product. At that point it was considered that satiation had been reached, so that no more codes were likely to be established by SMM7 or NRM2.

Frequencies of the codes for SMM1 can be found in Section 3.6.2.1, Table 3.4.

4.2.3. Limiting the scope

The vast field covered by SMM/NRM2 makes it necessary in the first instance to limit examination of the documents to particular areas, and the work of Excavator, Concretor and Bricklayer have been chosen, the first two because they occur on most sites; Bricklayer (or Masonry) because of the use of a fairly wide range of materials and that such work also occurs on most sites, be it only in manholes and foundations. The General Rules and Preliminaries section are also examined to see where clauses applicable to all works in the document are related to physical work rather than administrative issues.

4.2.4. Examination of SMM1

4.2.4.1. Generally

The first edition of SMM consists of 73 pages including an index of 10 pages. It is divided into 26 sections, the first for 'Preliminaries', the rest being mainly trade based. Most of clauses are numbered and have separate paragraphs which relate to different descriptions, e.g., clause 40 of 'Joiner' has 12 paragraphs, but within those paragraphs more than one piece of work might be given.

The number of clauses in each section of SMM1 is as follows: Preliminaries, 39 numbered clauses; Excavator 12; Concretor 16; Bricklayer 60.

Clause 18 of 'Concretor' section refers to concrete in floors and roofs, also to reinforcement, so it might be assumed that reinforced concrete has been covered in the section, albeit flimsily. Some six trade sections and 11 pages later, however, there is a separate section of 12 clauses covering 2 ½ pages headed 'Reinforced concrete'. Details of the clauses of SMM1, together with the coding applied to each one are shown in Appendix A.1., and for convenience 'Reinforced concrete' has been there added back to 'Concretor' section in **bold** typeface.

Many of the numbered clauses contain more than one paragraph; some of those paragraphs have sentences, or phrases, each of which could be considered to relate to separate items of work. The clauses had then to be broken down further to compare with SMM3, resulting in 344 items. For those items of SMM1, 1,351 coded comments were made. 31 codes were established during examination, one of which was later omitted because it applied to the London Building Acts and By-laws of Local Authorities, replaced by Building Regulations, so it did not apply to all the documents under examination.

4.2.4.1. Examination of content of the clauses

Reading the clauses not only identifies the subject matter of the codes, but also provides an insight to the thoughts and intentions of the various committees. Because of the nature of the examination and lack of minutes of meetings of the committees, the comments which follow are speculative but are not expected to be unreasonable or irrational. Not every clause requires comment, and where clauses are repeated in successive editions it is hoped that comment has not been duplicated².

² Statements made in the documents are in upright type, not necessarily quoted in full. Comments are in *italics*.

SMM1, Preface

‘The Surveyors’ Institution and the Quantity Surveyors Association were recognised for many years as the authorities for deciding disputed points in measurement of building works.’

That raises the question of what disputes there could be in the measurement of works? There seem only two areas for dispute, (a) the measurements themselves, (b) the object being measured. The answer could lie in the fact that ‘demands upon their services...directed attention to the diversity of practice...’ not at inaccuracy of measurements, so it seems that the objects being measured were probably the main causes of dispute.

‘They were particularly concerned with greater accuracy of work and uniformity of method’. *Is the concern in respect of the work of contractors or of quantity surveyors? It is difficult to imagine that ‘greater accuracy’ refers to taking of dimensions. Perhaps the question is answered by a sentence in the first paragraph, ‘...a just ground for complaint on the part of contractors that the estimator was frequently left in doubt as to the true meanings of items in the bills of quantities...’ i.e. that the work of the quantity surveyors was not giving the estimator a clear description of what to produce.*

The Joint Committee worked for a year or so before World War 1 began, so it seems likely that a significant part of the work had been done in that time. Contractors were not asked to attend until the war had finished, so it is less likely that they had an effect upon the items to be measured; more likely they were there to agree that the way in which they were measured in SMM was the normal or usual way.

The Committee were also assisted by representatives of some trades. It is likely that those trades would have been the more specialised, e.g., piling, asphalters, roofers, glaziers. Their input could possibly be more apparent in the detailed items. This might also be supported by the fact that SMM2 concerned only slating and tiling, and that all the amendments were additions.

The note to the revised edition, 1927, makes it clear that the combined bodies intended to retain their authoritative position in deciding points of measurement dispute.

SMM1, Preliminaries

This section provides three items worthy of comment:

Clause 1, paragraph 1 states that ‘these rules shall be applicable to...the preparation of BQ...equally with measurements of finished work’. No other use was expected.

Clause 1, paragraph 2 determines that ‘BQ shall fully completely and accurately represent the work...except...certain items...which...can only be...provisional’.

Clause 1 paragraph 3 defines what the contractor has to allow for which is not described in the items (except in certain specific cases such as Provisional and P.C. sums where profit to the main contractor is not included in the item). The main items that are not described are waste on materials, cartage, hoisting and all labour. It is difficult to understand how the work can be ‘fully, completely, and accurately represented’ without including items as important and costly as those. It can be supposed that the meaning ascribed to ‘work’ and ‘works’ by the RICS is not the physical effort involved, but the manifestation of that effort in the artefact produced, which must presume that the labour can be defined by description of the product.

SMM1, Excavator

The clauses of SMM 1 were examined at length earlier (p55 on) to extract the codes. Only comments additional to those are included below.

Clause 6 stipulates that ‘pier holes n.e. 5 yds sup in area are to be given separately’.

Whilst small pier holes are probably more expensive per unit than larger, on remeasurement the pier hole will need be checked to ensure that it is not over 5 yds sup. That involves taking the dimensions and squaring them before the category can be established. It would save time if dimensions were given in the BQ in the first instance, and the item measured by number. That would remove the need for separate categories,

since all pier holes whatever the size can be described in the same way. In any event the boundary appears arbitrary.

Clause 8, para 1, sentence 2. Breaking up and removal of brickwork, concrete or other hard substances in excavation given separately in yds cu and described. *The assumption that there will be such material particularly in urban situations is reasonable. Since the quantities cannot be known when contract documents are being prepared, they should be stated as provisional.*

NOTE: The category 'All dimensions should be given' is so important that it warrants this note as being one of the criteria needing to be established. It follows that if all dimensions are given for each item, there is no requirement for dimensions to be squared or cubed; all that is needed is a number of times that the category appears in the contract works. i.e., measurement by enumeration only. In its turn, this means that a complete section of quantity surveyors' work – squaring - becomes unnecessary, and the abstract includes dimensions in headings.

Clause 10. 'An item shall be given for keeping excns free from water'. *Similar to soil in previous items, rainwater, ground water, springs and so on are not items which can be predicted, by either the contractor or the employer. It seems inequitable therefore that the contractor should be asked to do exactly that by putting in a price which can be strictly upheld and is a contractor's risk. It is doubtful whether it is an insurable risk.*

Clause 11, para 1. 'Planking and strutting to basement excavation given in ft or yds sup; depth down to general level of excn shall be stated'. *Planking and strutting is an item which is often 'incremental' in that it may be necessary at an early stage in the excavation and may need to be adjusted both in area covered and type of planking and strutting required as the work proceeds.*

Clause 11, para 2. 'P & S msd to b s of trenches in yds sup stating depth and whether surface trenches or below basement'. *The work involved in P & S does not depend solely on the area to be supported; strutting and propping will vary according to depth and width of the trench and the soil to be upheld. There are cost and weight differences for props of differing sizes, in whatever material, affecting storage, loading and unloading,*

cartage, insurance and maintenance which have to be taken into account when pricing earthwork support. What is more, 'corners' require separate consideration for strutting. More information than given by description based on SMM 1 & 2 would have to be given, or obtained, for P&S to be priced accurately.

Clause 11, para 3. 'Alternatively, P & S to trenches may be given in ft or yds run & width & depth of trench stated'. *If this alternative were to have been the main item, there would have been less problems with the previous two items. The alternative is better, but why not enumerate?*

Clause 11, para 4. 'P & S to pier holes n.e. 2 yds sup on plan shall be so desc & given separately'. *Why should this division be set at 2 yds sup, (just under 4'3" x 4'3") when by giving the sizes of all pier holes, the arbitrary division could have been avoided?*

Clause 11, para 6, sentence 4(i). The description of the work to be underpinned shall be given as fully as practicable. *Although the work to be underpinned can be stated confidently to accord with the internal and external dimensions of the structure in question, there can be no certainty as to the depth of existing foundations, or what obstacles may be encountered. This fact makes the quantities given for underpinning provisional across most if not all the items, and they will need to be remeasured unless the dimensions initially inferred are in accord with the actual work.*

Clause 11, para 6, sentence 4(ii). An item shall be given (following the planking and strutting) of 'Provide and fix all necessary timbering in connection with the foregoing underpinning'. *At first sight, this may appear superfluous, but the wording is 'timbering', not P & S, so it would appear to refer to maintaining the stability of the existing walls above the underpinning; perhaps it should have been described as 'shoring'.*

Clause 11, para 7. P & S to tunnelling shall be separately given in ft or yds run and desc and the width of the tunnel, heights to springing and crown, and the girth of the soffit desc. *As Clause 9 para 2, shape of cross section of tunnel should be given, and desc could read 'No 1 tunnel...' etc.*

Clause 12. Puddling given in yds cu and desc. *Clay puddling is a process where clay is mixed with water and 'puddled' using a pug mill or similar, removing air bubbles and lumps to leave a smooth, fairly stiff mix which can be placed and rammed to form waterproof layers for canals, ponds, underground petrol tanks, etc. It would be of value to describe the item being waterproofed, together with all dimensions.*

Concretor

Clause 18, para 4. Conc to various levels given sep and approx heights of hoisting stated. *If the various levels were given as heights above datum instead of calling them 1st, 2nd, 3rd floors, the hoisting height would already have been given.*

Clause 28, para 4, sentence 2. Laps added to superficial measurement (*of sheet piles*). *Not necessary if piles are given by number rather than sup mst.*

Clause 28, para 4, sentence 3. If driving depth ex 10ft the extra depth stated in 5ft stages.

Why not give actual depth requirement and additional charge per ft of extra depth?

Bricklayer

Clause 37, phrases 1 & 2. All bkk more than 40ft above GL given separately or item of extra hoisting in stages of 20ft. *If brickwork is given separately for a height consideration, why not make the stages the normal ones which occur, e.g., scaffold lifts, and apply to all brickwork, blockwork, and other items which require scaffolding or bandstands?*

Clause 38, para 2, phrase 1. Alternatively, bkk in hollow wls may be measured exclusive of cavity & added to gen bkk. *Brickwork in hollow walls is brickwork to a different kind of wall than gen bkk. The skins are tied together, act together, and have to be built together, so both must be considered as part of the same operation. The way in which the wall is built depends partly on whether both skins are of the same material. A difference in materials will make a difference to the description. There should not be alternatives in a standard method.*

Clause 38, para 3. 'Where cavity closed at opgs, ends, etc., closing given in ft run & mat desc'. *Measuring the closure of a cavity vertically when the work is carried out horizontally makes no sense in practical terms. When a brick, or part of a brick has been laid to close part of a cavity, it will be some time before the next piece is laid above it..*

Clause 40, sentence 2. An item of cutting and waste given in ft sup, stating rate of taper or batter per ft in length or height. This applies to tapered walls and walls with one battering face, given in sup. measure. *For the measurement of cutting to be correct, the bonding throughout the wall must be described. This cannot be showing stretcher bond on the fair face; it must have bonders through.*

Clause 44, phrase 2. Alternatively, rough cutting and given in ft sup. *There should be no alternatives in a standard method, they lead to doubt as to which is 'best' for whatever purpose. Rough cutting is not an alternative to a rough arch; it occurs with every rough arch. Clause 34 says that rough cutting and waste shall be measured to each kind of brickwork.*

Clause 53. Bkk in beam filling inc with gen bkk; lab in beam filling inc cutting in ft run stating thickness. *If the material is measured in with the general brickwork, it will be priced as 'general brickwork' so the labour element of that item will be included. The labour of beam filling should have been described under SMMs own rules as 'the extra labour in beam filling'.*

To continue these comments through all editions of SMM/NRM2 would take up far more space than is justifiable in the body of the work. Further comments on other editions can be seen in Appendix A, [p.X](#), except that the position of SMM2 is explained below.

4.2.5. Examination of SMM2

4.2.5.1. Explanation

The difference between SMM1 and SMM2 is minimal. The extent is limited to one page inserted in SMM2 after the index, consisting of eight alterations to paragraphs and one additional paragraph, all affecting only the Slater and Tiler section.

Since the current work is examining different sections to those, there is no requirement to compare the two, for they are the same in the sections under inspection. It is therefore possible to continue to SMM3.

4.2.6. Examination of SMM3

4.2.6.1. Generally

Clauses in one edition can be carried over without alteration to the next or can be rejected for inclusion; they can be amended for different meaning which incorporates additional factors, an entirely different clause can be produced. Those four are the only situations that can happen which affect coding of clauses. If therefore a clause has been coded for one edition, and it is carried over to the next, it should not require further coding. If a clause has been discarded, its coding does not apply beyond the edition in which it last appeared. If a clause has been amended, it requires re-examination to see whether further codes are necessary to cover the amendment, or discarding those that are no longer applicable. New clauses must be coded on the same lines as the other clauses.

The third edition of SMM consists of 81 pages including a single page contents list. In addition, it contains 19 pages of 'Questions and answers.' It is divided into 16 sections, the first for 'Preliminaries', the rest being trade based.

Clauses are numbered more simply than SMM1 and 2. Each of the sections are divided into clauses starting at 1, being further divided where necessary into sub clauses each of which has a lower-case alphabetic reference in brackets, (a), (b) etc.

There are alternatives given in some cases, e.g., Bricklayer Clause 19 – ‘Trimmer arches shall be given in ft sup stating the thickness...Alternatively...may be enumerated’.

Some of the clauses/sub-clauses refer to more than one item, each of which can be regarded as a separate piece of work e.g., Bricklayer Clause 31 – ‘Raking out for and pointing flashings shall be given in feet run; that for stepped flashings and for work in old walls shall be given separately’. Raking out for flashings should be carried out whilst the mortar is still relatively soft, pointing can only be done after the flashings are fixed, stepped flashings are entirely different to straight flashings, existing work poses different problems and work to that of new. Allowing for that and treating such items as separate sub-clauses in such cases brings the total number of items to 135. The items for editions 1 and 3 are numbered in turquoise in the Appendix.

The Preliminaries section of SMM3 has 63 clauses and sub-clauses, Excavator has 44, Concretor 97, and Bricklayer 134, totalling 338. These are the numbers of clauses/sub clauses initially established for SMM3. In order to compare with SMM1, some of these items had to be sub-divided still further; the figures were then Prelims 68; Excavator 57; Concretor 112; Bricklayer 137, totalling 374.

For the 338 clauses and sub clauses, a total of 2187 coded comments were made about the sections, and 37 separate codes used. The distribution is shown in Appendix A7.

4.2.6.2. Comparison of SMM3 with SMM1/2

The number of codes used for SMM1/2 was 30. For SMM3 it was 37, the additional 7 being CU, Cut, DW, EO, Inc, MsA, Pat, bringing the thought that the additional codes might well have been applicable also to SMM1/2, but may have been missed. It was thought that whilst EO and MsA could be considered covered by code (C), (convenient for measurement), they are significantly different from each other and from other items in that category, so need to be looked at separately in detail, as follows:

E.O. (Extra over) is a measuring device for allowing a difference between one item and a similar one to be measured separately so that the main item may be aggregated with others

that do not have the same feature. Lee *et al*, (2014) explain the process thus – ‘For example, labours on...steelwork such as cranks to beams are measured as extra over. This means that the beam is measured its full length over the cranked bend and the estimator, when pricing the item, assesses the extra cost of forming the crank’. That is fine for enabling what could be many separate descriptions to be reduced to a few, but it does place the onus of interpretation upon the estimator and produces an estimation of an average where the range is not known. In the example that Willis gives, the estimator cannot know how many individual beams (say) have how many cranks in the two items of (a) x tonnes of steel, (b) y No of cranks. The estimator is expected to give a price for each crank, when it is the cost of each cranked beam that is affected. A beam having one crank could easily be of less cost per metre run than the same length of beam having four cranks, even if the cost per crank is not included, because of the greater difficulty of transportation, handling and positioning. The main point to notice about E.O is that it does not represent a piece of work; it is just a convenient way, for the q.s. of cutting down on the number of items measured.

MsA (Measuring around) openings is considered by this research to be required because the practice of deducting openings hides the cost of working around them. Measuring around openings achieves the same quantity of material as deduction, but with the added advantage (in the view of this research) that the additional cost of having (say) narrow piers between windows, with consequent cutting and wastage can be calculated, not guessed.

The number of clauses or sub-clauses in SMM1/2 is 325; for SMM3 the final number is 374, a difference of 49, or 15% more than SMM1/2.

The number of clauses or sub-clauses which have similar content of the selected sections for both editions is approximately 276. SMM 1/2 has 32 clauses or sub-clauses which have been omitted from SMM3 and SMM3 has 85 added which do not appear in SMM1/2.

These figures do not quite tally, i.e., if SMM1/2 has 325 clauses/sub-clauses, 32 are omitted from SMM 3 and 85 added in SMM3, then SMM3 should have 378. The anomaly

comes about because whilst the number of clauses which have approximately similar content in both editions is 276, some of the content is in short phrases. That is of no consequence when looking at similar content, but for comparing the clauses/ sub-clauses side by side, it was necessary in many cases to consider the short phrases rather than complete sentences. It must be noted that no change has been made by the researcher to the content of the descriptions in these instances; the short phrases have been brought about because the SMM committee have sometimes altered the order of phrases in a clause, sometimes transferred a phrase to another clause, and in other cases have inserted new phrases into an existing clause, so forcing changes in the order of descriptions of the edition being compared.

However, this is not a statistical or even an arithmetical exercise; it is more productive to look at the content of the clauses/ sub-clauses omitted from or added to the first edition in order to form the third. These are of several different kinds:

- Administrative items, e.g., Prelims 4 (i), (4 is the clause number, (i) is the paragraph number within the clause), “Date for completion of the work, and damages for delay”, which are not concerned with the work of producing the building on a day-to-day basis.
- Trade groupings, e.g., “The steelwork shall be measured and given as described in ‘Smith and Founder’” (Reinforced concrete, 1 (xi))
- Items concerned with position, e.g., “The work of each storey shall be given separately and the heights above or below a given datum shall be stated” (Reinforced concrete, 1(iv))
- Items concerned with time, e.g., “The time in which the work has to be executed shall be stated” (Piling, clause 12, para 1).

The reason for the omission of the preliminaries items, of which there are four, (4(i); 31(i); 32(i); 36(i)), is clear; the RIBA form of contract of 1931 deemed that the Bills of Quantities shall have been prepared in accordance with the Standard Method of Measurement, and since those clauses or similar were included in the form of contract, there was no need to repeat them in the SMM rules.

Items omitted from Edition 1, ‘Excavator’, are as follows³:

Clause 6. ‘Excavation for pier holes not exceeding 5 yds sup in area shall be given separately and so described’. *This is covered by clause 6(a) of Edn 3, - ‘Excavation for isolated pier holes shall be given separately and pier holes...not exceeding 1 yd cu shall be enumerated’. There is, however, a vast difference in the amount measured. Pier holes tend to be square; for Edition 1, the maximum size of the pier hole given separately has to be less than 45sq ft. A dimension of 6ft 8 ¼” square gives 44’4”8”1”” square feet in duodecimals. Given a depth of 3ft for each of two pier holes, under editions 1 and 2, the pier hole can be up to 6’8 ¼ “ square to qualify for being described separately, whereas under Edition 3, Excavator 6(a) it can only be 3’ square, an 80% reduction. If the pier holes are 4’6” deep, for editions 1 and 2 the pier hole can still be 6’8 ¼” square, but under Edn.3 it would have to be just under 2’5”by 2’5” to qualify, but would not then be practicable. These figures demonstrate how meaningless the demarcations are in categorisation.*

Clause 11, 4th para. ‘Planking and strutting to pier holes not exceeding 2 yds sup on plan shall be so described and given separately’ *This is covered by clause 12 (e) of Edn. 3 - ‘P & S to pier holes shall be measured to all sides and given in ft sup and the depth stated in stages of 5 feet’. Presumably the committee considered that all pier holes are ‘isolated’,(see clause 6) and are all likely to be relatively small.*

Clause 11, 6th para. ‘The description of the work to be underpinned shall be given as fully as practicable, and an item shall be given (following the planking and strutting) of ‘Provide and fix all necessary timbering in connection with the foregoing. *The comparable clause in SMM3 reads: ‘An item shall follow in ft run for providing and fixing all necessary supporting timbers to the work underpinned...’, which makes more sense.*

Items omitted from Concretor (and Reinforced Concrete) are:

³ Researcher’s comments are in italics.

Clause 18, para 1. 'If (*concrete is placed*) between or around steel joists, expanded metal, or other reinforcement, it shall be so described'. *Mention of expanded metal has been omitted, presumably on the basis that it is included in 'fabric reinforcement', so the replacement in SMM3, clause 1 (d), reads 'If concrete is between and around steel joists, rods, or fabric reinforcement, it shall be so stated...'*

Clause 18, para 4. 'Concrete to the various levels shall be given separately and the approximate heights of the hoisting stated'. *This was a useful clause which had no replacement in SMM3. No reason can be deduced for its omission, except perhaps because it limited the amount of aggregation that could be carried out by the q.s at abstract stage.*

(Reinforced Concrete) Clause 1 para 3. 'The system of construction shall be stated, and the character of the reinforcement described' *The words 'system' and 'character' are intriguing, but no definition is given.*

(R/C) Clause 1, para 4. 'The work of each storey shall be given separately, and the heights above or below a given datum stated'. *This is very similar to Clause 18, para 4 of Concretor' above.*

(R/C) Clause 1, para 8. 'Concrete ...given...(as) described in Concretor, and any additional labour required such as filling-in in layers and tamping shall also be described'. *The mention of additional labour is important since no labour as such is included in Concretor, whilst Preliminaries, Clause 1, para 3 of SMM1 says that all labour is held to be included. The clause could have been a mistake.*

(R/C) Clause 1, para 11. 'The steelwork shall be measured and given in the manner described in Smith and Founder'. *Very few items in Smith and Founder apply to reinforcement, and they are in the most general terms, so it is unsurprising that Edition 3 includes a Reinforcement sub-section in Concretor.*

(R/C) Clause 2. 2nd sentence. 'Footings shall be given separately, and the form described'. *This can only be thought of as a mistake. R/C footings would be created by the formwork.*

The item for footings in Bricklayer section (Clause 30) measures them in with the general brickwork. Perhaps the word should have been 'foundations'.

(R/C) Clause 9, para 5. 'Joints or connections between vertical and horizontal members shall be enumerated and described'. *From the point of view of measurement, these joints in reinforced concrete make no difference, so can be omitted without any problem. The formwork, reinforcement and concrete have all been measured, so from the measurer's viewpoint, the 'work' has been described. From the practical point of view, this is a meeting point of a number of reinforcing rods and stirrups which make it more awkward to place and vibrate the concrete, thereby creating an additional cost, so the item has importance, not only in cost terms but in terms of the integrity of the concrete, since they need particular attention.*

(R/C) Clause 9, para 6. 'Special jointing or connection between the (floor or wall) slabs shall be given in ft run, stating the thickness of the slabs'. *Comments here are similar to those of para 5 above.*

(Piling) Clause 12, para 1. '...the time in which the work has to be executed shall be stated'. *It is believed that an error has been made here in not connecting this wording with the tidal nature of the piling, i.e., the clause should have read 'the timing of the work should be stated' so that the contractor knows that he can only work for (say) six hours from low tide.*

Items omitted from Bricklayer is:

Clause 39 para 3. 'Polygonal walls shall be measured the mean length, and squints and birdsmouths measured as hereinafter described (see clause No. 49)'. *Clause 49 informs that squints and birdsmouths shall be given as rough, fair or purpose made. However, we are not told how many sides the polygon has, or if it is regular or irregular. It cannot be calculated from the total area, from the length, or from the length measured for squints and birds-mouths.*

The sections examined in SMM3 include 84 clauses or sub-clauses which did not appear in SMM1/2, i.e., they are new clauses. These are listed below:

- Preliminaries: Clauses 1c, 2b, 3b(iii), 4a, 4b, 5, 11(ii), 27, 34
- Excavator: Clauses 1c, 6a(ii), 6b, 7a, 8a(iii), 12a, 12b, 12g, 14.
- Concretor: Clauses 1c(i), 1c(ii), 1d(iii), 3, 7a, 7b, 7c, 8, 11a, 11d, 17b, 18, 19, 20a, 20b, 24, 25(i), 25(ii), 25(iii), 25(iv), 26a, 26b, 26c, 26d, 26e, 27, 28, 29, 32a, 32b, 32c, 32d, 33a, 33b, 33c, 34a, 34b, 34c, 34d, 35, 36, 37, 38, 39, 40, 41, 42, 43b, 43c, 45, 47d, 49.
- Bricklayer: Clauses 1b, 1f, 1g, 15, 23, 28c, 35b, 37, 38, 39b, 39c, 43a, 43b, 44g.

Detailed examination of each is as follows:

Preliminaries

Clause 1 (c) ‘Unless otherwise stated, all work shall be measured net as fixed in place’. *The contractor is here being told that he should include for a cost, which presumably is not wastage because wastage is included in item 1(d) ‘The description given of each unit of measurement shall be held to include waste on materials, carriage and cartage, carrying in, return of empties, etc....’ Although wastage is there shown as a separate item, the waste factor allowed on many materials should include carrying in, inspection, re-loading returned materials and dealing with the consequent paperwork, which is sometimes considerable. How such costs are to be dealt with in a different system will require to be taken into account. Note: although 1c, which is a general clause, does not appear in the preliminaries section of SMM1, it does appear in the ‘Reinforced concrete’ section of that document.*

Clause 2 (b) ‘A general description of the works comprised in the contract shall be given. The height of the building above and below ground level shall be stated together with the number of floors for the purpose of hoisting’. *A similar but shorter clause is included at Concretor 32. There is no ‘general description’ in SMM1/2, but concrete to the various levels is given separately in Concretor Clause 18 (iv), and heights of brickwork above*

ground level in Bricklayer Clause 37. There is little to choose between the two editions in this respect.

Clause 3 (b) (iii) ‘...also be informed where keys may be obtained...’

Clause 4 (a) ‘The particulars that will be inserted in the Appendix...’, and ‘tendering for provisional sums’ *have no direct bearing on the work to be carried out.*

Clause 4 (b) ‘If possession of site is to be given in sections and at different dates, this shall be so described, and the dates given’. *No direct bearing on the work description.*

Clause 5, Clause 11 (ii), Clause 27, and Clause 34 . *Comments are as Clause 4 (b) above*

Excavator

Clause 1 (c). ‘All excavation shall be described as excavate and get out (or excavate and basket out as hereinafter provided);... subsequent disposal of... excavated material ... given as a separate item. This...shall not apply to such ... as small manholes, drain & pipe trenches, shallow foundation trenches &c.... (where)... disposal may be included with the ... excavation’. *This statement avoids phrases like ‘excavate and deposit’, which would imply a further item of, perhaps, excavate from spoil heap and load to transport. ‘Get out’ indicates that the excavated material is in ‘mid- air’ ready for disposal. Clause 10 deals with the disposal of the soil, either to a shoot provided by the contractor or to a spoil heap on site. Using the expression ‘get out’ means that the contractor has no claim for any double handling at the side of the excavation. In that way, the contractor is faced with a ‘risk’ item, despite the fact that the spoil, in hand digging, will have to be placed in a short-term spoil heap at the side of the excavation. In the case of mechanical excavation, the contractor must have transport continuously available whilst excavation is taking place to avoid temporary spoil heaps, for which there is no payment.*

Clause 6(a)(ii) ‘...pier holes and post holes not exceeding 1 yard cube shall be enumerated’.

Clause 6 (b) ‘Where pier holes exceed 5 feet in depth a minimum measurement on plan of 4 ft x 4 ft shall be given for both excavation and planking and strutting’. *In effect, this clause acknowledges that when a hole is deeper than 5ft, a working space of at least 3ft 8ins x 3ft 8ins, (allowing for poling boards) is necessary.(it is little enough)*

Clause 7 (a) ‘A description of the work to be underpinned shall be given stating its length and the depth of the underpinning. An item shall follow in feet run for providing and fixing all necessary supporting timbers to the work underpinned giving particulars thereof where practicable’. *This appears to be intended to clarify the somewhat vague instruction of SMM1, Excavation, clause 11, para 6, which contains the sentence ‘The description of the work to be underpinned shall be given as fully as practicable, and an item shall be given...of ‘Provide and fix all necessary timbering in connection with the foregoing underpinning’’. The clarity of meaning of that sentence was questioned earlier in section 4.2.4.2., ‘Detailed examination of Excavator’, clause 11, para 6, sentence 4 (ii)*

Clause 8 (iii). ‘...where the quantity cannot be ascertained, a provisional quantity shall be given’. *This has been covered in Preliminaries 1 (b); its inclusion may demonstrate a need for a ‘general’ section, containing items which apply throughout the document.*

Clause 12 (a). ‘The term planking and strutting shall mean everything requisite to uphold the face of earthwork with the exception of special shoring’. *This seems to be another attempt to clarify SMM1 with regard to ‘timbering’ mentioned in SMM1 Excavator, clause 11, para 6.*

Clause 12 (b). ‘Planking and strutting to basement excavation shall be given in ft sup and the depth down to the general level of the excavation shall be stated. Any special shoring required shall be measured or described’. *This has to be looked at in conjunction with Clause 12 (a) which mentions special shoring. The interesting part is the statement of the alternative – measured or described, which indicates that the committee accept that measurement does not always provide all the information about an artefact or an operation; there is sometimes another way needed, and that is to describe it. There hangs one of the central tenets of this entire examination.*

Clause 12 (g) ‘Where retaining walls are to be constructed in two thicknesses involving the shortening of struts or shores and re-strutting or re-shoring, the planking and strutting shall be given separately and so described’. *This item looks as if it might be a response to a method of construction that was not well known at the time of SMM1, and so is a ‘legitimate’ novation. In researching the clause, the Questions and Answers section appended to SMM3 was examined. A statement was found that reads* ‘...the onus of

deciding whether planking and strutting is necessary...is upon the Contractor and not upon the Surveyor'. This led to speculation as to whether such an attitude would be allowable these days, and may be referred to in discussion later.

Clause 14. 'Hardcore filling exceeding 12" thick shall be given in yds cu and described; where 12" thick or under it shall be given in yds. sup stating the thickness'. *This is clearly rectifying omission of the item from the first edition.*

Concretor

Clause 1 (c) (i) – 'Any treatment of the finished face of concrete, beyond the ordinary depositing, spreading or levelling, shall be described and given in yds or ft superficial'. *SMM1 has no mention of finishings except to steps and landings in situ and for cast concrete work, so this is either the correction of an omission or the inclusion of an extra technique.*

Clause 1 (c) (ii) 'In the case of concrete measured as a superficial or running item, such finish may be included with the item'. *This merely provides an alternative to clause 1(c)(i) in specific cases.*

Clause 1 (d) (iii) '...and the system of construction and character of the reinforcement described'. *This requirement has been added to Clause 21 of SMM1 and is derived from Clause 1 (iii) of the Reinforced Concrete section of SMM1. As in A.5.1., the words 'system' and 'character' are not defined, making the clause difficult to understand.*

Clause 3. 'Concrete in small bases for fencing posts and the like shall be enumerated and the sizes given'. *Again, this appears to be correcting the omission of an item from the first edition.*

Clauses 7 (a) (i), 7 (a) (ii), 7 (b), 7 (c), 8, 11 (a) (iv), 11 (d), 18, 20 (a), 20 (b), *Comment as Clause 3.*

Clause 19. 'Work involving cutting in concrete shall be separately given; grooves, chases and the like shall be given in feet run, and holes, mortices and the like enumerated and described'. *This is specific to 'cutting' concrete as opposed to 'forming' the items.*

Reinforcement

Clause 20(a) 'Particulars shall be given of any tests to be applied to samples'

Clause 20(b) 'Any special restrictions in regard to hot or cold bending shall be stated'

Clause 24 'If high carbon steel is to be used it shall be given separately and all bends in same shall be enumerated and described as forged bends.'

Formwork

Clause 25 (i) 'Formwork... measured the actual surface in contact with concrete' *In SMM1 it stated '...allowance shall be made ...for overlaps and passing at angles', so that the quantity measured has been lessened.*

Clause 25 (ii) 'It shall be given in yds sup for the larger areas...otherwise in ft sup'. *SMM1 allowed formwork to be measured in squares, yards or ft sup, so squares are no longer allowed as a measure.*

(The remainder of Clause 25 is included as separate items in SMM1, i.e., wrought timber and timber left in.)

Clause 26 (a)'...descriptions... include straight cutting and waste, notchings, allowance for overlaps and passings at angles, battens, strutting, bolting, wedging, easing, striking and removal' *This goes with item 16 above in net measurement; notchings were measured in to SMM1. Strutting, bolting, wedging, easing, and striking were all included in the description in SMM1, so this appears be a clarification that formwork is treated in the same way as centering and casing.*

Clause 26 (b) 'Where...height of...strutting exceeds 13 ft formwork...given separately and height stated'. *There is no similar item in SMM1, so this might correct an omission.*

Clause 26 (c) 'Filleting to form stopped chamfered edges or splayed internal angles n.e. 2" wide shall be included in the description of beams &c'. *The items were measured in ft run with stoppings enumerated in SMM1, so there has been a reduction in the number of items measured.*

Clause 26 (d) 'Raking or circular cutting and waste and rounded or moulded edges...given in ft run. Moulded stoppings shall be enumerated.' *This omits the measurement of splayed stoppings.*

Clause 27. 'Formwork...shall be classified...' *Grooves and chases are omitted from the SMM1 list; tops and cheeks of dormers, sides and soffits of beams and lintels, and sides of piers and stanchions are 3 new classes.*

Clause 28. 'Formwork measured both sides of walls and surfaces sloping more than 15 degrees from horizontal'. *The only difference is that this was called 'sheeting' in SMM1*

Clause 29. 'All formations in concrete surfaces (other than the chamfered edges and splayed internal angles before mentioned) and details where produced by formwork shall be measured'. *The bracketed section refers to item 26 above, so this is pertinent to chamfered edges and splayed internal angles over 2" wide and any other (unidentified) formations.*

Clause 32 to 42 (19 clauses and sub clauses) are a completely new section headed 'Patent Fire Resisting Floors &c' so require no comment.

Piling

Clause 43 (b) 'If piles are to be driven from any other level than Ground level this shall be stated; if the piling frame is to be lowered or raised the exact height and nature of the work shall be described. Driving canted piles shall be given separately' *This has no comparable clause in SMM1.*

Clause 43 (c) 'Any extra excavation that may be entailed for the movement of the piling frame about the site in order to place the hammer over any pile which may be situated in an angle or similar position, shall be measured or covered by provisional items together with any necessary filling in and ramming afterwards'. *Comment as Clause 43 (b)*

Clause 45. Piles driven close together to form sheeting enumerated separately from piles not in contact, describing type and weight of shoe and type of interlock, if any. *There is no comparable clause in SMM 1. The mention of 'interlock' indicates that they are thinking of sheet steel piles such as Larssen type steel piling, which might not have been as well-known as it became later.*

Clause 47 (d) 'Cutting or burning through sheet piling shall be given in feet run'. *The comparable clause in SMM1 is 'Cutting or breaking away heads of piles to required levels shall be enumerated.'; this applies to timber and concrete - not to steel piles.*

Clause 49. 'If any special system of piling is required the general principles given ... shall apply; in the case of cylinder sinking the total quantity of excavated material brought to the surface for removal shall be given in yards cube'. *It is not clear what this means. It reads as if the quantity is of excavated material. not the solid (which should be possible to calculate if the length of drilling can be established), and which goes against their normal practice of measuring excavation in the solid.*

Bricklayer

Clause 1 (b). 'The general height to which the brickwork rises shall be stated'. *The comparable clause in SMM1 is 'All brickwork more than 40 ft above ground level shall be given separately, or an item of extra hoisting given in stages of 20 ft; otherwise, the height of the eaves above ground level and the extreme height to which the brickwork rises shall be stated'. None of these methods is precise.*

Clause 1 (f) 'Brickwork in very small quantities, such as brick supports to sinks, &c., shall be given separately'. *This is a new clause – there is no comparable clause in SMM1.*

Clause 1 (g). 'All labours to existing work shall be given separately and so described'. *Several clauses in SMM1 refer to work on old walls, but there is no comparable general clause.*

Clauses 15, 23, 28 (c), 35 (b), 37, 38, 39 (b), 39 (e), 43 (a), 43 (b), 44 (g). *New clauses.*

Clause 39 (c) 'The description for setting ranges shall include for setting back boiler (if any) and for forming all short flues and fixing covings, soffit plates, dampers, &c.; connections of hot water pipes to boiler shall be measured, described and given separately in the hot water fitter's work. The cutting away for hot water pipes shall be given as hereinafter described'. *This is more detailed than in Clause 62 of SMM1.*

4.2.6.3. Conclusions drawn from examination of SMM1/2 and SMM3

SMM1 (1922) demonstrates its good intentions in several ways. The Preface indicates that one of its aims was to ensure that the items in bills of quantities (BQ) were unambiguous, and that it hoped to assist in scientific and accurate tendering. In the Preliminaries it develops the theme, insisting that the BQ must fully, completely and accurately represent

the work, except for provisional items which by their very nature are indeterminate at early stages. That clause is repeated in the Preliminaries section of SMM3.

The Excavator section allows for working space for damp- proof covering, (in those days it was inevitably asphalt, carried out in the UK by a group of powerful specialist companies including Val de Travers Ltd [incorporated 1871], Tarmac Ltd [incorporated 1903], Limmer and Trinidad Lake Asphalt Co Ltd [incorporated 1921], Neuchatel Asphalt Co. Ltd [incorporated 1932]), but working space for other trades was not considered. It is thought here to be obvious that all trades in all situations need space in which to work.

The working space for asphalt is carried through into SMM3, the wording of the clause being very similar. The requirement for working space in which to carry out their work is apparent for every trade – it should not be the prerogative of any trade to be able to impose its will upon its own work without the benefits of the argument being available to all other operatives.

Excavation is dealt with generally in 5ft stages below the level of the site stating the commencing level with SMM3 following the same rule.

Concretor; edition 1, dealing with floor and roof slabs, instructs that the various levels shall be given separately, and the approximate heights of hoisting stated. This is omitted from the Concretor section of SMM3, thus giving less information about position in the later edition, although a new section – ‘Patent Fire-resisting Floors, Roofs, &c.’ is included, with Clause 32 (a) reading ‘A general description of the building stating its approximate area, height, and number of storeys and the height of each storey shall be given’.

Bricklayer: ‘Raising old walls or on girders shall be given separately, and the height at which (it)... commences...stated’. In SMM3 this clause has been considerably extended – ‘The necessary scaffolding for building brickwork in raising or off girders shall be given in feet run stating the height above ground at which brickwork commences. This shall only be given in cases where there is no brickwork immediately below the girders and it shall not apply in the case of steel framed buildings’. The wording is confusing – if an

existing wall of, say, 4ft 6ins height (1.37m) is to be built upon, it is clearly necessary for scaffolding to be erected alongside the existing work before the new section of wall, and its scaffold, can be raised. The situation is similar with work off girders; if there is no brickwork below the girder, a scaffold has to be erected up to the level of the girder before the new brickwork can commence, or special hanging scaffold to be erected; if there is existing brickwork below the girder, the situation is precisely the same. It is only where there is new brickwork up to the girder that scaffold for that brickwork can be assumed to be already accounted for, and scaffolding for the raising brickwork will be measured from the level of the girder.

The cause of this problem is explained by the fact that scaffolding generally is included (but not measured) in Preliminaries, clause 7 (a), and that in consequence it is assumed that the contractor will have used the measurement of general brickwork in the BQ to price the Prelims item. Since the brickwork in raising is measured separately, there is a possibility that it would not be included in the contractor's calculation of scaffolding area. Why the situation should be any different in steel framed buildings is not understood, unless the committee believed that all the brickwork in such buildings would be in raising off girders. The item continued to be used in SMM4 but was discontinued in SMM5.

'All brickwork more than 40ft above ground level shall be given separately, or an item of extra hoisting given in stages of 20ft'. (Why this particular height has been chosen is not known). The item has been omitted in SMM3, perhaps because of a new clause (2b) in its Preliminaries section – 'A general description of the works comprised in the contract shall be given. The height of the building above and below ground floor level shall be stated together with the number of floors for the purpose of hoisting'. It is clear that the committee understood that hoisting constitutes an important part of cost but did not wish to consider it in respect of individual items, leaving it to the contractor to include a sum (calculated in a manner which is not explained) for items such as hoisting and scaffolding.

Clause 2b of SMM3 was repeated in SMM4; in SMM5 it applied only where drawings are not supplied to tenderers with the BQ, similarly with SMM5 (metric). In SMM6, the provision of general scaffolding had been reduced to 'Preliminaries: General facilities and

obligations. Clause B13.1.b. Scaffolding.’ SMM7 changes to tabulated form and the reference is in ‘Section A, Preliminaries. A44. Contractor’s general cost items: Temporary works.1.3. Access scaffolding’. A similar but extended form is given in NRM2.

‘Brickwork of the various stages in chimney shafts shall be given separately, the heights and thicknesses stated, and the shape of the shaft described, and if built from an outside scaffold it shall be stated’. This clause is repeated in SMM3.

The above examples show that there is some regard for practical considerations, together with their cost effects in these sections, which carries on through the document into other trades, e.g.,

- a) Drainlayer has stoneware drains measured in lengths divisible by 2 feet, (because the pipes were manufactured in that length).
- b) Reinforced concrete has a clause ‘The work of each storey shall be given separately, and the heights above or below a given datum shall be stated’.
- c) Waller and Stonemason sections, as for bricklayer, instruct that work above 40ft above ground level to be given separately.
- d) Carpenter, under the heading of ‘formwork for reinforced concrete’ defines that ‘where beams exceed 8 ft length, a separate item shall be given for supports every 5 feet’.
- e) Smith and Founder, Clause 6, states ‘In the case of holes in rolled joists, those in web and those in flanges shall be given separately’, because the web is thinner than the flange and is of uniform thickness, but the flange is tapered so that the thickness is variable.

Despite the above allowances, apparent requirements, such as the need for temporary scaffold, bandstands, hop-ups, step ladders and boards, and so on, are not included in the places where they might be expected, i.e., in the items of bricklayer, plasterer, painter, where they could be directly associated with the work. They are supposedly covered by the item in Preliminaries, after Clause 6, where the contractor’s attention is drawn to the need for allowance to be made for such items. That is not the same as describing ‘how much of what’ is required, and because of aggregation of supposedly similar items, it

would be necessary for contractors to carry out their own taking off exercise if they wished to arrive at logical calculations of cost. That process however is subject to the relatively short time of tendering.

Inconsistencies in the document include:

1. Artificial stone, terra cotta, faience etc., has a clause which includes in its classification the work of modellers in the factory, which forms part of the product manufacture, not work of incorporation into the building. This is probably due to the influence of the specialist on what should be measured.
2. Joiner, Clause 29, para 4 orders that 'Floors shall be measured the dimensions after laying – i.e., no allowance shall be made for tongues', and the work has been measured net. Sheet piling, however (Clause 28, paragraph 4), states that all laps should be added to the superficial measurement. It might be considered, for example, that the interlocks in Larssen section steel piles are the equivalent of tongues and grooves in flooring. All materials should be treated in a similar manner, or strong reasons given why that should not happen. The difference in the above example is possibly that sheet piling is carried out by specialists who had a firm voice in what should and should not be measured, whereas carpenters were directly employed by contractors and had no influence.
3. In Reinforced concrete, Clause 1, para 5, reads 'All work shall be measured net', but Clause 11, para 2 states that 'Laps in sheet reinforcement shall be added to the measurement'.
4. External plumber Clause 1, para 5, has allowances for drips, rolls, passings, welted laps, welted edges and turn ups, although Clause 1, para 1 of the section states that 'Lead shall be measured net as fixed...'

4.2.7. Examining SMM4

4.2.7.1. Generally

The fourth edition of SMM consists of 77 pages including a single page contents list, somewhat less than the 88 pages of edition 3. It is divided into 19 sections, the first being 'General Principles', the second 'Preliminaries', the rest being trade based, i.e., 'Excavator', 'Concretor', 'Bricklayer', etc. The clauses retain the format set by SMM3, i.e., numeric, with sub-clauses using lower case alphabetic identification.

The same sections are examined as previously, except that 'Preliminaries' is now preceded by an additional section, 'General Principles', which has been included in the examination because it contains some items transferred from the previous Preliminaries.

The General Principles section of SMM4 has 11 clauses; Preliminaries section has 58 clauses and sub-clauses; Excavator has 49; Concretor 117; Bricklayer 142, totalling 377. For those 377 clauses and sub clauses, a total of 2239 coded comments were made about the sections, and 37 separate codes used, as previously established.

Coding has been carried out in Appendix A, starting on p. 91.

4.2.7.2. Comparison of SMM4 with SMM3

SMM4 begins with a new section, 'General Principles', which has 11 clauses that apply throughout the document. This is followed by 'Preliminaries' with 58 clauses and sub-clauses, 'Excavator' has 49, 'Concretor' 117, 'Bricklayer' 142. 'Concretor' includes 'Piling' as a sub-section, 'Centering' is included as a sub-section in 'Carpenter'; in SMM1 centering included formwork and was referenced in the 'Concretor' section so for continuity of comparison it was necessary to examine the centering clauses. The sections are derived from separating SMM by trades.

In total, the selected portion of SMM4 has 377 clauses and sub clauses, compared with the 338 of SMM3, an increase of 39 (11.5%).

40 new clauses appear in SMM4, and 21 have been dropped from SMM3. As with the comparison of SMM1/2 and SMM3, the results do not tally because of the way that whole clauses of SMM3 have been split into sub-clauses or combined into different clauses in SMM4.

There are 8 items omitted from SMM4 - General Principles / Preliminaries that were in SMM3. (The two sections are combined because General Principles is a new section derived from SMM3 Preliminaries. These are:

1. Clause 4(a)(ii). *This may have been omitted because it has nothing to do with measurement of the works.*
2. Clause 4(c)(ii). *This has nothing to do with measurement, although it could affect the overall cost of the work.*
3. Clause 5. *Covered by clauses 4 and 5 of Preliminaries.*
4. Clause 6(a). *It might be expected that these are covered in the Architect's fees.*
5. Clause 6(b). *It could be anticipated that the drawings are solely for the contract works.*
6. Clause 6(c). *This will occur when the tender is submitted.*
7. Clause 11(ii). *Covered by clause 1 of General Principles*
8. Clause 13. *The employment of a Clerk of Works is not the responsibility of the contractor. There is no provision for Architect's office.*

60 items have been brought forward to 'General Principles (G.P.) and Preliminaries (P)' from SMM3 unaltered or slightly altered. The only one of significance follows:

Clause 1, (G.P.) reads 'BQ shall fully describe the materials and workmanship and accurately represent the work to be executed' *and may be regarded as the equivalent to clause 1(b) of SMM3 Preliminaries, except that in SMM3, the comparable clause, 1(b) of Preliminaries (which started life in edition 1) reads 'BQ shall fully, completely, and accurately represent the work to be contracted for...' Why would it be necessary to alter the wording, dropping the word "completely" unless there is something highly significant that needs to be changed from the committee's point of view? It could be that the change is due to a realisation that the descriptions do not fully and completely represent the work*

although they may be considered accurate in what they do contain. This is a further example of where 'work' is not the same as 'works'. On the other hand the reason for alteration may have been that 'fully' and 'completely' were thought to be synonymous.

There are 9 new items in General Principles/Preliminaries, those requiring comment are given below:

Clause 2 'The SMM, whilst it aims at providing uniform units of measurement, is a definition of principle rather than an inflexible document. In particular and exceptional cases, the Surveyor is expected to use his discretion and to adopt special methods, provided the principles of measurement laid down are observed and the intention is made clear to the estimator. If it is in the interest of accurate and practical estimating, he may give more detailed information than is demanded by strict adherence to the document'. *This is a strange clause because it is directed only at the quantity surveyor. It is also important as an indication of the way of thinking – the committee are aware that SMM does not give the estimator full information that is necessary for accurate and practical estimating. At the same time, q.s. are not in a position to know fully what information is needed by builders' estimators, and there is no intrinsic reason why q.s. should have the right to define the needs of estimators.*

Clause 7 'All measurement of cutting shall, unless otherwise stated, be held to include for the consequent waste'. *Most cutting on most materials is straight cutting which is not measured; the result is that little or no waste is calculable from BQ. Much waste stems from lack of co-ordination of dimensions of different components in pieces of work, e.g., stud partitions and plasterboard covering. If 'pieces of work' were to be described, calculations of waste and feedback to designers would be much easier.*

Clause 8, 'Where a min area is defined for ddt of voids... ddt shall refer only to openings or wants detached from boundaries of the space measured. Reductions of area caused by projections from the boundary of the space measured shall always be the subject of deduction irrespective of size'. *The second sentence is worded oddly – how can an area be reduced by projections from the boundaries?*

Clause 9; 'Circular work shall be given separately; the term 'circular' shall be deemed to include any form of curve'. *Why this? 'Curved' includes circular, it is quite illogical to put it in the reverse.*

Clause 10, Clause 4(c) (*Preliminaries*) 'Any items affecting price which are incidental to or in amplification of such clauses shall be fully described'. *This clause was dropped from the next edition. It must have been difficult fending off enquiries about changes of direction or intersections of walls, including stud partitions.*

Excavator has 2 clauses omitted:

Clause 12(d) 'Alternatively the length of the trenches may be given in feet run and the item described as planking and strutting to both sides of trenches, stating the width and depth'. *Alternatives appear less acceptable than in previous editions.*

Clause 12(j) 'Planking & strutting to excavation circular on plan shall be given separately & so described'. *This is covered by clause 7 of 'General Principles'.*

and 6 clauses added, of which two require comment:

Clause 7(b) 'Preliminary excavation down to the base of the work to be underpinned shall be given separately and so described'. *This has been covered in the 'Questions and Answers' section included with SMM3. The question was 'Is it intended that excavation preliminary to...underpinning be measured as 'in underpinning' ...not as 'preliminary...? The answer- 'No. It is intended... to be...with the trench or bulk excavation'.*

Clause 12(a)(ii) (*The term planking & strutting*) '...covers the responsibility for upholding and maintaining the sides of earthwork by whatever means, if any, are considered necessary having regard to the nature of the ground. Items of planking and strutting shall be given under the following rules, whether any is in fact required or not, so that the Contractor's risk may be priced'. *The answer to Question 12 of the Q and A section of SMM3 indicates that the contractor's risk might not be fully understood. This clause appears to provide an explanation.*

Concretor has 4 clauses of SMM4 omitted:

Clause 7(c) 'Wedging up under stanchion bases or under steel grillages shall be enumerated and if steel wedges are to be provided it shall be so stated'. *Now included in SMM4, 'Steel and Ironworker', 2(g).*

Clause 30(b) (*Precast concrete work*) 'The labour on each item shall be described'. *Clause 6 of 'General Principles' instructs that every item is held to include labour. This clause was probably intended to indicate that 'labours' such as throating, stooling, grooves for water bars, etc., must be described for each of the items, but has been poorly worded and so omitted.*

Clause 32(a) (*Patent fire resisting floors roofs, etc.*) 'A general description of the building stating its approximate area, height, and number of storeys and the height of each storey shall be given'. *Clause 1 of 'Preliminaries' covers this item.*

Clause 44 (*Piling*) '...(giving) the depth of driving; if in water it shall be so stated. The price for driving shall include for all staging, driving apparatus, and shifting to the required position. Weight of monkey and maximum amount which the pile is to be driven by last four blows should be stated'. *Clause 11 of 'General Principles' covers work in water. From 'the price...' may be regarded as describing the work rather than the result, and so has been omitted, and 15 clauses added:*

Clause 1(d), 5(b)(ii), 5(c), 19, 23(a)(ii), 23(a)(iii), 23(b), 26(a)(iii), 26(b), 26(c), 26(d), 31(c), 33, 37(b), 50(b).

Clause 5(c) *states that concrete beds laid in bays as necessary are to be identified but adds that the description should include formwork to the joints between bays, so that for both the bays and the formwork the information is not sufficient to be able to price the work accurately.*

Clauses 23(a)(ii) and (iii) *say that (a) 'no deduction shall be made for openings less than 10 ft sup.' presumably assuming that the cost of setting out, cutting and wastage is equal to the cost of the material measured, (b) the description shall include the bending of the fabric as necessary (how can an estimator price that item?), (c) 'and the extra material at*

laps, particulars of which shall be given.’, *despite having stated previously in the same clause that ‘only the net area is to be measured’!*

Clause 26(d) ‘No deductions shall be made for openings less than 10 ft sup’. *On the face of it, that sounds reasonable, but the downside is that openings over 10 ft sup, which includes all doors, all stairwells and most windows come into the latter category, The practicality of the matter is that the usefulness of a sheet of ply is reduced by cutting holes in it, and there is not a lot of point in cutting a hole which will be surrounded by shuttering to the reveals of the door, window, etc. The result is that the clause need never to have been included.*

Clause 50(b) *contains the glib statement: ‘The driving of piles... shall be given in feet run measured from the shoe point when pitched to the shoe point when driven’. So, how do you get someone to do that, then?*

Bricklayer has 6 clauses omitted:

Clauses 1(a), 1(b), 1(f), 42(e)

Clause 43(b) ‘Forming of openings (*in partitions*) shall be enumerated’. *This could have set a precedent for openings in brick walls, which is perhaps why it was omitted.*

Clause 54(a)(ii) ‘Strings not exceeding 12 inches long shall be enumerated and described including the ends; breaks around pilasters not exceeding 9 inches wide shall also be enumerated’. *The clause is difficult to understand – a string course 12” long cannot be called a string; it is not clear whether the 9” wide refers to the pilasters or the strings. What a pleasure to see it omitted.*

and 9 clauses added:

Clauses 18(c), 18(d), 21(f), 27(e), 27(f), 32(b), 40(b), 40(c), 43(c).

4.2.7.3. Conclusions drawn from comparison of SMM4 with SMM3

SMM4 was published 3 years after the end of WWII, a time when much rebuilding was being carried out, when materials were in relatively short supply, timber was purchased on licence, and in order to speed up the process, considerable pre-fabrication of dwellings and simplification of design was necessary. New methods were being used and the 4th edition reflects this to some degree, perhaps tentatively, as the Ministry of Works Schedule of Rates had been used extensively in lieu of Bills of Quantities during the war. There is no radical change, however, despite new sections being introduced to deal with Heating and Ventilating and Electrical work – the concept remains unaltered. Possibly the most important change in this edition is the wording of clause 1 of the General Rules.

4.2.8. Examining SMM5

4Generally

SMM5 consists of 109 pages excluding Preface, Contents and Introduction pages, which is a considerable addition to the 77 of the previous edition (41%) It has 23 sections compared with the 19 of SMM4, omitting ‘Pavior’ and ‘Heating and Ventilating Engineer’, adding ‘Demolitions and Alterations’, ‘Piling’, ‘Underpinning’, ‘Rubble Walling’, ‘Metalwork’, and ‘Fencing.’

The sections examined have changed in titles from the previous, ‘General Principles’ has become ‘General Rules’, there is then the new section for ‘Demolitions and alterations’, ‘Excavator’ has changed to ‘Excavation and Earthwork’, ‘Piling’ has a separate section, ‘Concretor’ becomes ‘Concrete work’, ‘Bricklayer’ changes to ‘Brickwork and Blockwork’, followed by ‘Underpinning’ as a separate section when it was previously single clauses in Excavator, Concretor and Bricklayer. The new sections are necessarily included in the examination because they cover items included in other sections of previous editions.

As with previous editions, code results are given in Appendix A.

4.2.8.1. Comparison of SMM5 with SMM4

Introduction

A major difference between the two editions is the 'Introduction', on an un-numbered page, which changes the wording of a clause significantly from its counterpart in SMM4, clause 2 of 'General principles'. It reads:

'The Standard Method of Measurement provides a uniform basis for measuring building works and embodies the essentials of good practice but more detailed information than is demanded by this document should be given where necessary in order to define the precise nature and extent of the required work. The Standard Method shall apply equally to the measurement of proposed works and of executed works'. This should be read very carefully and compared with clause 2, 'General Principles', SMM4.

It is clearly a very important statement, which might be used in legal argument. Since the people supplying the information demanded by the document are quantity surveyors, it must be supposed that it is they who decide the necessity of additional information. Equally, it may also be supposed that where additional information is not provided, they have decided that it is not necessary. The users of the information have no say in the matter.

The same statement appears in all subsequent editions of SMM/NRM2, reverting to being included in the general rules section of SMM6 and editions following, so it appears to be regarded as important by each committee. Perhaps it is a defensive move, since the longer it goes unchallenged, the more it can be said to be accepted by the industry.

General Rules

There are 21 clauses and sub clauses in SMM5 General Rules compared with the 11 of SMM 4 General Principles.

A2(a) *has had a phrase added*, 'each measurement shall be taken to the nearest whole inch'; A3(b)(i) *makes it plain that* 'labour and all costs in connection therewith' *is deemed*

to be included (SMM4 stated categories which were to be included, but these might not have covered all labour).

A3(b)(iv) deems that the use of plant is included.

Two of the SMM4 General Principles items have been dropped; these are:

Clause 7, 'All measurement of cutting shall, unless otherwise stated, be held to include for the consequent waste'; SMM5 General rules, A3(b) states 'Unless otherwise... stated in the bill or herein...waste of materials (and) square cutting are deemed to be included with all items', so the dropped items have been partially covered in the new items, circular cutting being given separately in SMM5 but deemed to include waste.

Clause 9, 'Circular work shall be given separately; the term circular shall be deemed to include any form of curve'.

Clause 8 of SMM4 has become Clause A2(b) of SMM5, and the wording altered for the second part, changing the 'odd' phrase of SMM4.

Preliminaries

The section contains 53 clauses and sub clauses, compared with the 58 of SMM4. There are 15 new clauses: B3(b)(ii), B4(a), B5(a)(preamble), B5(a)(ii), B5(a)(xi), B10, B12, B14(b) and (c), B17(b), B20(a)(c) and (d), B21(a) and (b)

There are 2 clauses which enlarge upon the information in SMM4 but have no effect upon this study, these are: B3(b) and B5(a).

15 items from SMM4 have been dropped. These are:

4(c) 'Any items affecting price which are incidental to or in amplification of such clauses shall be fully described'. This is interesting, because it appears that the SMM5 committee do not wish items which affect price to be identified, whereas the SMM4 committee had inserted that clause. Perhaps they believed the clause to be covered by A1- 'Bills of quantities shall fully describe and accurately represent the works to be executed'.

12; 13; 14; 16(b); 18; 22; 23(a); 23(b); 24; 25; 27(a); 27(b)(ii); 27(c); 32(c).

Demolitions and alterations

Since this section is entirely new, there is no question of ‘new’, ‘enlarged’ or ‘dropped’ clauses, they are all new to the section. All that can be examined in that respect is: which have been taken from previous sections of SMM4, whether there have been any additions to such clauses, and how many are completely new clauses.

There are nominally 18 clauses and sub-clauses within the section. Thirteen of these are completely new, i.e., clauses C1(a), C2(a), C2(b), C2(c), C3(a), C4, C5, C6, C7, C8, C9, C10, and C11, of which three (C1a, C2a, and C3a) are relatively meaningless, making no contribution to the information. Five clauses which have been taken or adapted from previous SMM4 sections are C1(b), (c), (d), (e), C3(b), and they relate to clauses 31, 34 and 35(a) of SMM4 Preliminaries section.

Additions to the clauses transferred from SMM4 are (i), C1(b) includes scaffolding with the shoring incidental to demolitions and alterations described in clause 31, (ii) Clause 31 excludes shoring in connection with cutting openings, since that is anticipated to be included in a ‘Works on site’ bill, (iii) C1(b) excludes major shoring such as to old buildings left standing which is dealt with in Clause C10, (iv) the re-use of reclaimed materials is dealt with for the first time in C1(e).

Excavation and earthwork

This section is ostensibly comprised of 65 clauses and sub-clauses, but these have had to be divided further in order to compare with SMM4, and also include the new section of ‘Underpinning’, finally amounting to 113 items.

It may be thought initially that clause 1(e) of SMM4 (‘All excavation shall be described as excavate and get out’) is the counterpart of clause D6(c) of SMM5, (‘Getting out excavated materials by any means necessary shall be deemed to be included with the items of excavation’). A moment of reflection, however, shows that the first is telling users how to describe excavation, but the second is stating that the words ‘getting out’ need not be

included in the description. Moreover, the words are meaningless; if a machine, or an operative, for that matter, excavates some material and lifts it, that material has been 'got out'. The question is then what happens to it. If it is deposited at the side of the excavation, the item should say so, whereupon another item is created of 'excavate from spoil heap'. If it is loaded into barrows, that should be described, and there is then an item of 'wheel to somewhere' to consider. If loaded direct to lorries, the item becomes 'excavate, load and cart away to – '. The 'getting out' wording avoids implying a method of working but creates its own problem of possible disputes.

48 new items have been added, of which 6 are relatively meaningless- these are D2, D6(a), D19(a), D20(a), D22(a) and H2. All have the same message – 'For rules relating to Section D (or H) generally see Clause D1 (or H1) hereof'. The others are as follows:

D1(c); D5(c)(ii) ; D6(c)(i) ; D6(d) ; D6(g)(ii) ; D6(g)(iii)

D10(a)(ii) is important in that it requires a minimum width of 2'6" for trenches over 3ft deep, making it possible that the committee have considered the predicament of the bricklayer having to straddle the work.

D10(a)(iv) rules that no distinction should be made between surface trenches and basement trenches, as had been the case in SMM4, and so removes some identification of position.

D10(a)(v) ; D10(b) ; D16(a) ; D16(b) ; D16(c) ; D16(d) ; D16(e) ; D16(f) ; D17(b) ; D17(c)

D17(d) ; D17(e) ; D19(c) ; D19(e) ; D20(b)(i) ; D20(b)(iii) ; D20(c) ; D20(d) ;

D21(a)(ii)

D21(a)(iii) ; D21(d) ; D21(e) ; D21(j) ; D22(b) ; D22(d) ; D22(f) ; D22(g) ; H1(b) ;

H1(c)(ii)

H1(d); H3(c)(ii); H4 ; H6: The clauses of Section H are included because Underpinning has been allocated section H in SMM5, whereas in SMM4 it was included in the Excavator section.

There are 11 Clauses which have not been retained in Excavator section of SMM5 from SMM4, as follows:

1(e)(i); 1(e)(iii) ; 5(a) ; 5(b) ; 8(a)(iii) ; 9(b) ; 12(g)(ii) ; 12(h) ; 13(i) ; 13(ii) ; 14(a):

Some of the clauses retained from SMM4 have been extended. Had they been significant they would have been commented upon, but are here referred to by number.

D1(a), D7, D11(a) and (b), H3(b)

Concrete work

This has been much enlarged in SMM5, with piling having become a separate section. There is no point in writing out clauses for new sections with which there is nothing to compare, so such items have merely had the numbers shown below.

There are 175 clauses and sub-clauses in SMM5 compared with the 117 of concretor section in SMM4, despite Piling having been separated. The useless sentence ‘For rules relating to Section generally, see clause 1 hereof’ has been used 5 times in the section: F2(a), F27(a), F40(a), F47(a) and F53(a). These are not included below.

Clauses added are as follows, comments in *italics*.

F1(a)(i); F1(d); F1(e) ; F1(f) ; F2(d)

F3(b) Foundations to stanchions in trenches classed as trenches. *This is to correct the poor description of 7(a) in the 4th edition.*

F5(d) Concrete for granolithic to be described. *If this is monolithic granolithic, the concrete and grano are so closely linked that they have to be considered together in planning and programming, since the grano has to be laid when the concrete takes its initial set, some hours after placing.*

F6; F7(b) ;

F8(d) Filling to hollow walls in sq yds. Splayed top edge deemed included. *What is the point of including a linear item with a superficial one? The quantity is not calculable without considerable work on the part of the estimator, whereas the q,s has had the information in the taking-off process.*

F10(iv); F13

F14(a) Treatments to unset surfaces in sq yds. If concrete ne 12” thick, it shall be included in the description. *Thickness should not be a criterion in this instance. What should be considered is whether the item must be carried out as a separate operation.*

F18(d) Self centering fabric r/f so described; tempy strutting inc in description, & when above 11ft, height stated in 5ft stages. *‘Self-centering’ fabric is what is more generally known as ‘Hyrib’.* (Glanville. W.H.(ed).1939, Vol. 4. p.231-2)

F19(b) Notching fabric around obstructions enumerated irrespective of size. *The size of the mesh and angle of cut make a difference in the number of actual cuts, why not give that information or the number of cuts?*

F20(a)(II) Where the face of the concrete is troughed or similarly shaped, the method of measuring the formwork shall be stated. *Is that not the purpose of the document?*

F20(c) ; F20(e)

F20(g) Making good exposed faces of concrete after formwork removal shall be inc in formwork description. *Erecting formwork must be a separate operation from dismantling, as is this item. It should not be included in the formwork description.*

F21(d) ; F22(b)

F25(c) Formwork to small machine bases and isolated suspended hearths shall each be enumerated stating the size. *What have the bases and hearths in common? Only that they are of concrete and small. They are not otherwise alike.*

.F26(c) Cutting and fitting formwork around projecting members (pipes, continuity bars) shall be enumerated singly or in groups. *How does that work? Cutting around such items has clearly to be a part of carrying out the formwork, so it should be considered an interruption in the continuity of the formwork.*

F27(a) *All items from this clause to F39 are in a new sub section called Precast concrete units; only those items which require comment are listed below.*

F27(e) Precast units over 6ft long shall be so described, stating the number. *Why that particular length, and why cannot all units be dealt with in the same way?*

F28, Structural units (stanchions, beams, purlins, trusses) shall each be enumerated separately stating the size. *It would have been better worded after 'separately' to end the sentence 'for each size', which would have left no doubt.*

F29(b) Units of irregular shape shall be enumerated stating the size. *It would perhaps have been too much to hope that the shape would also be stated or shown.*

F29(c) Angles and intersections in partitions shall each be given separately in lin yds stating the thickness. *It is interesting that attention should be paid to angles and intersections in precast partitions, but that it should not have been likewise for brick, block, or stone. This could be a precedent.*

F29(d) Notches, rounded corners etc. shall each be enumerated separately stating thickness of concrete and the girth. *Since this clause applies only to precast units, such items will be a part of the formwork, and the formwork is deemed to be included with the item.*

F30(a) *(There are 4 sections to this clause)* (i) Posts and heads to partitions each given separately, (ii) those that are cast on partitions, (iii) Curved members, (iv) Fair ends, rounded ends etc. to be described. *Each of these depends upon the formwork, and for most pieces of formwork that include such items a drawing has to be produced by somebody. Would it not be better to concentrate on describing the formwork?*

F32 to F38. *These clauses concern a variety of different products - shelves, divisions, kerbs etc., but the same comment applies as to F30(a).*

F40 to F46. *These clauses are all contained within a sub-section, 'Hollow block suspended construction', and because the formwork required is very similar to that of the general reinforced concrete section, the comments made there apply to these clauses also.*

F47 to F52 *A sub-section, headed 'Prestressed concrete', and again the items below are the only ones which require comment,*

F47(e) *Particulars to be given of type of jack used for tensioning, wedges, etc. It is not often that SMM is specific about tools to be used in an operation. Another precedent.*

F48(b) *Members cast in sections (i.e., not in one continuous operation) shall be so described stating the number & average length of sections. Similar to the previous clause, here the SMM is becoming involved with the operations.*

F53 to F55 *Sub section headed 'Precast prestressed units', comments below:*

F54(a)(II) *Units of identical section but of varying lengths ne 10 ft may be grouped together and the lengths averaged. Working out the average length would probably take as long as giving the numbers of identical items, and the latter would probably be more useful.*

F54(a)(III) *Those over 10ft long may be similarly grouped in further stages of 5 ft and the lengths averaged in each case. Same as comment for previous item*

F56(a) to F61 *comprise a new section headed 'Contractor designed construction'. There are no comments for this section.*

F66. *Mortices, etc. shall be enumerated separately. Running mortices with lead or mortar shall be given in the description. Mortices cast in the concrete will not be used for some time. The positioning of the railings, posts, etc., will have to take place before they can be run with lead or mortar, and in some instances that could be months. This makes the*

running of the lead a separate programme item, and also causes a further item of cleaning out the mortices.

Clauses which have not been retained in Concrete work section of SMM5 from SMM4, are as follows:

1(e)(iii); 14 ; 31(a)(ii) ; 31(c) ; 36(c) ; 37(b) ; 37(d) ; 38(a) ; 38(b) ; 38(c) ; 38(d) ; 39 ; 40 ; 41

Brickwork and blockwork

Similar to concretor, this section has been much enlarged. There are 5 clauses referring back to G1, which are G2(a), G14(a), G24(a), G29(a), G32(a). These have not been commented upon below.

The new clauses are as follows:

Generally

G1(a) Brick and blockwork measured mean length by average height. *This is reinforcing the practice of measuring on centre line which avoids measuring angles and intersections and also avoids the tacit requirement to measure different heights of brickwork separately.*

G1(b) Labours on different kinds of work given separately.

Brickwork

G2(b) ; G3(a) ; G3(b) ; G10(d) G14(b); G14(c) ; G14(f) ; G15(b) ; G15(e) ; G16(b)

G18(b) Facework to sunk or projecting plain bands ne 12” wide given in lin.yds stating if different bricks, width of band & depth of set back or proj. Horiz., raking, vert., and curved bands each so desc. Facework to margins, rough cuts in thickness & extra mat given in the description. *Cutting or extra material depend partly upon whether sunk or*

projecting. Amount of cutting depends partly on bond, partly on depth of set-back. If it were enumerated and fully described, an accurate price would be possible.

G18(c) ; G18(d) ; G19(b)

G20(a) Flush, sunk and projecting tile creasings each given sep in lin yds as EO brickwork, stating number of courses and depth of set back or set forward. *Giving these as EO makes life more difficult for the estimator; why not as complete pieces of work?*

G20(b) Fair ends, irreg angles, each enum separately. Stopped ends and other angles deemed to be included. *If G20(a) were to be described as suggested, there would be no need for this item.*

G21(c); G21(d); G24(b); G24(c);

G24(d) Pointing included in the description. *Pointing is usually carried out as a separate operation. The work needs to have attained some stability, in order to rake out as necessary, and there is need for a sufficient quantity to make it worthwhile changing tools. Nevertheless. the mortar needs to be still not fully set so that the pointing mix can bond.*

G25(a); G25(b); G25(c) ; G25(d) ;

G26(a) Sills, copings, thresholds, etc., of fair face or facings given in lin yds stating size & orientation of bricks e.g., headers on edge, stretchers on end. Horiz, raking, vert, curved or set weathering each so desc. Rough and fair cutting given in the desc. *These items cry out for enumeration.*

G26(b) Ends, internal, external and irreg angles each enum separately. *All could be included in the G26(a) description if each were described separately as individual items.*

G29(b) Particulars in accordance with G2(b) and G14(c) to be given. *References to other clauses makes the document more difficult to use.*

Blockwork

G32(a) to G42(b). This is a new section rather than the single mention of blocks in clause 43 of SMM4. There are a few comments to be made:

G32(c) Measurements of walls shall be taken between attached piers. Thickness of attached piers taken as combined thickness of wall and pier. Those of length not exceeding four times thickness classed as piers, those exceeding and those caused by openings classified as walls. *This is a weird construct, established, it seems, only to provide 'measurable' items. It should be quite clear that as a piece of work, the bonding of the 'pier' part is inextricably linked with the wall, and they have to be built as one. The pier affects every course of the wall in which it appears, it is not a separate entity.*

G33(c) Filling ends of hollow blocks or using special solid end blocks each to be given separately in lin yds as EO the work in which they occur. *Most blocks that are not flat ended have a semi-circular groove vertically which forms a joggle with the next. A bigger problem arises when a hollow block has to be cut vertically in order to keep the bond, and a large space has to be filled between it and the joggle of the adjacent full block in establishing the bond. That joint needs probably five or six times the amount of mortar to fill it as the normal joggle, so size of the cut block needs to be stated in order to establish the position of the cut.*

G43; G44(a);G44(b);G44(c);G45;G46;G47;G48(a);G48(b);G48(c);G49;G51;G54;

G55(b); G57(b); G58;

G59 Making good walls and making good fair face or facings in connection with any foregoing labours to be given in their desc. Making good plasterwork & other finishings given as section U. *It is a given that making good to holes or mortices cannot be carried out until the purpose of the holes has been fulfilled, i.e., the pipe, cable, post etc., must be fixed before making good can happen. In consequence the work of making good is completely separated from the original item.*

G61(c); G65(a); G65(c)

G65(d) Centering to be as the actual surface supported, Strutting, shoring, bolting wedging, easing striking and removal deemed to be included. *Centering is very much like shuttering in that it has two main stages, erection and dismantling, and often a third, easing. These clearly cannot take place at the same time on the same piece of work, so they require to be described as separate operations.*

G66(a) Centering to flat soffits over 12” wide and ne 6ft span given in sq. yds.

G66(b) Centering to flat soffits ne 12” wide & ne 6ft span given in lin yds stating width.

G66(c) Centering to flat soffits over 6ft span to be enumerated stating span and width.

G66(d) Centering to sloping soffits shall be so described.

The last four items represent much that is ridiculous and bureaucratic about the system, and why it does not represent practical work. The first three have to be given in square measure, linear measure and enumeration because, presumably, of some obscure criteria which take account neither of practical limits, nor actual cost divisions. The fourth is worded in such a way that it is not clear whether the first three also apply to it.

G67 Centering for curved soffits and vaulted soffits each to be given separately in sq yds. *So in this item width or span do not matter?*

G68 Centering for segmental, semicircular & other curved arches each to be enumerated separately, stating span, width and rise. *Again, it does not seem to matter if span is less or greater than 6ft.*

G69(a); G69(b); G70.

4.2.8.2. Conclusions drawn from comparison of SMM5 with SMM4

The overall impression of SMM5 is that it has been drawn up by a group of people who are concerned more with making this a legal document than an information source for builders. The language has become more bureaucratic and officious than technical. The word ‘hereof,’ which is of no assistance to anybody, is liberally sprinkled across the pages; repetition of the words ‘For rules relating to Section Z generally see Clause Z 1

hereof' becomes tedious, and there is much cross reference to other clauses, some in other sections.

The change to wording of the Introduction has been commented upon in a previous section.

The Preface speaks of the need 'to define rules of measurement arising from new techniques and methods of construction' but does not define those rules in any new way – it continues with the same sort of methods which have been used since before its beginnings in the early nineteen hundreds. That is excusable, of course, on the grounds that it is only concerned with measurement, and solely with the use of measurement in establishing an equal basis for tenderers., Users of the document, however, involved with the execution of the contract works, were attempting, even when it was published in 1963, to use it for such procedures as interim valuations, programming, valuing variations, final accounts and arbitrations. The averaging, aggregation, deeming, etc., that are explicitly used in the preparation of BQ ensure that the tender cannot reflect the actual cost of the building. That is true of all editions, not just SMM 4 or 5.

4.2.9. Examination of SMM5 (metric)

4.2.9.1. Generally

SMM5 (metric) states categorically that it is a conversion, not a revision: that the fifth edition has been rewritten, substituting metric terms for Imperial. That statement does not appear to agree with the facts, probably depending upon how the word 'conversion' is defined. In normal terms, however, if one converts, say, pounds sterling to US dollars, the result today with the pound trading at \$1.3353 (ignoring transactional costs) is that £100 will buy \$133.53. It would not be surprising if that were to be thought of as \$133.5. That has not happened in SMM5M. The first item in SMM5M to be affected by the conversion is A4(b)- regarding the sizes of steel/metal sections. SMM5 has 4 categories, small, medium, large, and extra-large. 'Small', i.e., n.e. 6" in depth has been replaced by 250mm in the metric version, approximately 9⁷/₈", an increase of nearly 44%. 'Medium', i.e., 6" –

12”in depth has been dropped. ‘Large’, i.e., ex 12”, n.e. 18”, has been replaced by ex 250mm n.e. 500mm, which is $9\frac{7}{8}$ ” - $19\frac{3}{4}$ ”. ‘Extra-large, i.e., over 18” has been replaced by over 500mm.

Thus, four categories have been replaced by three, the first of which has increased its range by 44%. This is not the only example, there are similar cases throughout the document. It may be thought that this is of little import, but in an arena where the q.s. is regarded as the soul of rectitude, and precision is demanded of contractors, such sweeping changes are disturbing. One might anticipate that the categories represent actual cost divisions, but with such radical alteration able to be implemented arbitrarily, that thinking must be doubted. In addition, a situation where the content of descriptions is examined requires that the written word validates the intent, but in this case the intent is not apparent.

It has the same number of pages as SMM5, (109), except that in the revision of 1970, a page was added for the sub-section ‘Fitted carpeting’. Other than that, and the extra Preface page, (separately numbered), the wording is almost exactly the same apart from the changes to the units of measure, and it still has 23 sections with the same titles. The same sections are examined as in SMM5, so the ‘Fitted carpeting’ revision does not require to be considered as a separate edition.

Because there are no major changes to the individual clause meanings of SMM5M there are no major changes to be anticipated from the coding, and the results may be taken as similar to SMM5 (4.3.5.3.).

4.2.9.2. Comparison of SMM5 (metric) with SMM5

General Rules

This title replaces ‘General Principles’ given in edition 4. The wording of clause 1 of the 4th edition reads ‘Bills of Quantities shall fully describe the materials and workmanship and accurately represent the work to be executed’, indicating a connection with the labour of production, but this is changed in edition 5. A.1 to ‘...shall fully describe and

accurately represent the works to be executed'. It is believed that this demonstrates an awareness of the need to distinguish between the meanings of 'work' and 'works', the latter having a noun meaning. This interpretation is in keeping with clause A.3.(b)(i) which states that labour and all costs in connection shall be deemed to be included with all items.

4.2.9.3. Conclusions drawn from comparison of SMM5 (metric) with SMM5

There are no different conclusions to be drawn from the content of the descriptions since the two editions are near identical except for the differing units. The main general conclusion to be drawn is that the committee have used the revision to make the new document look more euro friendly rather than to consider whether there are any cost effects.

4.2.10. Examination of SMM6

4.2.10.1. Generally

SMM6 consists of 114 pages excluding Preface, Contents, and Introduction pages, which is a 4.8% increase over the 109 of the previous edition. It has 22 sections compared with the 23 of SMM5M due to combining 'Carpentry' and 'Joinery' into a 'Woodwork' section.

The preface states that 'Rapid developments in ...design and construction...have repercussions on measurement...and what it is cost significant to measure' leading to a need for a new edition. The words 'cost significant to measure' are important; it is assumed by the committee that they are in a position to judge what is cost significant and to whom. It is suggested in this study that the cost referred to in that phrase is clients' cost, not contractors, the likelihood being that the unpriced and low-priced items in BQ are the target. It is unlikely that any members of the committee were practicing estimators, (estimators rarely have time to attend such meetings), and there are no records available which show specialisations of the members.

It is the first edition to relate the work of every section to drawings, albeit in a relatively loose way, i.e., 'A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document'. Since the BQ are prepared before tendering, the people who are most concerned with implementing the clause are q.s. They are therefore charged with judging whether each section's work is evident from the drawings or not, so that if they give a general description of the work in the BQ, there is an implied criticism that information has not been provided on the drawings. That constitutes a disincentive for a 'general description' to be provided. The sections examined are similar to those of previous editions.

4.2.10.2. Comparison of SMM6 with SMM5 (Metric)

The General Rules section of SMM6 has 35 clauses and sub clauses; Preliminaries section has 34; Demolitions and alterations contains 26; Excavation and Earthwork 86; Piling has 72; Concrete work 272; Brickwork and blockwork 294; Underpinning 23, totalling 872. For those clauses and sub-clauses, a total of 2,746 coded comments were made about the sections using the 37 codes previously established. No additional codes were found necessary.

The coding carried out is shown in Appendix A.

The Preface to the sixth edition states that the new document is an interim response to the conclusions of a Development Unit which had been set up as the result of a report upon Measurement Conventions. The fact that an interim SMM was thought necessary is an indication of the urgency with which the subject was regarded at the time, and it appears to have been connected with developments in the design and construction of buildings having an effect upon both measurement and what is cost significant to measure.

In SMM6, it became mandatory for drawings to be provided, which may have been connected with the odd clause that appears at the beginning of 13 of the 22 sections of the document reading 'A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document. Where the sequence of the work is dictated by the design this shall be described'

What makes the clause odd is first that it is not directed at all sections, though in ‘General Rules’ and ‘Preliminaries’ this is to be expected since they have no direct connection with work other than mainly management items. Other sections excluded are: Piling etc.; Underpinning; Asphalt; Roofing; Woodwork; Metalwork: Drainage. It can be seen that the first four of these could be regarded as specialist operations, and they, together with woodwork, all have a clause specifically mentioning ‘Location drawings.’

Secondly, the clause is directed at the quantity surveyor, because of the requirement to check that the work of the section is not evident from the location drawings. Surely it is always incumbent upon the q.s. to raise a query with the designer if it is felt that the work is not clearly described. If the q.s. includes a clause in the BQ which is a general description of the work in a particular section, all the tenderers know that the work is not completely defined in the drawings supplied. That should create a flying start to a relationship.

SMM6 cleared out much of the redundancy of the previous edition by taking out all the clauses saying ‘For rules relating to Section XX generally see clause XX1 hereof’ but continues the practice of referral to other clauses, which can make for heavy reading. Sadly, however, it dropped the eminently sensible part of Clause D10 (a) which stated for trench excavation ‘In...trenches over 1 m deep the min. width measured shall be 0.75m for the full depth and...apply also to the concrete...therein’.

4.2.10.3. Conclusions drawn from comparison of SMM6 with SMM5(Metric)

A guide to the changes made between 5th and 6th editions of SMM (RICS, 1978) gives a summary of the main changes, perhaps the most helpful of which is the requirement for general location drawings to be included in the tender documentation. That instruction, however, is accompanied by a clause applicable to 13 of the 22 sections of Edition 6 which reads ‘A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided...’ Clearly, that is an instruction to the q.s., but it can also be seen as a message to the designer to ensure that as much information as is necessary to produce the BQ is included on the location drawings.

Furthermore, it is not at all certain that the contractor will regard work to be 'evident' when such information is not provided.

A clause regarded by RICS as an innovation is included in most sections of SMM6 - the requirement to supply, maintain and remove all plant needed for the work section. It is not explained how the clause does not clash with the General Rules clause A4.2.d., which deems plant and all costs in connection to be included with the general items.

Dropping the words 'get out' is said to be because excavation will be carried out by mechanical means. Is soil not 'got out' when either hand or mechanical means are used?

A significant move toward the thinking adopted in this paper occurs in the requirement to state the number of separate surfaces covered by formwork to soffits and walls (but not other situations, and without separating them by size). In brickwork the concept of 'reduced brickwork' has been eliminated. There are other changes explained in the document, but most are outside the scope of the sections chosen for this study.

No additional codes have been found to be necessary for edition 6, which brings the thought that the number and scope of the coding has now reached satiation; that examination of the two remaining editions for the same purpose would have a similar result and so is unnecessary. Furthermore, SMM7 and NRM2 are both of a changed format to the previous editions, so that descriptions are achieved by choosing from a number of possibilities. In those circumstances, the content of descriptions is randomized, with the possibilities being permuted to an indeterminate number. It is not even certain whether SMM7 should be called a 'Standard method of measurement', because it has so few complete items against which to measure.

4.3. Summary and link

Although this chapter is headed 'Analysis of the data' it has only dealt in detail with the data arising from analysis of SMM editions. The sheer volume of work arising from that source has made it necessary to examine case studies in a separate chapter (Chapter 5),

despite being introduced in this. Those case studies, as will be seen are also quite extensive.

CHAPTER 5. CASE STUDIES AND ANALYSES

5.1. Introduction

There are several reasons for needing to carry out observations of work in this study. It is necessary, in general, to ensure that the researcher's knowledge of the industry is updated and relevant to current conditions; in particular that divisions of work envisaged (not envisioned) correspond with practices on site; to probe those practices and the workpieces produced so that the relevance of SMM/NRM2 may be examined in context, and the criteria being sought checked against practice to ensure relevance.

The analysis of case studies has two distinct parts: (a) photographs of individual pieces of work and (b) describing those pieces of work in detail in order to compare with items in the most recent version of the Standard Method, i.e., NRM2. It was thought necessary that the observer should be as unobtrusive as possible in order that the operations being performed should not be interrupted or unknowingly modified, hence questioning kept to a minimum.

Within the areas of work previously studied, i.e., basically Excavation, Concreting and Masonry, separate pieces of work have been observed on sites as they occurred, photographed, then examined in detail to see (a) how they would be described under the latest rules, i.e., NRM2, and (b) to see what is not included in the NRM2 description. Thereby were produced a series of case studies that have been looked at in minute detail. These have been written up in order of NRM2 sections, but in some cases the item pictured may not be immediately associated with the section unless the reader is aware of SMM/NRM2 content. Each case study is illustrated by photographs showing the sequence of events as closely as possible without interrupting the flow of work. These are numbered alpha-numerically, the letters relating to SMM sections, i.e., 'E', 'C', and 'M' representing Excavator, Concretor, and Masonry/Brickwork, the figures being the case number followed by the number of each photo in sequence of activities of the case, i.e., Photo E.1.3. is the third photo of case 1 of Excavation section. The photographs for these case

studies are shown in Appendix A, starting on p 257, so they may be scrutinised whilst reading the text. The letters in brackets within each description are the appropriate codes for the item when observed.

Note: items marked with an asterisk (*) have been added back to the list of coding as they have been recognised during these examinations and are of importance.

Each of the case studies is completed by a commentary which attempts to illustrate some of the codes established in the earlier desk exercise, and also shows the links to what may be called a hierarchical structure based partly upon work carried out at Building Research Station many years ago (Nelson 1969), in which facets essential to any piece of building work were embodied into a sentence which still holds good, paraphrased as ‘Building work may be described as actions with tools (or plant) upon materials to produce work pieces capable of satisfying functions required in the finished building’.

5.2. Case study analysis

5.2.1. The choice of subject for case study observations

Finding a site willing to allow an observer to wander freely, taking photos, talking to operatives and managerial staff during the Covid 19 epidemic seemed hopeless at one stage, but as described in section 3.6.1., the first was obtained almost by chance, the second followed through an associated company. Like the ‘choice’ of sites, the choice of subjects for photography of ‘pieces of work’ was relatively random: the observer went to the site every day for two or three months, arriving at 7.30 a.m. each day so that the informal meeting discussing the work for the day could be attended as an observer, not as a participant. After the meeting, when work started at 8 a.m., the observer would walk around the site until an operative or group was found at work.

The observation commenced with a photograph of the state of the workpiece, but when the work became clearly repetitive, the observer would continue to travel around the site.

Visits were relatively short, perhaps spending up to 2 hours on the site before leaving to write up the description. In this way, the operatives were able to proceed without interruption, and did not feel harassed or 'spied upon' as far as could be seen. The process seemed to create a good relationship where we could pass the time of day whilst work could continue without interruption.

The second site was obtained in early October, when the observer met a director of a related company at a site of new houses being built for sale in a semi-rural area on the city outskirts. The meeting took place on a steep banking where a 2-metre diameter culvert was being constructed of concrete pipes to divert an underground stream. In consequence, having regard to the observer's age, the director gave instructions that permission had been given to allow access wherever the observer needed to go, but only on condition of being accompanied by one of the site staff in case of difficulty.

That situation became uncomfortable after a very short time because the observer was acutely aware of taking up a considerable amount of the staff member's time, and hence creating a cost to the company which was never envisaged by either party. Despite the relatively short time of perhaps seven or eight visits to the site, some valuable observations were able to be made. The point here is that it is not the number of sites that are necessary, but that a range of differing pieces of work are required to constitute the sample cases. Analysis of individual case studies is provided below.

5.2.2. Excavation (Earthwork)

.Case No E.1. Bed of sand to receive gas-proof membrane

Photo E.1.1. shows 1000-gauge stabilising membrane as per drawing (Appendix C, drawing C.1.2., Ground floor slab edge detail) laid to the various bays of the ground floor, (starting level, (SL). Access (Acc) for the work is via the track where stands a forklift (Tpt) for bringing tubsful of the sand for temporarily (T) holding down the membrane. The roll of membrane (Wt) has had to be cut (Cut) for each bay, and some bays have 'external' angles to be cut into (Ls). Photo E.1.2. shows the sand being shovelled and/or

raked from the temporary heaps and spread to a bay, supplementary sand being transported as necessary. Photos E.1.3. and 4 showing compaction in progress, and that each bay is a separate workpiece (Wp), with several different shapes (Sh) and sizes (D) involved, also that laying the membrane, spreading the sand and punning the sand are all different pieces of work, producing different workpieces at differing levels of a hierarchy (DW). Punning to internal corners cannot be done with the machine being used; it would have to be done with a hand punner, an additional operation (O), and also a change of method (M). Moving the punner from bay to bay, is not only a matter of weight, but also of plant positioning (PP). Photo E.1.4. also shows ducts for services in place. It should be noted that there are two membranes involved here, the stabilising membrane to receive the sand bed which, after punning, will receive the gas-proof membrane.

Figure 5.1: Bed of sand to receive gas-proof membrane (Photo E.1.3).



Photo E.1.3 is reproduced above (Fig. 5.1.) and it can be seen that access for this work is easy, but that description of the work as being ‘in bays’ is of little help when those bays are not of regular size and shape. The difficulty of tamping internal angles with a machine of that shape is clear.

The operation/activity/tasks are simple; placing plastic membrane on a previously prepared base, cutting it to the size and shape of the bay, meanwhile placing a granular material upon it in heaps to hold the plastic sheeting in position, then spreading and raking the material to a consistent thickness. The sand is then compacted, a repeated or continual action with a tool (perhaps two tools if the corners are hand punned) upon the material, producing workpieces which are bases suitable for laying gas-proof membrane, (i.e. ready to perform their function), in bays of different sizes and shapes. The tools involved were the forklift machine, tub, shovels, rakes, knife, mechanical punner, hand punner. It can be understood from the above that it may well be necessary to identify different stages of hierarchies, associating each with its relative complexity. This will be looked at in a later section.

Case No E.2. Laying gas-proof membrane

Once the filling (Case E.1.) has been consolidated, the methane resistant membrane, necessary because of old mine workings below the site, can be laid on it (SL), carried out by a specialist company. There is a danger from the gas, so it should be considered as an adverse condition (Ad). The start of the process is shown in photo E.2.1 where the operatives have brought their materials and generators (PP) for the heat guns, each fitted with a protective pad (Pr)⁴ adjacent to the working area. Access (Acc) is from the site road. Photo E.2.2. shows the first roll, (Wt), being laid on the sand, a rapid process. The edges rise up over the surrounding blockwork, and sufficient left hanging over the edge to be raised later, as shown on drawing B. (Appendix C.2., p. 328) Where necessary it is held down temporarily (T) with concrete blocks. The material is cut to fit around pipes already

⁴ The category ‘protection’ has been thought to be necessary because of this analysis. It has been added back to the list of codes.

in position, (Cut) and the minimum lap can be seen marked with a dotted white line in E.2.2. and 3. Each lap between sheets is jointed with a heat gun (photo E.2.3), and particular attention has to be paid around angles, pipes and ducts, (Ls) where cuts have been necessary, jointing the cut edges with a white sealing patch (O), (photos E2.3. and 4). On completion, all joints are inspected (photo E.2.5.) and re-sealed where necessary. Groups of pipes are sealed with a poured compound (photo E.2.6.). Change points in this case are from laying the membrane to cutting around pipes, etc.; from either of those to welding the joints between sheets, from any of those to cutting and patching at angles, after which sealing around pipes with plastic compound is carried out, then a final inspection and repair as necessary. Figure 5.2 is shown below (Photo E.2.4): Again, the operation is basically very simple, involving the rolling - out of a package of a single material. Instead of a tool being used to carry out the task, the roll is pushed along by the operative's foot until the next impediment, the division between bays, is reached and cutting is necessary in order that there should be no 'pockets' of folded material where the explosive gas could gather. The many bays involved make for much difficulty in folding cutting and sealing, in addition to the heat bonding of all side and end seams. Additional

Figure 5.2: Laying gas proof membrane (Photo E.2.4).



complications are the many ducts for services rising through the membrane, which all have to be cut around and sealed, first with a plastic 'bandage', then a plastic compound poured around them, being contained by use of some of the spacer block strips acting as permanent shuttering.

All these intricate, small individual pieces of work are 'deemed to be included' so that no information regarding their number would be available in a BQ. Also, these many small tasks have their own tools and additional materials associated with them and can each be considered as a series of equal hierarchical stages, in view of the fact that each of the pieces is ready to perform its function almost immediately (given any necessary setting or curing time). Because of the need for continuity of the membrane, the entire ground floor must be thought of as a single workpiece (Wp), since it is not capable of fulfilling its function until all joints and angles are sealed, so the 'hierarchy' in this case has only two levels.

Case No E.3. Piling for ground beams

The site on which these observations have been taken has a variety of problems; it has a slope down to a fast running burn in an area of protected woodland; there are underground streams which make it necessary to pile the site; a considerable amount of rock is under the site, some as large layers, some as boulders; there is a minor public road which has to be kept open, under which there are services running to older houses further up the lane; there are some old low walls alongside the lane which are to be preserved; an underground stream has to be diverted into the burn by a culvert 2.0 m dia. which has to cross the road, making it necessary to support the services and keep them in operation. Photo E.3.1 shows a plot prepared for piling (SL) and illustrates the slope (R) of the site with stepped plots for the houses. Photo E.3.2 is of the piling rig (PP) on the day after arrival having been erected on the first plot to be piled, which has easy access from the site road (Acc) looked at from the temporary road and fencing (T) which diverts traffic whilst the culvert is taken across the existing lane. On the left can be seen some of the

2.0m dia. pipes to be used for that purpose. Fig 5.3 (Photo E.3.3.) shows a pile in position (Loc) being plumbed ready for driving. The working space is limited to an extent by piles already in position, so the sequence of workpieces is important (Seq)*. Photo E.3.4. is of the same plot, now piled, and the machine has been moved to the next plot (PP) to repeat the process. It is clear that the precast concrete piles have considerable weight, (Wt), but the pile rig moves them around the site with ease (Tpt). Whilst each pile constitutes a separate workpiece, the set of piles for a single plot is the next stage of a hierarchy. The sheet steel piles in the foreground are to form a retaining wall between the existing houses up the slope and the new development. Although no ‘work study’ was attempted, it was noticeable that the time taken to move and locate the rig about the site was roughly equal to the time spent in driving the piles.



Figure 5.3: Pile being positioned (Photo E.3.3.).

The material in this case is a precast concrete pile, the main ‘tool’ in operation is the self-propelled piling rig, the action to be performed is to drive the pile by repeated blows from the drop hammer of the rig, the workpiece is a pile in position ready to perform its function of supporting the ground beams off which the building will be constructed.

The rig is moved to various positions around the plot, from each of which it may be able to reach several piles, depending partly on the layout of the piles, partly upon their spacing and partly the size and capacity of the rig itself. Clearly, in order to be able to take decisions upon the type of rig to be used, details of the pile sizes and their layout must be known in addition to as much information as possible about the ground conditions. The more information of that sort given to the contractor, the greater the likelihood of a realistic estimate of cost.

*(Seq) Sequence of working is another code which has had to be added to the list

Case No E.4. Forming culvert to divert underground stream

Most of the case studies in this section are relatively easy to observe and describe. This one is different and relies entirely upon the photographs. [Photo E.4.1.](#) shows the burn at the bottom of a steep slope which has been excavated to allow the manhole sections and the culvert pipes to be laid. Some of the rock which has had to be broken out (EO) can be seen as backfilling to the right of the pipe near the bottom of the photo. A view from further away showing the 'trench being backfilled is given in E.4.2 (PP). The 'breaker' attachment to the excavator can be seen in action in E.4.3.

Figure 5.4 (Photo E.4.4. below) demonstrates how one section of trench support (T) is all that is used for the entire operation, and E.4.5. shows the way in which the trench support is used to give access (Acc) for the next section of pipe to be laid (a Thursday), E.4.6. is of that section of pipe backfilled on the following Monday. At the time of writing, the culvert

is not complete, but it will proceed in the same manner. Photo E.4.7. is a view from about the same spot as E.4.2. but after filling the entire area to make up levels.

Figure 5.4: Section of ‘trench’ ready for moving earthwork



Fig 5.4 shows a section of pipe which has been placed, jointed and supported ready for the next task, which is for the excavator to take out a further section of trench, following which the trench support will be pulled forward against the direction of flow to the position shown in photo E,4.5., ready for the next pipe section. The direction of flow is from right to left of the photo as can be seen by the socket of the pipe. The terrain is rugged, and access limited for operatives; most of the work is carried out by machine except for flexible jointing. The total operation consists of (i) excavate trench, (ii) move trench support section forward (iii) lay and joint pipe, supporting the leading edge, (iv) backfill previous section of pipe, (v) repeat from (i). These operations are carried out in lengths of one pipe, so the whole procedure may be considered as incremental (Inc), every

part depending upon the previous having been completed, and each one may be thought of as a change point., Progress is often impeded by the excavator having to break up rock whilst excavating the trench (photo E.4.3.). The material and action changes are from excavation of soil to breaking up and excavating rock, moving, and aligning the trench support, transporting and placing the concrete pipes, jointing the pipes with flexible material by hand, backfilling with the machine whilst gradually moving the trench support forward, then repeating the process. The tools used are the excavator plus a variety of attachments – the bucket for excavation generally, breaker tool for cutting through the rock, chains for lifting and moving the concrete sections and the trench supports, the bucket replaced for backfilling. ‘Actions’ include break, cut, compact. move, place, on a variety of materials and plant, rock, soil, concrete pipe sections, trench support assemblies.

5.2.3. Concrete work

Case No C.1. Reinforcement cages for ground beams

As is normal these days, most bending of reinforcement for the site is carried out before delivery and it follows that work of reinforcement fixers on site is one of assembly, transportation and placing in position. On this site the decision had been taken to assemble individual lengths of cage away from their final position and join them together during the placing process. This enabled the work to be carried out in parallel with excavation rather than in a linear fashion; additionally, it can be understood that assembly in the trenches would have been considerably slower because of the limited space (Acc). Photo C.1.1. shows some steel trestles or hurdles in the foreground of the type which were utilised (borrowed) (T) by the reinforcement fixers in their assembly of the ground beam cages. Access (Acc) to the work, whilst limited, is adequate. Photo C.1.2. shows the two fixers to the right with trestles in parallel rows; on the ground between the trestles is a completed cage which cannot be seen clearly. C.1.3. shows the operative checking the distance between stirrups (D). Photo C.1.4., shows detail of the process; a row of trestles can be seen in the background, their bright finish contrasting with the rusted steel of the reinforcement. The parallel row is out of shot at the front. Several rods can be seen to be

spanning across the two rows of trestles; these are temporary supports (T) for the beam under construction. The four top bars of the cage are running from the top left downward to the right, placed on top of the support rods at right angles, and each has a slight offset or crank to allow for connection to the next cage when in final position (DW). Those longitudinal bars are marked (D) with the positions of the stirrups (Loc). The ends of the stirrups can be sprung apart, enabling them to be placed in position rather than sliding them on from the end of the cage (M). When all the stirrups have been placed, the bottom four rods can be laced through them. Up to this point, the work has progressed rapidly. The main work is in wiring each rod to each stirrup, and that takes more time than all the previous tasks. On completion, the cage is lifted slightly by the excavator so that the supporting rods can be removed before transporting to position (Fig. 5.5) (photo C.1.5.). (T). Before final positioning in the trench, (Loc) spacer blocks are placed on the blinding concrete (DW), (a pallet of spacers can be seen in the trench at top left-hand corner of photo C.1.6.). Some of the spacers can be seen along the bottom edge of the reinforcement cage running diagonally in the centre of the same photo. That task takes longer than moving the cage into position. Wiring the newly made cage to another which is already in position is more difficult for access (Acc), (see photo C2.1) and will also involve an additional stirrup or two (DW). The final position is checked by the site engineer (Loc). Change points in the process can be seen as (i) from setting the supporting rods in an approximate position to (ii) placing the longitudinal bars in position on the supports, (iii) marking for stirrups on the longitudinal, (iv) placing the stirrups in position, (v) placing the bottom longitudinal in position, (vi) wiring every junction of members, (vii) wiring diagonal rods to the sides of the cage to prevent too much bending in transportation, (Pr). (viii) Moving the completed cage to position, (Tpt). (ix) Wiring the completed cage to the previous section (DW



Figure 5.5: Transporting completed section of ground-beam cage (Photo C.1.5).

On this site there are two separate buildings, these reinforcement cages being for the smaller of the two. The larger block had precast units where the reinforcing cables were post – tensioned. The hierarchical structure of this work is as follows; (i) all the separate pieces of rod, stirrups and binding wire which go to make up one section of cage; each is a completed workpiece in itself, each individual piece having had work carried out on it, be it only the cutting to length and twisting into its final position (relative to the cage section) of a piece of binding wire. (ii) One completed section of cage, its hoisting and placing in position is a workpiece at the next level of detail, the final part of which is shown in Fig. 5.5 above (iii) All the separate cages which are interconnected in one building, placed in final position. The materials comprised all the pre-cut and bent pieces of steel rod and a quantity of binding wire, the tools used were the operatives cutting pliers and the

ubiquitous digger used as a mobile crane, plus temporary work bench and support rods. The actions of the operatives were limited to the placing of rods and stirrups, cutting bending and twisting binding wire. This photograph also serves as a reminder of how important the item of transport is to any site; it is applicable to every material and often to other plant and operatives.

Case No C.2. Shuttering to ground beams

The shuttering to ground beams on this site is non-traditional. The material used is a flexible plastic sheet that is easily cut (Cut) with a saw and can be used for a variety of purposes, shuttering, protection to floors and glass, spot boards, and so on. Instead of having to be supported from the outside of the beam by runners, struts, wedges etc., the board is held off the beam by spacers, and the load of the concrete is resisted by backfilling the trench up to the board, the reinforcement cage itself struts the width of the beam. No striking is necessary – the board is left in. The board and spacers can be seen in Figure 5.6 (photo C.2.1).

The change points are from (i) cutting 2440 x 1220 sheets to the appropriate width to (ii) fixing spacers to the reinforcement cages (DW), to (iii) Placing the boards in position and wedging temporarily (T), to (iv) backfilling to hold boards in place. As can be seen, access for the work is variable, parts are difficult, others relatively easy. This piece of work involves three materials – the plastic spacers, the plastic board, and the backfilling soil. The operatives actions are in placing the spacers; measuring, cutting and placing the plastic sheets, and placing the backfill material, the ‘tools’ involved are the operative’s hand for the spacers, a rule or tape measure plus a saw for the plastic sheets, and the excavator or a shovel for the backfill.



Figure 5.6: Shuttering to ground beam (Photo No C.2.1).

Because the ground beams, when completed, will all be interconnected, there will have to be parts of the shuttering in the photo cut out, e.g., all the trenches on the right of the shuttered beam have yet to have their cages fixed, so portions of the shuttering will have to be removed at the intersections, and the additional cages will then be shuttered.

Consequently, all the concrete to ground beams can take place at one visit, making both the shuttering and the concrete single workpieces.

Case No C.3. Holding down bolts for steelwork

Each steel stanchion on the site has a base plate with four holes for holding down bolts; on this site all the base plates are the same size, as are the holes. Photo C.3.1, 28th Aug., shows a carpenter, having cut, (D) (Cut) (Sh) and drilled several plywood formers to match the base plates, fixing the holding down bolts to them through fiber cones, each bolt having a square plate washer. The ground beam cages were all in position over the area

where steel columns were to be erected, so that the bolts could be placed in position (photo C.3.2., 3rd Sept). Photo C.3.3 is of the first batch of concrete being placed (5th Sept). Photo C.3.4. shows the concrete level (SL) being checked; the formers kept above the concrete by short lengths of reinforcement (T). C.3.5. shows the position of the formers being checked and adjusted (Loc). Two days later, the nuts were removed, the plywood taken off and the nuts replaced. This happens whilst the concrete is still green so each bolt can be checked for necessary movement (photos C.3.6 and C.3.7.). The steelwork arrived on 12th September (photo C.3.8.). Two days later, the nuts of the holding down bolts were removed and placed near the bolts, a shim placed in position (photo C.3.9.), the stanchions placed and levelled, (Loc) and the nuts replaced (photo C.3.10.). On 22nd Sept., the bases were grouted, and on 23rd a shuttering box was fitted around the base of each column. On 24th, the boxes were filled (photo C.3.11.) and on 25th they were struck. The change points were from (a) measuring marking and cutting the square ply formers to (b) drilling holes for the bolts (c) assembling cones, plate washers, bolts and nuts on the ply, to (d) placing the assemblies on the reinforcement in approximate position, to (e) positioning and levelling the assemblies when concrete was poured, to (f) undoing the nuts, removing the ply, ensuring that the bolts were moveable within the cones, and replacing nuts, to (g) undoing nuts and placing shims, to (h) fixing steel columns and putting nuts back on, then a break whilst the steelwork is all levelled and aligned, to (j) when the bases are grouted. (k) Surplus grout was cut away later (Cut) when shuttering boxes were fixed at the base of each column to act as kickers (Loc).

Dates have been given so that the reader can have an impression of the length of time during which these unmeasured, 'deemed to be included', 'minor' items are having an effect upon the duration of the 'steelwork erection' operation.

There are quite a number of different pieces of differing materials and different workpieces involved in the entire operation, each involving different actions and tools The ply has to be measured, marked out and cut then drilled for the bolts, the bolts, nuts washers and cones are bolted through the ply. Each such assembly has to be placed in its approximate position before concreting; Whilst concreting, they are positioned exactly and

held; whilst the concrete is still green, the nuts and washers are taken off and the ply former removed so that movement of the bolt can be checked.

Figure 5.6. (Photo C.3.7) shows the concrete completed to the ground beams (and the complex bay formation) on which can be seen the positions of the holding down bolts.



Figure 5.7: Holding down bolts after removal of formers (Photo C.3.7).

When movement is assured, the washers and nuts are returned and the concrete left to reach full set. The nuts and washers are then removed again for each steel baseplate after having placed a shim below the centre of the plate to keep the steel clear of the concrete. The gap also acts a starter point for any additional levelling shims that may be required. With three columns held in position, beams can be put in position and bolted to obtain some stability, and the work can carry on from there. Only when all the beams and columns have been levelled and plumbed can the bolts be fully tightened. When that is done, kicker boxes are made for each base, which are then concreted. The materials

involved are the ply formers, fibre cones, bolts, nuts, washers and shims, timber and nails for the kickers and concrete to fill them. Tools involved are rule or tape, pencil, square, saw, electric drill and bits, cable reel, laser level, hammer, spanner, barrow, shovel. Actions performed include: measure, mark, cut, place, hold, tighten, loosen, drive, move, allow (to set). The workpieces include: (i) a ply former cut to size and shape and drilled, (ii) the same former with four bolts and cones attached, (iii) the assembly placed in position, (iv) concreting the beams with final positioning of the assemblies (v) the removal of the former from the fixed bolts, waiting for the steels to be set in position then (vi) tightening the nuts to achieve stability of the steel so that it may be plumbed and levelled, at which point (vii) the nuts can be finally tightened. (viii)The shuttering for kickers can then be carried out, (ix) kickers concreted, and (x)the shuttering struck later.

The same sequence applies to every column, so that they may all be aggregated as precisely similar pieces of work, but with each location defined in the aggregated item. The amount of information necessary for this ‘deemed to be included’ work is probably not far short of the amount needed for the steelwork itself, and the holding down bolts are important for the accuracy and stability of the building.

Case No C.4. Shuttering to edge of ground floor slab

It was intended that the ground floor slab to block A be concreted in one day, so it was necessary to have enough shuttering (T) to encompass the edge of that area. Photo C.4.1. shows the shuttering timber after delivery (Tpt). The maximum width (D) that the merchant could supply was not enough for the method, so additional narrower pieces were sent to make the dimension – these were nailed to the edge of the larger pieces as the first task (D), (Photo C.4.2.). The timber was cut to length (D) (Cut) and bolted to the blockwork of the outer skin shown in drawing B (appendix C.1.2., p. 329) Photo C.4.3. shows the first length being bolted, with a second carpenter assisting levelling (Loc).

In Figure 5.7., (Photo C.4.4) below, the bolts to the blockwork and their washers can be clearly seen. The 225 mm thickness of the concrete can be recognised by the concrete block standing on edge in the centre, adjacent to the shuttering. Sub-division of the entire

block into its constituent dwellings was achieved by a light metal angle bolted down to the blocks at the party walls, as a crack inducer joint. (Photo C.4.5.). The edge shuttering was removed on Monday following a Friday concreting. The change points between workpieces were (i) nailing the timbers together (D), (ii) cutting the result to length (Cut), (iii) drilling and bolting each section to the concrete blockwork (Tpt), (iv) nailing at corners (v) striking the formwork (vi) cleaning the timbers for re-use, (vii) removing the timbers (Tpt).



Figure 5.8: Shuttering edge of slab (Photo C.4.4.).

Because of the concreting of the slab as one operation, there is only one use for the shuttering immediately available on the site, and only one workpiece to be produced for this shuttering. In essence this is one of the simplest operations observed on the site with only five different materials involved- two different sections of timber, nails, expanding bolts and washers. Tools used were claw hammer, saw, drill and bit for concrete.

5.2.4. Masonry

Case No M.1. Blockwork in walls

The non-traditional nature of the construction on this site makes it difficult to observe either blockwork or brickwork. One of the reasons for this is that the external scaffolding (Acc) is also used as a support (T) for the timber internal skin of the external walls. Photo M.1.1 shows one of the ties which hold the scaffold and the flooring panels together at intervals, the latter having already been fixed to the top of the vertical timber panels. Blockwork in the common parts forms a fire resisting barrier (Pr) to ensure that the escape stairs are protected. Party walls between flats are formed of two timber skins with a cavity between them which is filled with fire resistant material (photo M.1.2., diagonal wall bottom right), (Pr) The gang laying the blocks work together to deal with one hallway and corridor at a time as a piece of work, up to first lift (M). Photo M.1.3 shows one such, looking from the rear of block A.

The blockwork is showing 8 courses, which is about 1.76m high, making the top of the 7th course about 1.54m high. Some of the work is left down; photo M.1.4 shows a large area a little over 5 courses high which has been left to take the edge of the precast landing. At that stage, a scaffold can be erected, (photo M.1.5., showing the scaffold platform at about the same level as the landing) (Acc) and blockwork continued for the second lift up to first floor level (photo M.1.6). The scaffolding can then be removed, and the area is ready for the installation of the staircase. It can be seen that an observer cannot stand near to the operatives whilst they carry out their work because it would be obstructive. However, the horizontal change points in the work can be seen quite easily – up to landing level, up to first lift, up to first floor level, and in photo M.1.7 up to underside of lintels also. The reduction of light engendered by the scaffold and the blockwork is apparent. Vertical changes, such as reveals, ends of lintels, junctions, movement joints, etc., are perhaps not so obvious because they are dealt with fairly quickly, rather than being static for days, as in waiting for scaffold to be erected or precast stairs to be positioned in the case of some horizontal breaks. The expression ‘movement joint’ has been used here because it seems likely that their function is to accommodate movement of both the timber panels, which

are tied to the brickwork, and any brickwork expansion. Also, to be seen in the photographs are some of the change points for the timber panel erection gang, which, although not chosen for the study, serve to point out that similar reasoning regarding change points is also valid for other trades. M.1.2. shows the timber wall frames to the ground floor just after completion, temporarily strutted. The lorry at the far end has floor panels on board, ready for unloading. Photo M.1.6 shows the first-floor panel in position and being fixed, which will stabilise the corner of the building. The blockwork has been brought up to the level of the first floor.

Figure 5.8, below, shows the blockwork for fire resistance around the common parts stairwell, which is at a suitable level to erect a first lift of scaffold so that it may be taken up to the level required for the first floor.



Figure 5.9: Blockwork in common parts stairwell (Photo M.1.5.).

Only two materials are involved in the operation – blocks and mortar. The tools necessary are wheelbarrow, trowel, pins and line, bricklayer's level, plus a bolster and club hammer

for cutting blocks as necessary. The workpiece can be considered in this case to have a starting level (SL) of the top of the fifth course, and to have started in the vertical plane at the right-hand side of the large central opening. It will finish at the return angle to the right of the operative. The reasons for including angles and intersections or not in a workpiece of this nature can be argued separately later when workpieces are discussed at length.

Case No M.2. Brickwork in external skin of cavity walls. (1)

Brickwork has similar problems to blockwork for an observer. Fig. 5.9 (Photo M.2.1.) shows the space (Acc) (W) between scaffold and external brickwork, taken just as work starts for the day. Once work gets under way, there is no room for an observer to be within easy speaking distance of any person working on the brickwork without being obstructive to either the operatives or their labourers who also need to use that narrow route. That difficulty has been exacerbated by Covid19. The vertical break in the brickwork in the foreground is a movement joint, one of several change points; pin and line are in position for the bricklayer seen in the distance to continue the coursing to sub-sill level in the horizontal and to the movement joint in the vertical.

A roll of white movement joint material can be seen in the bottom right. Sockets for the ledgers are apparent on the prominent scaffold tube to the right of the photo. These sockets are at 500mm centres and make it convenient for bricklayers to be working at low level (W) bringing up the external skin, with their materials at a comfortable height of about 500 mm., whilst carpenters or others can be working on a cantilevered platform above them on the outer face of the internal timber panels. The different levels can be seen in photo M.2.2., where the blockwork is at lintel level (The lintel constitutes another piece of work which is not being examined here).



Figure 5.10: External skin of cavity wall (Photo M.2.1.).

The photo shows the bricklayer in the distance setting up his pins and line for the next course above that which can be seen. In addition to the pins and line, the bricklayer will need the same tools as for the blockwork in the previous case. The vertical line of brick edge that can be seen on the left foreground is caused by the fact that a movement joint has to be formed at that point. The bricklayer has left some bricks out at the bottom on the previous day so that the mortar will now have gone off and he can immediately place the expansion jointing and wedge it in with three courses without disturbing the previous work. That edge is also the starting point for a number of workpieces, (DW) some of which are caused by sill levels, (which also indicate other start and stop points above them), but others are caused by the non-traditional nature of the structure, because wall ties have to be fixed to the timber internal skin. This takes quite a lot longer than laying wall ties across a cavity from brickwork to blockwork, but both methods should be treated as separate workpieces from the brickwork.

Case No M.3. Brickwork in external skin of cavity walls (2)

Brickwork workpiece change points can be seen in Figure 5.10., (photo M.3.1.), at the NE corner of block A; (See Appendix C2, Drawing A, p. 329); this is the area where external brickwork commenced. It is an area of considerable intricacy: The bottom course of facings left of the pier has an overhang above the previous blockwork, (the reasons for which are not known), making it necessary for the edge to be supported (T) on a board.

Placing the board in position is the first piece of work. The next piece of work is in laying the facings on the board, and five courses of brickwork can be laid as similar workpieces (provided that they each have the same change points) before reaching a course with the interruptions of telescopic vents which occur at approximately 1700mm centres around the perimeter of the building. Such a vent can be seen in the centre of Figure 5.10, and it is clearly intended to fit in the space that a brick would normally occupy. Its position has previously been fixed by its lower part being bedded in the internal blockwork (See appendix C.1.2. for edge detail).

There is a closer in the top course at the junction with the pier (Cut), which means either that the dimension from the pier to the vent was set out wrongly earlier, the brickwork and/or blockwork has not been designed to brick dimensions, or the bricklayer has made a mistake in his bonding or joint width. There is a change of brick colour at the pier and also three changes of direction around the pier, all of which indicate different workpieces.

The tools and actions involved in the production of these workpieces are similar to those of the previous masonry items, materials have been added by the different coloured bricks and the vents. The workpieces of the uppermost course are quite clear: (i) the course of light facings going away from the vent, the top section of the vent, (iii) the full brick and cut brick abutting the pier. (iv) The change of brick colour and direction, (v) change of brick direction, (vi) change of direction and as many bricks as it takes to reach the next break point, probably another vent or movement joint. Those six pieces of work for one course in that small area are supplemented by three workpieces for each of the five courses below, which can be aggregated as five workpieces at a different hierarchical level.



Figure 5.11: External cavity wall – pier (Photo M.3.1.).

Thus, with nine separate pieces of work around the small area, it is unsurprising that the work started at that point, just because of the amount of setting out involved. The bricklaying squad who started work on that corner on their first day on site approached the site manager for higher payment for that reason. Whether the claim was justifiable having regard to non-deduction of openings cannot be determined in this exercise.

Case No M.4. Brickwork in external skin of cavity walls (3)

Photo M.4.1 below shows a situation which is somewhat similar to the previous. Only three courses can be laid before the colour of brick changes at the pier; those courses have three changes of direction, with a further change in the return, (unseen in the photo) so that at six courses high, the pier brickwork will have had six separate pieces of work even when aggregating similar courses, and however slight each ‘interruption’ may appear to

be. Having reached that level, the placing and fixing of telescopic vents will cause additional pieces of work; (the position of the vents cannot be inferred from the photo). Tools used and actions involved will be similar to the previous masonry items.



Figure 5.12: Pier at an entrance (Photo M.4.1.).

5.3. Observations generally

The purposes of carrying out observations were:

- a. to check that the observer' knowledge of the industry is updated and relevant to current conditions.
- b. that divisions of work envisaged correspond with practices on site.
- c. to compare the criteria with SMM/NRM2
- d. to check that the criteria are relevant to site practices.

With regard to (a), the observer's knowledge of the industry varies between the construction of a large and expensively finished office building for the Bank of England, the final account of the Royal Festival Hall, the final account for the rebuilding of Port of Spain, Trinidad, tendering for the construction of the University of Ibadan, Nigeria, tendering for the construction of seating and protection to statues in Westminster Abbey for the Coronation in 1953, tendering for the provision of aviation fuel facilities for all USAF bases in the UK, together with open-cast coal production at one end of the scale, to the supervision of designers and the construction of conversions of some 60 to 70 tenement-style buildings into flats for a housing association, all as single contracts with small contractors, at the other, plus 13 years' experience at the Building Research Establishment working alongside such people as F.Horton, C.D.Daltry, R.E.Jeanes, J.I'a Nelson and E.R.Skoyles, so it is extensive but not necessarily relevant.

It is pleasing to be able to report that although there have been considerable changes, particularly in mechanisation, on sites, nothing arose which was not quickly understandable, and it is very satisfying to have become acquainted with these developments. Furthermore, it is believed that a good rapport was established with both supervisory staff and site operatives.

The divisions of work envisaged in the study, item (b) above, are not recent ideas, but have arrived via work at Building Research Establishment in the 1960s by Jeanes (1966), Skoyles, (1967) and Nelson (1969). Skoyles was developing Operational bills, so had little contact with Jeanes and Nelson who were working on the Operative Skills study and a study of Coding and Data Co-ordination respectively. Skoyles' definition of an operation has been mentioned earlier; Nelson (1969) considers the sub-division of 'operations' into 'tasks' as due to a number of factors:

Different functions of parts of the workpiece.

1. Change of geometry of workpiece.
2. One piece of work being complete before another can be set out.
3. Change of material.
4. Change of labour skill required.

5. Time restrictions on tasks to coincide with natural breaks.
6. Operations requiring a specific sequence.
7. Access restrictions delaying start until previous operation complete.
8. Extent of information needed in defining resources and workpiece.

It can be seen that this coincides, to some extent with the ideas put forward herein. Where the ways' part is that Nelson (1969) sees 'measurement' of materials as being a necessary component whereas this study eschews such thoughts, making numbering the only measure in order to ensure that all dimensions have to be given in the description.

Item (c) says that another reason for the observations is to be able to compare the criteria with SMM/NRM2. That is not quite correct. What is really meant here is that although the criteria could have been compared directly with NRM2 (as being the latest edition), there would be difficulty in explaining the items of NRM2 which the researcher would have had to choose and describe in words, then going on to explain how the criteria were giving better and fuller information. That sounds rather suspect because the researcher could have chosen only items that were favourable to his argument. By using a working site with photos being taken of relatively random items (i.e., there was little choice on each visit), the work being carried out can be explained much more clearly, when readers would be able to reach their own conclusions as to whether the criteria could give better and fuller answers.

The observations show that the list of actions (verbs) developed is appropriate for all the pieces of work involved. It appears likely that they will be equally suitable for other activities and sections covered by SMM/NRM2, but if any items should be discovered which are not included in the list, it is easy to carry out the same process of selection in order to accommodate them.

Item (d) is to check whether the criteria are relevant to site practices, and this is very much like Item (c), in that one photo is probably worth a page of written explanation. To check whether they are relevant, one must look at each criterion in turn and ask the question 'Is information regarding this area relevant to some of the pieces of work carried out on building sites'. It has to be worded in that way, because some of the criteria apply only to

specific items, e.g., 'Adverse conditions' cannot apply to all items because not all conditions are adverse; 'Temporary work' cannot apply to permanent work.

In these observations it has also been demonstrated that the codings garnered during examination of the several editions of SMM/NRM2 are equally applicable to the items of work on site, thereby validating the codings and the method of generating them. The fact that two further codes, (Pr) protection and (Seq) sequence, were added during examination of the site observations, does not detract from the process; it can be considered to demonstrate that this study is willing to accept that change and adaptation are a necessary part of discovery.

Each one of the 'change points' spoken about in the preceding cases represents a change in the information being used. They can be compared with Skoyles' (1968) use of 'activities' and 'operations' as 'pieces of work', where he defines them as 'the work done by a man or gang of men between definite break points in the production pattern without interruption by the work of another gang'. These are interruptions in operatives' work by changes, at definite points in the production pattern, of the information being used. They can be identified by changes in material, in direction, in tools used, in 'other work' such as at junctions, stopping points such as reveals, lintels or padstones, and leaving out bricks for sills. That list is not necessarily complete – the change points will vary from contract to contract and from trade to trade.

It is considered that these are more rational than Skoyles' definition which is limited to the work of separate gangs, not taking account of the possibilities of interruptions in one operative's work pattern. The implication for description of excavation, for example, is that each straight run of trench has to be treated as if it were a separate piece of work; there should be no aggregation with other trenches unless they are precisely similar, and they must be 'measured' by enumeration because that is the only method of describing an object that can ensure that all dimensions are given rather than 'quantified'. The starting trench of any 'closed figure' can only be established by consideration of the individual site; it makes no difference to the quantities. A 'difference' that does occur is between starting to dig on an unbroken surface, and starting at a 'dug face' which may change the trench lengths initially decided upon, but in practice there need be only one unbroken

surface per closed figure; all other trenches of the same figure can be from dug faces, so it makes no major difference to time or cost of the completed figure. If there is any difference in cost between a start on unbroken or dug surfaces, it only requires to be allowed once per closed figure.

Change points also happen at changes in width of trench. Excavators these days do not require much time in changing buckets (sometimes an hour or more each time in earlier years) or in general conformation (i.e., from face shovel to backacter or skimmer), although it would be necessary to make an allowance in each case for changes of this nature. Modern machinery makes such changes in minutes, sometimes in under a minute, so the cost of change is not excessive. It must be accepted however that changes happening frequently can cause additional wear on bearings and other parts, so that maintenance and repair costs have to be carefully considered. Hiring machinery or sub-contracting excavation places the onus for maintenance and repair upon somebody other than the main contractor; the cost remains, and somebody other than the contractor is entitled to add profit to it in such cases. Additionally, it may be more advantageous for the main contractor to take the responsibility for such costs because of the possibility of a smaller or less well financed company failing to maintain plant effectively, or leaving the site entirely if they find such burdens too onerous.

Excavating to reduce levels or basements has similar problems. Not only does access for the machine have to be taken into account, but also access for cart away vehicles, and removal of machinery from lower levels when the job is advanced, leaving ramps to be excavated from high level, which may require the use of a drag line rather than the usual multi-conformation machines to which we have become so accustomed. These are serious considerations which can affect cost greatly. Nevertheless, they can all be thought of as individual pieces of work with start and finish points which require to be established for progress to be organised.

The workpieces can only be established fully when the site and the project restraints are known. Using that concept then allows concrete work to be planned earlier, because any difficulties of excavation can be assumed to be solved and for concrete there is a regularity of materials, sizes and techniques which are well known and relatively standardised.

NRM2 has three classes of concrete: unreinforced, reinforced less than 5% of the volume, reinforced 5% or more of the volume. Having established those classes, it measures reinforcement, except accessories and mesh, by the tonne. The measurement by weight was established before the first edition of SMM in 1922 and has never been altered. In consequence, q.s. measure the lengths of reinforcement and convert to tonnes at abstract stage. Apart from the fact that the entire industry has become used to dealing with reinforcement (and structural steel) in tonnes, the only use that can be made of that information on site is in unloading and transporting.

On the site where case C2 was observed, all the reinforcement was supplied to site cut and bent, as is normal. Consequently, none of the work of the steel fixers is measured; it is all deemed to be included. On a site which had a standard form of contract, this would have meant that the work would have progressed in a less efficient manner for the contractor, i.e. payment for the work would have depended upon beams being in final position, so it would have been necessary to fix each section as it was completed in order to ensure a payment to be made for the month. That way of working would have been considerably less productive than assembling all the beams and then moving them all to position. (Which, of course, depends upon having space in which to store the sections of beam). In that way, payment may be sometimes dependent upon the sequencing of the work.

5.4. Reconciliations with NRM2

5.4.1. Introduction

It is necessary to ‘reconcile’ the case studies with NRM2 because the sites from which the cases were obtained had no BQ. Since NRM2 is the latest in the series of documents starting in 1922 which measure building works, it is the one which is likely to be considered the most relevant to the current position of the industry, and it is widely regarded as being the authoritative document for measuring any building. That being so, it should be possible to observe building work of almost any sort being carried out and associate it with the appropriate items of NRM2. The word ‘almost’ is used because there

is now a separate document dealing with works of repair and maintenance. In addition, this research has been concerned with work, which is not measured, so carrying out the reconciliations should also help to identify items which are not covered by NRM2, thereby assisting validation of the study.

NRM2 has a different format to previous SMM editions; SMM provided clauses from which the user could choose to find that which described the item being measured. NRM2 in effect poses a series of questions to the user, the answers to which gradually build into a description, and in consequence seem rather less definite. The tables positioned within the reconciliations represent the answers to NRM2 questions regarding these cases, and in order to be able to write in general about the tables they have been called ‘responses.’

It should be noted, however that NRM2 has several levels of description. The preliminaries sections describe the building, its location, access, type of construction, etc., together with names and addresses of client, and his technical advisors, plus a great deal of technical and administrative information. The section is generalised and does not deal with individual pieces of work, and so is inappropriate to consider when dealing with observations of pieces of work being carried out.

5.4.2. General categories

The sections dealt with in this study started, with SMM1, as Excavator, Concretor, and Bricklayer. Over the years, these have become subdivided, and portions added, so that NRM2, the latest edition, requires sections 3 to 14 plus 34, i.e., 13 sections, to encompass those changes. Reconciliation of observed work with NRM2 has to bear that in mind in order to ensure that comments made should not be inaccurate or misleading.

In each of those 13 sections, several sub-sections are given which are of a general nature and correspond with the meaning of ‘Preliminaries’ in that they apply to all items that follow in the section, rather than specific pieces of work. The main preliminaries section (Section 1) has two items referring to drawings. Item 1.2.1.1. states ‘List of drawings from which the bill of quantities was prepared’; item 1.2.2.2. reads ‘List of drawings and

other documents relating to the contract but not included in the tender documents.’ Neither of them say that these drawings will be provided to the contractor, so the list cannot be used for any particular purpose. The drawings provided to the contractor are dealt within the next section.

5.4.2.1. Drawings accompanying each section

The first of these ‘Section Preliminaries’ is headed ‘Drawings that must accompany this section of measurement’, which is a general sub-heading throughout the 13 sections under consideration. Little seems to have been done to standardise the terminology involved in this exercise, there being 21 different drawing ‘types’ for the 13 sections. It is as if each member of the committee had been given one section to examine and answer the question implied in the heading, and no editing of the result had been carried out. This results in some confusion, redundancy, and a couple of idiocies.

As examples, it may be thought that ‘Layout’ did not need the word ‘Piling’ to be added if it is included in the Piling section; it seems a little unnecessary to have a drawing for ‘Work outside the boundary’ in the ‘Underground drainage’ section if any mention is made of a sewer connection, and ‘Any other major masonry’ is not a drawing nor is it an informative title. No more has been achieved by what is shown in these ‘drawing titles’ than could have been obtained just by using normal terms – plans, elevations, sections and possibly layouts.

5.4.2.1. Minimum information on drawings

That is the heading for the second of the ‘Section Preliminaries’, and for the same 13 sections there are 27 or less different classes of information registered therein. The exact number is not decided because although similar headings have been able to be aggregated for the purpose of this exercise, (‘Position of piles’ from Section 7 has been grouped with ‘Pile sizes and their location’ from Section 6), there are other headings which are not quite as clear cut, i.e., is ‘Scope and location of work relative to existing structures’ from Section 4 sufficiently similar to ‘Any items adjacent to site that may impact on the works’

in Section 5 that they may be grouped together? However, it seems reasonable to include ‘Position of existing adjacent buildings’, (Section 5) with the latter, because it is possible that adjacent buildings will have an impact on the work.

‘Scope and location of the work relative to existing structures’ in Section 4 (Alterations, repairs and conservation) can be thought of as being related to ‘Pile sizes and locations’ of Section 5. Also, ‘Relative position of concrete members’ of Section 11 might easily be allied with ‘Position of main structural frame members’ of Section 14.

The phrasing seems to be imprecise in some of the items, e.g. Section 10 has ‘Condition of ground’, which leaves the reader speculating upon what it might mean – good or bad, wet or dry, stony or sandy, all are imprecise.

The impression one is left with is that there has been no editing to co-ordinate and clarify the phrases so that similar clauses are worded in a similar way throughout the document,

5.4.2.2. Mandatory information to be provided

The word mandatory means ‘commanded’, so it could be anticipated that the information will be provided in some way, but not necessarily the drawings, since the previous section deals with that aspect. It may be expected to be contained in the specification, the BQ, the schedule of works or such other document as may be produced.

As in 5.3.2.1 and 5.3.2.2., there are 13 sections and initially there were 40 ‘information headings’. These have been whittled down to 34 by considering, for example, that the word ‘limitations’ can be considered as being much the same as ‘restrictions’, so that ‘Limitations due to hazardous or toxic materials’ can be aggregated with ‘Restrictions of method of disposal of waste, including toxic waste’.

5.4.2.3. Works and materials deemed included

This is defined in clause 3.2.3.2.(d) as ‘works and materials that are not measured but are deemed to be included in the building components/items measured in each work section. For the 13 sections looked at, there were 74 items remaining after some aggregation. It

appeared that more care had been taken in editing these, because considerable aggregation had already been done by the authors, Prior to that aggregation there would have been 114 separate items deemed to be included, which is a greater proportion than the Pareto principle considers.

5.4.2.4. Further use of general categories

Because of the general nature of the first three categories discussed above, which do not have any direct bearing on work which is being executed, it was thought unnecessary to include them in the reconciliations which follow. The fourth, 'Works and materials deemed included' are used in the reconciliations because one of the requirements of this study is to look at work which is not measured. Only those 'deemings' which are relevant to the item being examined are stated in the tables.

5.4.3. Reconciliations

5.4.3.1. Excavation and earthworks

Case No E.1. Bed of sand to receive gas-proof membrane

(Table 5.1 below shows the responses to NRM2 where possible and where applicable).

The relevant clause given in NRM2 is: '5.12. Imported filling; X m³; 1. Blinding bed n.e. 50mm finished thickness; 2. Level; *ground floor* 3. Destination stated, *ground floor bays*, on polythene d.p.m. Note 2. Thickness is after compaction'. (The italics in the previous paragraph are those of the researcher). Item 3 of the 'Notes' column defines that 'destination will comprise general areas to make up levels, backfilling foundations, landscaping areas, planter beds and the like', so that it seems that not only the destination, but the purpose or function of the work should be stated, except it is not made clear. The description given by the researcher assumes that it should be so. However, clause 3.2.3.2 (7) reads 'The fifth column (level 3) lists the further supporting information, including any additional dimension requirements, which shall be included in the description of the

building components/items’, and all that is said in level 3 of this item is ‘Destination stated. Maximum or average depth of layers stated’, which implies that such beds may be laid in layers, but nothing is said about the number of such layers and how the estimator is expected to know how many times the same area could have to be compacted. Paragraph 3.3.3.3 demands that ‘Descriptions shall state the building components being measured (taken from the first column of the tabulated rules) and include all Level 1, 2 and 3 information (taken from the third, fourth and fifth columns respectively) applicable to that item. Where applicable, the relevant information from column five shall be included in the description’. It means that compacting the material is ‘deemed to be included’, but because of that, there is no measure of compaction.

It appears that NRM2 gives only enough definition for the contractor to collect information about such work as an average in ‘bays’ of whatever size and shape, and whether on polythene or some other surface. NRM2 defines the component in this instance as ‘imported filling’, so the q.s. would have to decide how to describe the location. There are no rules regarding the level of precision; there is no way of obtaining information to identify an ‘average’ bay. To obtain more precise information would require that each individual bay is identified that its shape is recorded, stating the number of internal angles, and that the operatives’ time spent on each bay is recorded. When that information is obtained, it is of little use to the contractor in estimating since the requirement of NRM2 is a price per meter cube of filling, not necessarily in bays.

Table 5.1: Reconciliation of Case E.1. with NRM2.

Reconciling case study No. E1 with NRM2 Section No. 5					
NRM2 heading: ‘Excavating and filling’					
No	Item of Work	Unit	Level 1	Level 2	Level 3
12	Imported filling	m ³	1. Blinding bed n.e.50mm thick	1. Level, 50mm thick.	1. Ground floor bays
Notes, comments and glossary					
1. All types of surface treatment are deemed included					

2. Thickness is after compaction
Works and materials deemed included
1. Disposal of all surface water

Case No E.2. Laying gas-proof membrane

Table 5.2. below shows the response. The relevant clause in NRM2 is 5.15. ‘Methane barrier, X m² ‘; Level 1, = ‘2. Over 500mm wide, thickness Y or gauge Z’; Level 2 = ‘1, Horizontal’; Level 3 = Orders that protective fleeces or boards shall have the type stated, in this case it is 100mm rigid polystyrene insulation; 3.2 that the method of anchoring shall be stated, and here it is held down permanently by the 225mm concrete ground floor slab. The ‘Notes’ column determines that;

‘1. All turn-ups, turn-downs, laps and joints deemed included. 2. Forming holes deemed included.’

Table 5.2: Reconciliation of Case E.2. with NRM2.

Reconciling case study No. E.2 with NRM2 Section No. 5					
NRM2 heading: ‘Excavating and filling’					
No	Item of Work	Unit	Level 1	Level 2	Level 3
15	Methane barrier	m ²	1. Over 500m wide	1. Horizontal	1. 100mm rigid polystyrene 2. Anchorage. <i>Temporary, conc.blocks; Permanent, G.F. slab</i>
Notes, comments and glossary					
1. All turnups, turndowns, laps and joints deemed included					
2. Forming holes deemed included					
Works and materials deemed included					
1. Disposal of all surface water					

The work as seen on site in terms of time was divided in a ratio of roughly 3:1 between the work involved in the two Notes and the work of laying the membrane. Whilst the membrane is held in position by the concrete slab which is laid over the polystyrene insulation, it should be noted that both the membrane and the polystyrene in succession have to be held temporarily in position when even quite light winds are blowing because they are both affected in that situation. Concrete blocks can be seen in use for that purpose on the membrane in several of the photos.

Case No E.3. Piling for ground beams

Once the piling frame has arrived at the site and has been unloaded, it is self-propelling (its tracks can be seen clearly in photo No D18). The machine itself is complex, but its activities are simple- pick up pile, move to position, establish precise position, establish plumb or angle, strike pile until it either stops at rock, reaches a firm position (judged by how far it moves when struck) or requires extending. The time spent in driving piles is probably less than the time taken in moving the frame from one position to the next, lifting and positioning the pile. That makes it necessary for the position of stacking the materials to be carefully considered in order to reduce moving time as much as possible, and for the area to be piled to be planned for least movement of the rig. NRM2 Section 7 is the one concerned with piling: these are driven piles (3), the unit of measure is the linear metre, they are of precast concrete (Item 1 of level 1), size (say) 250mm x 250mm (Item 2 of level 1), total driven length (say) 7m (Item 3 of level 1)(The note says that this is measured from commencing level to the bottom of the pile, but that cannot happen in practice), total number of piles driven, (say) 80 (Item 5 of level 1). There is nothing of relevance in level 2. Level 3 concerns the reinforcement to the precast piles. Table 5.3. below shows the response.

Table 5.3: Reconciliation of Case E.3. with NRM2.

Reconciling case study No.	E.3	with NRM2 Section No.	7
NRM2 heading.	‘Driven piling’		

Notes, comments and Glossary					
No	Item of Work	Unit	Level 1	Level 2	Level 3
3	Driven piles	m	1.Type stated 2.Nominal size stated 3.Total bored or driven length; Max length stated 5. Total No.	3. Raking; rake stated	1. R/f to precast piles
Notes, comments and glossary					
1.Irregular ground levels must be stated... <i>Different for each building</i>					
2.Features that might affect piling..... <i>rock outcrops</i>					
3. Lengths measured along axes of piles from starting level to bottom of pile					
Works and materials deemed included					
1.Repositioning piling plant during the works,					
2.Maintaining all piling plant					

Case No. E.4. Culvert to divert underground stream

The section of NRM2 which applies to this work is 34, ‘Drainage below ground’. The work was not entirely unexpected, having regard to the nature of the ground and the surroundings, but the sheer volume of water concentrating in one area made it a problem which could only be solved by somewhat drastic measures. Table 5.4. below shows the response.

Table 5.4: Reconciliation of Case E.4. with NRM2. (1)⁵.

Reconciling case study No. E.4 with NRM2 Section No 34					
NRM2 heading. ‘Drainage below ground’					
Notes, comments and Glossary			1. Work outside site boundary must be measured separately		
No	Item of Work	Unit	Level 1	Level 2	Level 3
1	Drain runs	m	1.Av. trench depths	1. Method of jointing	2. Curved

⁵ There are two sections headed ‘Notes, comments and glossary’ in this table.

			2. Type and dia of pipe 3. N/A	2. Bedding and/or surround 3. N/A	
Notes, comments and glossary					
1. Drain runs measured from external face of manhole to external face of manhole					
2. Average depth is calculated for each run irrespective of max, depth.					
Work and mats. deemed included:					
1. Earthwork support					
2. Compacting bottoms					
3. Trimming exc					
4. Backfill w exc. mat					
5. Compacting backfill					
6. Disposal of surplus					
8. Pipes within manholes					
9. Build in ends of pipes					

This is because the first appears with the ‘section preliminaries’ of NRM2, the second appears against the item.

Table 5.5: Reconciliation of Case E.4. with NRM2. (2)⁶.

No	Item of Work	Unit	Level 1	Level 2	Level 3
2	E.O. drain runs	m ²	1. Breaking up hard pavings, thickness stated	1. Reinstating to match existing	2. Curved
Notes, comments and glossary					
1. Msmt of EO items to be based on designed widths of beds in trench. In the absence of a bed the width shall be calculated as nominal size of service plus 300mm subject to a minimum width of 500mm.					
2. Hard material is any material which is of such a size, position or consistency that it can only be removed by special plant or explosives.					
Work and mats. deemed included:					
1. Earthwork support					
2. Compacting bottoms					
3. Trimming exc					
4. Backfill w exc. mat					
5. Compacting backfill					

⁶ Earlier part of this table is the same as for Table 5.6, so is not repeated.

6. Disposal of surplus

Table 5.6: Reconciliation of Case E.4. with NRM2 (3)⁶.

No	Item of Work	Unit	Level 1	Level 2	Level 3
2	E.O. drain runs	m ³	1. Breaking out hard materials, thickness stated	1. Details stated	
Notes, comments and glossary					
1. Measurement of EO items to be based on designed widths of beds in trench. In the absence of a bed the width shall be calculated as nominal size of service plus 300mm subject to a minimum width of 500mm.					
2. Hard material is any material which is of such a size, position or consistency that it can only be removed by special plant or explosives.					
Work and mats. deemed included:					
1. Earthwork support					
6. Disposal of surplus					

Table 5.7: Reconciliation of Case E.4. with NRM2 (4)⁶.

No	Item of Work	Unit	Level 1	Level 2	Level 3
2	E.O. drain runs	nr	8. Around existing live services crossing trench		
Notes, comments and glossary					
1. To be measured where precautions are specifically required. The method of protection is left to the discretion of the contractor.					
2. If in doubt, the surveyor must measure an item giving the nature of the service.					
3. It is not mentioned in NRM2, but in addition to protection, support has to be given to each service that crosses the trench					
There are no 'deemed to be included' items.					

Table 5.8: Reconciliation of Case E.4. with NRM2 (5) ⁶.

No	Item of Work	Unit	Level 1	Level 2	Level 3
6	Manholes	nr	1.Detailed desc stating max internal size of chamber.	1. Base slab thickness	
7	Inspection chambers		2. Depth from top of cover to invert level in 250mm stages	3. Cover slab dimensions	
Notes, comments and glossary					
1. Size stated is max. internal size of chamber					
2. Rocker joints are deemed included					
Work and mats. deemed included:					
1. Earthwork support					
2. Compacting bottoms					
3. Trimming exc					
4. Backfill w exc. mat					
5. Compacting backfill					
6. Disposal of surplus					
8. Pipes within manholes					
9. Build in ends of pipes					

Table 5.9: Reconciliation of Case E.4. with NRM2 (6) ⁶.

No	Item of Work	Unit	Level 1	Level 2	Level 3
13	Sundries	nr	1.Detailed dimensioned description.	1.Step irons 2.Intercepting traps 3.Backdrops 4.Any other associated item	
Notes, comments and glossary					
1. Bedding jointing and building in deemed included					
There are no 'deemed to be included' items					

Table 5.10: Reconciliation of Case E.4. with NRM2 (7) 6.

No	Item of Work	Unit	Level 1	Level 2	Level 3
14	Covers and frames	nr	1. Dimensioned description.	1.Manufacturers reference	1. Method of fixing frame
Notes, comments and glossary					
1. Bedding covers in grease deemed included					
There are no ‘deemed to be included’ items					

5.4.3.2. Concrete work

Case No C.1. Reinforcement cage for ground beams

NRM2 is sparse with its categorisation concerning reinforcement, (there are just three items of ‘work’ available), possibly because some information will be expected to have been provided under separate headings in the BQ, e.g., ‘Reinforced concrete in ground beams’, so that the reinforcement purpose or function is already given. Table 5.11 below shows the response to NRM2.

Table 5.11:Reconciliation of Case C.1. with NRM2.

Reconciling case study No. C.1. with NRM2 Section No. 11					
NRM2 heading: ‘In-situ concrete works: Reinforcement’					
No	Item of Work	Unit	Level 1	Level 2	Level 3
33	Mild steel bars	t	1. Nominal size stated	1. Straight 2. Bent 3. Curved 4. Links	1. Ex 12m long 2. Deformed 3. Bending restrictions
34	High yield bars	t			
35	Accessories not at discretion of contractor	nr	1. Nominal size stated	1. Chairs/stools 2. Connectors	

Notes, comments and glossary:
1. Forming hooks, tying wire, spacers, cutting, bending are all deemed included 2. Chairs and connectors deemed included if not at contractors' discretion
1. Work in substructure, superstructure, or external works to be stated. 2. Watertight work shall be so described

In this instance, the bars are all relatively small diameter, (say) 10 and 16mm high yield steel, so the NRM2 items might be '16mm dia high yield (straight or bent) steel bars in ground beams' for the main steel, and '10mm dia high yield steel links in ground beams', and the weight in tonnes for each given. That leaves all the work of bending (by the supplier in this case), unloading, assembling, tying the joints, moving to position, placing spacers etc., undescribed. Furthermore, the q.s. takes off and abstracts all the lengths of steel involved before the results can be converted to tonnage. The site labour involved in carrying out the work deemed to be included is considerably more than that ostensibly described in the BQ item. The work of tying the rods to the stirrups with binding wire at every passing takes longer than all the prior work.

Case No. C.2. Shuttering to ground beams

Because the contract where this item was observed is 'design and build', the formwork to ground beams is at the contractors choice as to whether it is left in or not. Supposing that it was not design and build, with a BQ prepared under the rules of SMM/NRM2, the formwork would only be described as being left in if it were the intention of the surveyor, and in that case it would most likely have been unavoidable. If nothing were mentioned, the choice of material for formwork would be at the contractor's discretion and could be left in if desired so long as there were no chance of the formwork causing damage to the building. It might require the approval of the architect to the material and the method of its use (Hudson, A., 1914), which cannot be withheld unreasonably. It could then be measured as the response below indicates (Table 5.12).

Table 5.12: Reconciliation of Case C.2. with NRM2.

Reconciling case study No. C.2. with NRM2 Section No. 11					
NRM2 heading: 'In-situ concrete works: Formwork'					
Notes, comments and Glossary			<ol style="list-style-type: none"> 1. Work in substructure, superstructure, or external works to be stated. 2. Watertight work shall be so described 		
No	Item of Work	Unit	Level 1	Level 2	Level 3
13	Sides of foundations & bases	m m ²	1. ≤ 500 high, width stated 2. >500 high		
Notes, comments and glossary:					
4. Permanent formwork or formwork left in shall be described					

Spacers, which are here intimately connected with the shuttering, are deemed to be included in the reinforcement item. Placing the spacers for the formwork cannot be carried out until the cage is in place and takes longer than fixing the plastic shuttering board.

Case No. C.3. Holding down bolts for steelwork

The entire process of the holding down bolts took place over a period of a month. That could have been a shorter time, but the point to be made is that this was not one operation but many. Table 5.3.7. below, shows a response, but it is only for the supply of the bolts. The process of casting the bolts into the beams is covered by Section 11, In-Situ Concrete Works, under the sub-heading of 'Accessories cast into in-situ concrete'. The response to that part is given in Table 5.14, which immediately follows 5.13.

Table 5.13: Reconciliation of Case C.3. (Part 1) with NRM2.

Reconciling case study No. C.3. (part 1) with NRM2 Section No. 15					
NRM2 heading: Structural metalwork					
No	Item of Work	Unit	Level 1	Level 2	Level 3
10	Holding down bolts or assemblies	nr	1. Type & diam. stated	1. Anchor plates, frames, members tubes, cones etc.	1. Supply only
Notes, comments and glossary					

Table 5.14: Reconciliation of Case C.3. (Part 2) with NRM2.

Reconciling case study No. C.3 (part 2) with NRM2 Section No. 11					
NRM2 heading: 'In-situ concrete works: Accessories cast in'					
Drawings that must accompany this section:			1. General arrangement drawings..... <i>N/A</i>		
No	Item of Work	Unit	Level 1	Level 2	Level 3
Accessories cast into concrete					
41	Type or Mfrs ref	m ² m nr	1. Dimensioned description	1. If lin or sup used, desc must inc spacing dims	
Notes, comments and glossary:					
1. Chairs and connectors deemed included if not at contractor's discretion <i>OK</i>					

Other items relevant to such work, under the sub heading of ‘In-situ concrete sundries’ are:

- a) 11.42 ‘Grouting, measured by number; Level 1- Dimensioned description; Level 2.1 – Stanchion bases’,
- b) 11.43 ‘Filling mortices or holes, measured by number’, with no Level 1 or 2 items.

There is a note applying to such items, reading ‘Formwork or other temporary means of support to exposed edges and the like is deemed included’.

The holding-down bolt work in this instance, and probably most others, is intimately entwined with the concrete work. The relationship with structural steelwork does not occur until after the bolts have been cast into the concrete, i.e., when they are ready to fulfil their function. In general, it can be said that the physical work involved in this section and the time taken for the entire sequence is not adequately described for the contractor to make a guess at its cost, even if its effect upon the concrete work is not considered. It would not be surprising if the total cost of labour in dealing with holding down bolts from start to finish was on a par with the cost of labour in erecting the steelwork (excluding the crane and driver). Additionally, it is a key operation which if anything were to go wrong, could cause a delay which would extend beyond its immediate effects, since all following trades in the area would be delayed.

It seems that the intention of NRM2 is that the supply of the bolts should be given under the ‘Structural metalwork’ section, but the fixing to be included in the concreting section. Whilst that does not create any problems for the estimator, it would be better if a note were made in the concrete section that the bolts need to be ordered and obtained from the steel supplier in good time, so that any cost in obtaining, storing, identifying and drawing from store can be allowed, and also as a reminder to site management. Estimator, buyer, planner, site manager and the steel supply and erection contractor all need this information.

Case No C.4. Shuttering to edge of concrete slab

This produces a problem which should be addressed.

SMM 1 & 2 include formwork with centering and casings in the Carpenter section, clause 1 para 1: ‘Centerings shall be measured the actual net surface to be supported...’;

SMM3 & 4 state that ‘Formwork shall be measured the actual surface in contact with the concrete.

SMM5 & 5 Metric, clause F20(a) read ‘Formwork shall be measured as the actual surfaces of the finished structure which require to be supported during the deposition of the concrete...’ ;

SMM6 clause F13.2 reads: ‘Formwork shall be measured to the surfaces of the finished structure which requires (*sic*) to be temporarily supported during the deposition of the concrete’;

SMM7, E20.M1 states ‘Except where otherwise stated, formwork is measured to concrete surfaces of the finished structure which require temporary support during casting’.

NRM2 has no comparable statement. Since every prior edition has mentioned the subject, it can be presumed that NRM2 has deliberately excluded the clause, and, because these are ‘new’ rules, the users might assume that there is a new and different way of measuring and describing formwork, whether or not any indication is given in the document.

Case C.4 is affected by this problem as far as reconciliation with NRM2 is concerned. The formwork is wider than the concrete face supported, and has no struts, being fixed by bolts to the solid concrete blocks under the edge of the slab. The item is covered by Section 11.14 ‘Formwork to edges of horizontal work’, measured in metres: Level 1.1. ‘≤500 wide width stated’. There is the rub, because the actual width of the shuttering is about 325mm, and it is necessarily 100mm wider than the face of the concrete supported because of the bolts to the lower concrete blocks. If this had been a contract where NRM2 was in use, a conflict might have occurred because the contractor might claim the full width, whilst the q.s. would probably not agree.

Leaving that aside, the work pieces that can be seen in this case are straight runs of formwork together with their bolts, stopping at angles and starting the next as a contiguous but not continuous piece of work. For each run after the first, there is nailing at the angles to be considered, and the cost per metre run could probably vary according to the length of the run. These will not be considered as separate pieces of work under NRM2 and the whole would be aggregated.

Striking of separate pieces of material after a time lapse also require to be considered as separate pieces of work in order to be able to allocate material to other items, whether of formwork or some other purpose.

Table 5.15 below shows the response.

Table 5.15: Reconciliation of Case C.4. with NRM2.

Reconciling case study No. C.4. with NRM2 Section No. 11					
NRM2 heading: 'In-situ concrete works; formwork'					
Notes, comments and Glossary			1.Work in substructure, superstructure, or external works to be stated. <i>Sub-structure</i> 2.Watertight work t.b. so desc. <i>N/A</i>		
No	Item of Work	Unit	Level 1	Level 2	Level 3
Formwork			1. Plain formwork 2. Special finish formwork <i>N/A</i>		
14	Edges of horizontal work	m	1. ≤ 500 high: width stated <i>Conc 225</i>		
		m ²	2. >500 high <i>N/A</i>		
Notes, comments and glossary:					
1. Work in substructure, superstructure, or external works to be stated.					
2.					

5.4.3.3. Masonry

Case No. M.1. Blockwork in walls

The blockwork is 100mm solid concrete in fire resisting walls, mostly around common parts. They are structural in some places, having to take the load of precast concrete stairs and landings.

Table 5.16: Reconciliation of Case M.1. with NRM2.

Reconciling case study No. M1. with NRM2 Section No. 14					
NRM2 heading: 'Masonry: Block walling'					
No	Item of Work	Unit	Level 1	Level 2	Level 3
1	Walls, overall thickness stated	m ²	<i>Nil</i>		
Notes, comments and glossary: <ol style="list-style-type: none"> 1. Describe type of construction and coursing 2. Walls msd on centre line unless otherwise stated 6. No dds for voids etc where area $\leq 0.50\text{m}^2$ 					

Other items measured will be:

Item 11: 'Extra over walls for perimeters and abutments, details stated' measured in m, the notes to which state 'This will include work forming eaves, copings, kerbs, quoins, ends and the like'.

Item 12: 'Extra over walls for opening perimeters, details stated', measured in m, the notes to which state 'This will include work forming sills, jambs, reveals, cavity closers, architraves, lintels, mullions, transoms, thresholds, steps and the like'.

The last two items, 11 and 12, each have a level 1 – '1, a dimensioned description', and level 2 – '1, method of forming'; '2, closing cavities, additional ties, insulation and all other associated work is deemed included'. The 'main item' in the measurements will be the one with the rate for the bulk blockwork. Because there is no measure of the items deemed to be included, there is unlikely to be, in the future of any contract, feedback of

cost for those items. ‘Ends and angles’ in the case shown above are an example – there is no point in measuring ends and angles on site, because any results obtained apply solely to the circumstances of that site. The only way in which they could become useful is for circumstances to be associated with the relevant workpieces in the description of the work. It is not expected that all circumstances could be incorporated into a description, but it would improve estimating considerably if those which are foreseen or foreseeable could be stated.

Case No M.2. Brickwork in external skin of cavity walls (1)

The response table is given below, Table 5.17.

Table 5.17: Reconciliation of Case M.2. with NRM2.

Reconciling case study No. M2. with NRM2 Section No. 14					
NRM2 heading: ‘Masonry: Brick walling’					
No	Item of Work	Unit	Level 1	Level 2	Level 3
1	Walls, overall thickness stated	m ²	1. Brickwork	1. Skins of hollow walls	1. Method of forming
Notes, comments and glossary: <ol style="list-style-type: none"> 1. Describe type of construction and coursing 2. Walls msd on centre line unless otherwise stated 3. Radius of curved work taken from centreline <i>N/A but disagree</i> 6. No dds for voids etc where area ≤ 0.50m² 4,5,&7 <i>N/A</i> 					

There are additional items which would require similar exercises to the reconciliation sheets for each one, i.e.,

Item 14 ‘Forming cavity, X m²’,

Level 1 – ‘1. Width and method of forming’,

Level 2 – ‘1. Type and spacing of ties’,

Item 15 ‘Cavity insulation, Xm²’,

Level 1 – ‘Type and thickness’,

Level 2 – ‘Method of installing or fixing’

Item 16 ‘Damp proof courses ≤ 300mm wide, Xm’

Level 1 – 1. Gauge or thickness; 2. No. of layers; 3. Comp. and mix of bedding mats.

Level 2 – 1. Vertical; 2. Raking; 3. Horizontal; 4. Curved; Stepped.

Notes, etc – 1. Dpc deemed to inc (a) laps, ends, angles (b) point edges (c) bond to membranes, etc and there are other items yet to be carried out at the time of observations, such as lintels, holes for pipes and balanced flues, window surrounds and sills.

Case No M.3. Brickwork in external skin of cavity walls (2)

The NRM2 clauses are precisely the same for this work as for Case M.2., so there is little point in reproducing the previous reconciliation. The reason that this has been treated as a separate case is that it is felt that pieces of work that differ from each other are considered to be alike by SMM/NRM2 because only the grosser attributes are considered. That is akin to saying that all forms of public transport are similar because they all have seats whilst omitting to mention that some travel on land, some on water and some in the air. Hence there is a need to point out that pieces of work do not only differ in the kind of change points that are apparent, but in the number of changes and ‘rate’ of change (i.e., how many changes per comparable unit).

Case No M.4. Brickwork in external skin of cavity walls (3)

Again, the NRM2 clauses are the same as for Case M.2. The reason for its inclusion is to demonstrate that having similar kinds of change points do not necessarily result in another

piece of work having the same appearance. Again, there is no point in reproducing the same sheet as for Case M.2.

5.4.4. Reconciliations generally

It was necessary to ‘reconcile’ the case studies with NRM2 because there was no BQ for the sites involved. It was therefore possible that the entire study could have been dismissed as invalid since the basis of the examination has been all the editions of the Standard Method of Measurement plus the New Rules of Measurement 2, which are responsible for the content of descriptions of building work in many countries around the world. It had to be demonstrated that whether or not a BQ existed for any site, the content of descriptions of work on that site could be closely linked to the rules of measurement.

That does not give any legitimacy to the rules, it only shows how closely bound they are to the psyche of the industry which has used them in more or less the same form for a century. It has, however, shown that the use of the sites is valid.

It can be seen in some of the above examples that there is a hierarchy of work items involved. In case C1 the hierarchy ranges from the small pieces of wire for joining rods and the individual rods, to the beam sections in relatively short lengths, to each of the ground beams made up of several such lengths, ending up with the entire system of beams for a single block of flats on a site. Case E1 is at a low level of hierarchy, where one material – the sand - has to be spread in bays, which are formed by the external and internal block foundations for timber panels, and the punned.

Case E2 – laying the gas proof membrane is also at a low hierarchical level, but this work has a direct connection with E1 because E1, the bed of sand, must be complete before E2 can be completed, although E2 can be started at any time when sufficient of E1 is complete.

Again, there is one main material being laid, and the bays are the same as those in which the sand was laid, but because the material is supplied in rolls it has to be cut to length or width, cut around pipes and cut at all angles, so there is more than one piece of the

material to contend with. In addition, because this is a gas proof membrane, a tool has to be used to seal joints between pieces, and small pieces of a different material have to be fixed at the joints around pipes and at angles which have been cut. Thus, in the second instance the workpiece, identified by the bay, is roughly the same size and shape, but there are differences in the type of material and the number of tools being used. Case M2 This is not about hierarchical structure but is concerned instead with intricacy. One has only to look at the intricacy of the steelwork shown in case study C1 and the brickwork in M2,3 and 4 to understand that the descriptions engendered by items 14.11 and 14.12, along with those ‘Works and materials deemed to be included’, make no attempt to convey intricacy to the estimator. The ‘bulk’ clause of NRM2 14.1.2 is considered to be the primary item.

Dealing with mainly bulk clauses may seem to be a reasonable way of looking at the situation when only considering measurement and tendering, but as the case studies show, the juxtaposition of differing pieces of work and the frequency of their occurrence is responsible for the intricacy of a situation. The greater the quantity of ‘work’ which can be carried out without change of pattern or rhythm, the lower tends to be the cost of the item. That is, in effect, the principle of mass production. If items of work have to be carried out that interrupt routine, however small and apparently insignificant, they will have an effect upon the cost of the whole. That is why SMM/NRM2 are not suitable in valuing the work done for interim payments, or for valuing variations. To carry out tasks demanding accuracy in order to make fair payments requires accuracy of initial prices, which, in its turn, makes it necessary to have accurate information about the work.

The problem with NRM2 is that although it might be said to mention most, if not all, the items of work to be carried out on a building, only a few of them are described, and then not in full – the physical work, the tools and plant necessary and wastage are three areas which are ignored – but what stands out is the immense amount of work concerned with what appear to be regarded as less important items which are blithely disposed of by ‘deeming them to be included’ in the contractor’s calculations without giving any clue as to their quantities or even pointers toward a means of establishing those quantities. It is not surprising that the industry is noted for its fragmentation and its adversarial stance

when the people carrying out the work are intentionally denied information regarding what they should be doing by the very group that are paid to describe the works.

5.5. Summary and link.

This chapter has described the case studies carried out on site, with detailed descriptions of the work being done, referring to the photos shown in the Appendix. An example photo is shown in each instance for those who do not require to follow the entire story, The observations are reconciled with NRM2 by means of tabulated examples which are also described in detail. The next chapter (Chapter 6) examines the rules and practices of measurement, looks at hierarchies of building work, recognises that there will be a need for a ‘vocabulary’ to be standardised, gives a rough definition of a ‘workpiece’, and lists the criteria, along with discussion of a variety of relevant issues.

CHAPTER 6. RESEARCH FINDINGS AND DISCUSSION

6.1. Introduction

This study has covered four main areas, each of which has its own findings. The areas in question are:

1. Reading the text of selected work sections for each of eight SMM editions. The purpose of this reading is in order to obtain codings for subjects relevant to establishment of the criteria. The codings have been listed; a full list and explanatory notes appears in Section 3, [pp. 66 to 75](#)
2. Re-reading those documents critically in order to see whether they were biased, misleading, incorrect, and so on, and looking to see how they might be corrected. The detailed comments made have been recorded in sections 4., from [p. 87 on.](#)
3. Visiting sites and recording work of the chosen sections being carried out, in photos and written notes, The photos are shown in Appendix B, and the notes in sections 5.1., [pp 145 to 167](#). The separation is in order that the reader may refer to both in a convenient manner.
4. Reconciliation of the site observations with NRM2, i.e., finding out what parts of the work observed were taken into account by NRM2, has been described in Sections 5.3.3.1 to 5.3.4., [pp 175 to 195](#).

6.2. General comments

With regard to items 1 and 2 above, the individual items have been commented upon, but general comments may be made regarding the entire series of SMM1 to 6 editions:

Edition 1 sets out with good intentions stating that BQ should assist in scientific and accurate tendering, should be unambiguous, should fully, completely and accurately represent the work.

Having said that, the document goes on to measure working space for damp-proof coverings, (normally asphalt at that time), but not for concretors, bricklayers, carpenters and following trades. It measures excavation in the stages in which it believes the work is carried out but does not acknowledge the stages in which masonry is carried out. A nod in that direction is given by measuring separately for hoisting above 40 feet. It is difficult to visualise what happens at 40 ft that makes the statement necessary, but since no minutes of the meetings are available, no reasons for decisions can be found.

The preliminaries section of the document deems that labour, wastage, hoisting all materials and similar are held to be included by the contractor, which appears to be incompatible with hoisting items that are shown separately, and also that the work is fully and completely described in BQ. It allows that the different levels of concreting, e.g., ground , first, second floor, should be given separately, but apparently does not see why the different levels of masonry should be treated in the same way.

The only difference between editions 1 and 2 is that the latter has had a number of items added or altered in the Slater and Tiler section, so has no effect upon this study.

Edition 3, of 1934, repeats the mantra that BQ should fully, completely and accurately represent the work, but also repeats that all labour, wastage, and so on are held to be included by the contractor. The working space distinction is retained for asphalters, as are the stages of excavation, but the separation of levels for concreting has been removed. The latter appears to have been replaced in the Preliminaries by a general description of the area, number of storeys, height of each storey, and total height of the building, which whilst giving some information, eliminates the relationship between the quantities and locations in the building.

Edition 4 was not published until 1948, three years after WWII, a time of licenses for materials, scarcity of materials, the use of the Ministry of Works schedule of rates instead

of BQ. It contained new sections for Heating, Ventilating and Electrical work. The Committee for this edition seem to have realised the inconsistency of BQ being said to ‘fully, completely and accurately represent the work’ and changed it to ‘fully describe the materials and workmanship and accurately represent the work to be executed’, i.e. whilst materials and workmanship are fully described, the work has only to be accurately represented, a much more general statement – e.g., ‘Mr. X is a human being’ is an accurate representation of Mr X, but does not give enough information to identify him.

A new clause, clause 2, appeared in the ‘General Principles’ section of Edition 4 stating that ‘SMM ...is a definition of principle rather than an inflexible document.

In...exceptional cases, the Surveyor is expected to use his discretion and to adopt special measures, provided the principles of measurement laid down are observed and the intention made clear to the estimator. ... In the interest of accurate and practical estimating he may give more detailed information than is demanded by strict adherence to the document’. That sounds like a very wide opening for more information to be provided in general, but in fact does very little to encourage that course. ‘Provided the principles laid down are observed’ is the phrase which eliminates any information being added which deals with the effort expended by labour or plant, which concerns wastage, or which is concerned with such things as the cost effect of deducting openings, measuring on centre lines. If one takes a clause at random from the areas under study and attempts to provide extra information, it is soon found that there are clauses which forbid any such move. To demonstrate that in the present study, would require much more space than is available.

Edition 5 claims in its Preface to be ‘the result of an exhaustive examination of Edition 4 in the light of... suggestions received and the need to define rules of measurement arising from new techniques and methods of construction’. It does not appear to have occurred to the committee that examining previous editions to see what is wrong with them is not the same as examining the principles under which they were first set up to see if they were appropriate to the current time. There is no point in amending rules which were appropriate to the rebuilding of London after the Great Fire of 1666 to try and accommodate the changes which have taken place in the industry since then. There is no apparent change of method between this and previous editions. There are changes of

wording, however, which are important. There is an 'Introduction' on an un-numbered page which changes the wording significantly from that of its counterpart in SMM4, i.e., clause 2 of 'General Principles' which is shown above in the comments upon SMM 4.

The amendment in SMM5 reads: 'The Standard Method of Measurement provides a uniform basis for measuring building works and embodies the essentials of good practice but more detailed information than is demanded by this document should be given where necessary in order to define the precise nature and extent of the required work. The Standard Method should apply equally to the measurement of proposed works and executed works'. This is an important statement, and the changes from SMM need to be recognised:

- (1) SMM5 no longer claims to be a flexible document.
- (2) It no longer claims to be a definition of principle.
- (3) It no longer refers to 'exceptional cases'; it has become 'where necessary'.
- (4) Where additional information is not provided, it must be assumed that the producer of descriptions has decided that it is not necessary.
- (5) SMM5 states that it provides a basis for measurement of building work, (not of describing it), throwing the onus for description on the quantity surveyor.
- (6) SMM4 makes it plain that the additional information is given in the interests of accurate and practical estimating. In SMM 5 it is 'where necessary...to define the precise nature and extent of the work', so the emphasis is not on the contractor's requirement for information that provides a basis for accuracy in tendering, but rather that the quantity surveyor should concentrate upon the accuracy of his measurements and descriptions, whether or not they are relevant.

It is clear that users of the information have no say in its content. The same statement appears in all subsequent editions, so it appears to be regarded as important by each committee. It could be regarded as a defensive move, since the longer such statements remain unchallenged, the more they can be said to have been accepted by the industry.

SMM5 (metric) states categorically that it is a conversion, not a revision: that the fifth edition has been rewritten, substituting metric terms for Imperial. That statement does not

appear to agree with the facts, probably depending upon how the word 'conversion' is defined. In normal terms, however, if one converts, say, pounds sterling to US dollars, the result today with the pound trading at \$1.24 (ignoring transactional costs) is that £100 will buy \$124. That has not happened in SMM5M. The first item in SMM5M to be affected by the conversion is A4(b) - regarding the sizes of steel/metal sections. SMM5 has 4 categories, small, medium, large, and extra-large. 'Small', i.e., n.e. 6" in depth has been replaced by 250mm in the metric version, approximately 9 $\frac{7}{8}$ ", an increase of nearly 44%. 'Medium', i.e., 6" – 12" in depth, has been dropped. 'Large', i.e., ex 12", n.e. 18", has been replaced by ex 250mm n.e. 500mm, which is 9 $\frac{7}{8}$ " - 19 $\frac{3}{4}$ " i.e., a 6" band has been replaced by a 9 $\frac{7}{8}$ band which is 52% greater. 'Extra-large, i.e., over 18" has been replaced by 'over 500m', which is 6.5% greater.

Thus, four categories have been replaced by three, the first of which has increased its range by 44%, another by 52 % and the third by 6.5%. They are not only arbitrary, but they are also irrational. This is not the only example, there are similar cases throughout the document. It may be thought that this is of little import, but in an arena where the q.s. is regarded as the soul of rectitude, and precision is demanded of contractors, such sweeping changes are disturbing. One might anticipate that the categories represent actual cost divisions, but with such radical alteration able to be implemented arbitrarily, such thinking must be doubted. In addition, a situation where the content of descriptions is examined requires that the written word validates the intent, but in this case the intent is not apparent.

'SMM6. A guide to the changes made between 5th and 6th editions of SMM', (RICS, 1978) gives a summary of the main changes, perhaps the most helpful of which is the requirement for general location drawings to be included in the tender documentation. That instruction, however, is accompanied by a clause applicable to 13 of the 22 sections of Edition 6 which reads 'A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided...' Clearly, that is an instruction to the q.s., but it can also be seen as a message to the designer to ensure that as much information as is necessary to produce the BQ is included on the location

drawings. Furthermore, it is not at all certain that the contractor will regard work to be 'evident' when such information is not provided.

An innovative clause is included in most sections of SMM6 - the requirement to supply, maintain and remove all plant needed for the work section. It is not explained how the clause does not clash with the General Rules clause A4. 2. d., which deems plant and all costs in connection to be included with the general items.

Dropping the words 'get out' is said to be because excavation will be carried out by mechanical means. Is soil not 'got out' when either hand or mechanical means are used?

A significant move toward the thinking adopted in this study occurs in the requirement to state the number of separate surfaces covered by formwork to soffits and walls (but not other situations, and without separating them by size). In brickwork the concept of 'reduced brickwork' has been eliminated. There are other changes explained in the SMM6 guide, but most are outside the scope of the sections chosen for this study.

The preface to SMM7, 1988, states that the edition is the result of a working party (set up in January 1971) which reported in December 1971 and produced the sixth edition in 1979 as an interim measure. It took 8 years for an interim measure; the entire result took 17 years, the work of at least 39 people apparently. Whether that result is worthy of the effort is open to question.

NRM2 is the latest edition, published in 2013. It makes plain that it is about measurement, no longer trying to make a connection with 'work' and has apparently shed its links with the CIOB and the Building Employers Confederation. By not having those partners, it can no longer claim to speak for the industry, despite the presence of three contractors represented in the steering group. It is much larger than previous editions, splits off repairs and maintenance into a separate volume. and has apparently a greater number of rules. The basis of its way of measurement, however, is not new but is similar to all previous editions. albeit with less detail and more deeming. Contractors could now refuse to have anything to do with its methods of description or valuations arising from them because they have had no say in their compilation.

The detailed discussion as to how the codings were generated has already been given in section 4.

6.3. Findings arising from codings

In the course of reading the documents and trying to understand both the meaning and the effect of the clauses, it seemed that the codings were of four types; (a) A few questioned the basis of the clauses, i.e. it was queried whether ‘alternatives’ were acceptable in a ‘standard’ method, (b) Items attempted to deal with unusual or extreme conditions, e.g., work in water, compressed air, etc., (c) Where information was intentionally omitted from the items, such as location, access, working space, dimensions, etc., which formed the bulk of the codings, and (d) items where information was omitted from the items because of the working practices of quantity surveyors.

It is the last of these which is of some concern. It may perhaps be considered that their inclusion does not derive directly from examination of the documents but arises from the author’s *a priori* knowledge of such practices. That may be so to an extent, but it is strongly asserted that (a) these matters have such an effect that they cannot be ignored, (b) if it had not been for the examination of the documents, the points made might not have been brought into the light of scrutiny, (c) that in any event, *a priori* knowledge, if found to be correct, is acceptable in studies such as this.

It is with those points in mind that examination of the practices follows.

6.3.1. Deduction of openings

Foremost among the rules of measurement is the deduction of voids or ‘wants’ in the work. SMM1 to 3 did not find it necessary to mention this specifically, except that SMM3 stated that work was to be measured net as fixed in place. The fourth edition, 1948, expanded the rule; clause 8 of ‘General principles states: Where a minimum area is defined for the deduction of voids...such minimum shall refer only to openings or wants detached from the boundaries of the space measured. Reductions of area caused by

projections from the boundary...shall always be the subject of deduction irrespective of size'. Similar clauses appear in all subsequent editions. Apart from the problem of visualizing a reduction of area caused by a projection, the concept appears to be innocuous. What causes problems is that no account is taken of any difficulty arising because of the opening.

Making deductions is not measuring work, nor is it necessarily measuring a lack of work, it is only measuring a lack of materials. In carrying out a deduction, there is a possibility that any extra cost of working around the opening (which is part of the cost of forming the opening) is not considered, and feedback of cost cannot be obtained by including items such as 'Form opening'. Openings only exist because work is carried out around them (similar applies to 'form cavity'). There are two ways of measuring an area which includes an opening. One is to measure the total area and deduct the area of the opening, the other is to measure the parts around the opening and add the separate areas together. Both achieve precisely the same total area, but the first method does not allow an observer of the work to determine whether the different portions have differing labour costs per unit. In taking-off quantities, the q.s. will measure all the areas of similar construction, (e.g., walling), add them together and then deduct the openings.

When entered in the bill of quantities or other document, the total quantity of walling of that description will have a unit rate set against it by the estimator, so it must be supposed that the q.s anticipated that the estimator will know what the average cost will be of that sort of work in that sort of building whatever its height, relative complexity and so on. (It should be noted that the quantity of walling measured is not of the same ilk as the area of the walls in the building, due to the quantity of openings deducted, i.e. a wall where the overall size is 10 m x 3 m with openings totalling 16 m² is carrying out the functions of a 30 m² wall, not a 14 m² wall). However, the only reasons for re-measuring the work on site are for the purpose of monthly valuations, or for establishing the final quantities of work where there has been considerable variation, and in carrying out those tasks, the same terms of measurement have to be used as those by which the BQ was prepared. For contractors to measure it again in a way which would bring out the intricacy, allow for various heights, etc., would be entirely at their cost and achieve no purpose under the

existing method of measuring the 'works'. It should to be recognised, however, that all the information regarding factors that make for difference in cost which are caused by the design of the building, (i.e., not those due to skill variations of the operatives, the weather, non-receipt of information, and other extraneous factors) are implicit in the drawings and specifications supplied to the contractor, and hence, when q.s. are taking - off from any drawings, or when the quantities are taken off by computerised methods, the intricacy implied in those drawings could be defined if a method of describing 'intricacy' were to be established, e.g., identifying all the break points and levels, such as junctions, angles, stop-ends against openings, different materials, change of working level etc.

Instead of attempting to supply that information, q.s. are obliged to reduce the possible content of descriptions to comply with the requirements of SMM/ NRM2. Whilst the method gives accurate enough quantities for materials, it is not conducive to accurate accounting for labour costs or materials wastage. The practical position is that there are only two main areas of the industry that can be thought of in terms of deduction, and they are demolition and excavation. Lesser items are in cutting chases, cutting holes, cutting off pile tops and similar. At the same time, not deducting small items allows the assumption to be made that the labour in forming the opening is equivalent in value to the material over-measured, the 'swings and roundabouts' syndrome beloved of quantity surveyors. That may be thought accurate enough for the small items, but deducting door and window openings leads to the need for 'manufactured' descriptions such as the 'Extra over walls for perimeters and abutments' and 'Extra over walls for opening perimeters' of NRM2. There is no need for deductions if all items are measured as additions.

Openings, in the main, are not cut – they are constructed. Describing the way in which areas around openings are constructed, which consist possibly of several separate pieces of work, would enable them to be identified for costing purposes and allow for feedback to be communicated to estimators and designers alike, making for design that is aware of cutting waste, for example, and giving estimators valuable detail. As a footnote, it is interesting to see that the interactive programme, 'MASON', concerned with brick and blockwork, quoted in Hendrickson, (1987), asks questions of the operator about walls being priced, their size, position in the building, number of openings and their sizes, then

uses the responses to establish output figures, i.e., in carrying out an estimating procedure, it uses similar information to that proposed in this study, except that no mention was made in the Hendrickson article regarding angles and junctions which are here also considered necessary.

6.3.2. Centre line measurement

NRM2, 14, Masonry, Notes, comments and glossary, 1, informs that all walling is to be measured on the centre line irrespective of construction. This is a wonderful tool for measuring materials, giving the ability to use one set of dimensions for a range of items. By taking the centre line of external walls, it is often possible to deal with excavation, disposal of excavated material, earthwork support, backfilling to excavation, concrete in foundations, brickwork or blockwork, form cavity, cavity fill, and dampcourse, from the same dimensions. Unfortunately, it does not give any help in some areas of cost and is a hindrance in many cases.

Once a machine is on site, excavation of foundation trenches has three main components, moving to the starting position of the trench, movement along the line of the trench, and changing position at corners. When the entire foundation has been dug, the process restarts for another foundation in another area. It is clear that a major part of the cost of excavation of trenches is the cost of movement of the machine from one trench line to another; it follows that the cost of trench excavation could vary with the ratio of trench length to number of corners. Measuring on centre line treats the entire foundation as if it were a straight line, so the only feedback that is likely to be obtained from site is the total cost of foundation trenches of particular sizes. Depending upon which edition of SMM/NRM2 is in use, that may be in terms of width in two or three categories by depth in several stages. The complexity of the design in terms of plan layout cannot be passed on; the cost of intricate foundations of one contract may be aggregated with the cost of relatively simple foundations of others; the designer never gets the opportunity to understand the true cost of his design.

Because of the break in productive work whilst the excavator is moving and setting up for the next section of trench, there is also a possible break in the continuity of carting away excavated material, leading to some increased cost, so the more angles there are, the greater that increased cost is likely to be. With earthwork support, the situation is that the sides of the trenches are measured in full, but again no distinction is made at corners. Strutting across a straight trench is relatively simple, since one strut can be holding up both sides. When it comes to corners, there is no opposite side to strut against, so the strutting is necessarily different. With timber trench sheeting, the strutting can be diagonal; using modern metal trench support panels, the corners need to have an adapted 'manhole box' or other special parts to deal with the situation. Whatever system is used, corners are a different issue to straightforward trenches, so there tends to be a different cost.

Brickwork or blockwork, whatever its position in the building, has its cost affected by the number of angles and junctions involved. That cost is difficult to establish by measurement because the work of producing angles and junctions cannot be observed and timed completely separately from the general run of brickwork. Probably the only way to arrive at approximate costs of those items is to take a large sample of bricks being laid, some having angles and/or junctions, some not, and compare times of each. That would not take very long if all workpieces were to be pre-described in that way. A similar method could apply to cavity fill, the laying of dampcourse, and so on.

6.3.3. Aggregation

Aggregation is carried out during the taking-off process. All items of a particular material are added together except that there are some 'sets' or groups separated in the abstract which have been laid down in SMM/NRM2. Aggregation is not specifically mentioned in any of the editions of SMM/NRM2, but it is implicit in many of the items; SMM7, E10.4.2.0.0 for example, deals with in-situ concrete beds thickness 150 – 450 mm, so that whilst not actually prohibiting the separation of beds of 150mm from beds of 200, 250 mm, and so on, it does inhibit producers of descriptions, encouraging them to aggregate all such items. It is the view of this study that items can only be aggregated when they are

precisely the same in every respect, since it is possible, often likely, that variations such as differing sizes of materials, e.g., difference in lengths of skirting, have an effect upon cost of the finished article. SMM acknowledges this to an extent in, for example, SMM7, J. Waterproofing, 1. col 2 where asphalt widths of $\leq 150\text{mm}$, $150 - 225\text{mm}$, $225 - 300\text{mm}$, and $>300\text{mm}$ are imposed.

Quite apart from the inadequacy of separation shown for the first two sections above, it might be supposed that the committee producing the rules believe, or, have been convinced by the asphalt industry lobby to accept, that there is a difference in cost at each of these points. Unsurprisingly, the same rule does not apply to plastering (SMM7, M20) or painting (M60), where separation is between $\leq 300\text{ mm}$ and $>300\text{mm}$, and there is not a powerful lobby. That should not be considered the fault of the lobby, who try to protect the members of their industry, but is a failure on the part of SMM committees to recognise the similarity of circumstances, whether or not it is intentional.

The fact that smaller items of material are treated differently to the bulk has been apparent through much of the history of SMM, perhaps demonstrating an awareness that the size of the workpiece is a factor of cost; that the smaller a piece of material, the more expensive the labour fixing it is likely to be per unit of measurement. One problem with all editions of SMM is that size divisions are usually arbitrary, and it is not known whether costs of any item increase as a straight line, as a curve, or as steps. Another is demonstrated in the skirting example mentioned earlier, where skirting width and thickness are accepted as being cost factors, but skirting length is not, which shows little regard for reason. Some such problems are dealt with summarily in SMM6 where the divisions are between functions, i.e. walls, ceilings, skirtings etc., rather than sizes. That trend continues in SMM7.

The way of discovering possible points of increase in cost, or from which a graph could be plotted, is by keeping sizes separate so that differing costs may be identified. Examples of aggregation in NRM2 are: Carpentry, 16.4.1. 'Boarding, flooring, sheeting, decking, casings, linings, sarking, fascias, bargeboards, soffits and the like, not exceeding 600mm wide; finished width and thickness stated', measured in linear metres and Carpentry,

16.4.2, same description as above but over 600mm wide; finished thickness stated, measured in square metres The point about aggregation is that it ensures that dissimilar items in dissimilar locations, containing differing quantities of materials can be bracketed together, thus making ‘average’ cost even less significant. It is realized that many will be aghast at the suggestion of aggregation being discontinued, on the grounds that the quantity of information produced by not aggregating will be phenomenal compared with the normal BQ. That is possibly so, but it is not anticipated that the results of this study will be producing ‘normal’ BQ. All such information is expected to be provided electronically. What is more, at some stage during the building process, somebody must produce information of this sort, which could be provided very early on if there were a method in existence. The object of this study is to produce criteria for a system which provides information to all users in the same manner, with the same content headings, and with the same sort of structure for each item. Averaging lengths of materials has much the same effect as aggregation.

6.3.4. ‘Extra over’ (E.O.)

E.O. (Extra over) is a measuring device for allowing a difference between one item and a similar other to be measured separately so that the main item may be aggregated with others that do not have precisely the same features. Willis (Lee *et al*, 2014) explains the process thus – ‘For example, labours on...steelwork such as cranks to beams are measured as extra over. This means that the beam is measured its full length over the cranked bend and the estimator, when pricing the item, assesses the extra cost of forming the crank’. That is fine for enabling what could be many separate descriptions to be reduced to a few, but it does place the onus of interpretation upon the estimator and produces an estimation of an average where the range is not known. In the example that Willis gives, the estimator cannot know how many individual beams (say) have how many cranks in the two items of (a), x tonnes of steel, (b), y No of cranks. The estimator is expected to give a price for each crank, when it is the cost of each cranked beam that is affected. A beam having one crank could easily have less cost per metre run when fixed than the same length of beam having four cranks, even if the cost per crank is not included, because of

the greater difficulty of transportation, handling and positioning. The main point to notice about E.O is that it does not represent a piece of work; it is just a convenient way, for the q.s., of cutting down on the number of items measured.

Another example is 'Extra over false ceiling for access panel', which is again leaving it to the estimator to do considerably more work. Such calculations are lessening the work of the taker-off whilst reducing the amount of information transmitted, which may have been originally supplied on the drawings, or standard detail sheets. NRM2 has reduced considerably the number of items that are to be measured as 'extra over'. (Lee *et al*, 2014), but, similarly to SMM7, it has made the q.s. choose from a list of possibilities for most descriptions produced so that if an item does not conform precisely with what it suggested, there is a greater possibility that it will be forced into an existing category than that a new description be produced. A 1B wall in English bond, faced one side, consists of a first course (say) of commons stretchers on one side and facings stretchers on the other. The second course will be completely of facings headers. The ratio of facings to commons is therefore 3 : 1. There is a 'care' cost of laying facings that is more than laying commons, but in this instance it is unlikely that less care can be taken in the laying of the commons. The 'extra over' cost of facings is then the difference between prices of facings and common bricks, but the pricing of the item is likely to be similar to that of Smith (1986), where the difference in cost of material has the difference in cost between laying commons and facings deducted in proportion to the number of commons. By doing so, it is assumed that the labour cost of laying commons with facings is the same as in laying commons only. That is not necessarily so.

6.3.5. 'Categorisation'

This term refers to the tendency of SMM/NRM2 to allocate categories or classes of work to various items throughout the sections. This has been lessened to a great extent in SMM7 and NRM2, but still exists, with no explanation ever having been given for selection of the various categories. NRM2 produces the following examples in the early pages of the tabulated work sections (after Preliminaries):

Section 5, Excavation and filling: Items 2.1 to 3. Removing trees or tree stumps, girth 500mm to 1500 mm; 1500 to 3000 mm; over 3000mm stated in 1500mm stages. What it is that decides that a tree is a tree if it is 500mm girth (measured at 1m above the ground), and not a tree if it is 490 mm girth is not revealed.

Items 6.1.1 to 3 and 6.2.1 to 3, Bulk and foundation excavation, not exceeding 2m deep; over 2m not exceeding 4m deep; thereafter in stages of 2m.

Item 11.1 and 2. Filling obtained from excavated material, final thickness not exceeding 500mm deep; or final thickness exceeding 500mm deep.

Section 11, In-situ concrete works, Items 2, 3, 4, 5, 6, Horizontal, sloping, vertical or sundry work, all have for level one, '≤300 mm' and 'exceeding 300mm'.

It is known why the excavation stages changed from being not exceeding 0.25m, not exceeding 1.00m, not exceeding 2.00m and so on in SMM6 to the stages shown in 6.1.1 etc., above. Apparently, this is based on the assumption that excavation will be carried out by mechanical plant (RICS, 1978). It is not clear how the assumption affects the categories, but it must be presumed that there is some basis for having categories at all, known only to the SMM committee. Categorisation is very similar to aggregation, mentioned earlier, and might not need to be considered separately. The point of the above discussion is to explain that in a rational system there should be a rational reason why each rule is instituted, which should not be merely for the convenience of one of the parties to a contract.

6.3.6. 'Deemed to be included'

The RICS (1966, p.3) are quite clear about the meaning of this, and state 'Where this phrase is used in the SMM, it is not necessary to mention the items referred to in the bill. The estimator is expected to be familiar with the requirements of the SMM'. The sentence means also that it is not necessary to include the words 'X is deemed to be included' within the item.

That may be so, but the requirements of SMM do not necessarily coincide with those of the estimator. It is the task of q.s., by dint of the use of SMM/NRM2, to provide the estimator with the information necessary to be able to calculate the contractor's cost of carrying out each item tabulated in the BQ. This is confirmed in the foreword of NRM2 stating that 'NRM2 replaces the Standard Method of Measurement of Building Works... the latest edition being SMM7' and clause 3.1.3 having repeated the clause of SMM7 that 'Bills of quantities are to fully describe and accurately represent the quantity and quality of the works to be carried out. More detail than is required by these rules should be given where necessary to define the precise nature and extent of the required work'. Because of those sentences, it is apparent that 'deeming' elements of cost to be included cannot be sufficient to provide the estimator with the information needed. Moreover, it should be clear that if the words are included in an item description, it is an admission that some information has been excluded.

6.3.7. 'Reduced' brickwork

This term was last used in the 6th edition, (Metric)1978, and is given here only to illustrate how the way in which an item is measured and billed can affect the accuracy of pricing. It arises from a desire to aggregate as much brickwork as possible and it consists of calculating all thicknesses of brickwork except ½ B as if it were 1B, e.g., 40 sq yds of 1 ½ B walling would become 60 sq yds reduced to 1B, 40 sq yds of 2B would become 80 sq yds of 1B. both items would be added together on the abstract to become billed as '140sq yds of brickwork reduced to 1B'. Whilst that is convenient for reducing the number of items in the BQ, it is wrong in terms of cost. There are different mortar quantities for different thicknesses and for using bricks with or without frogs (Price-Davies 1952).

In Fig. 6.1, it can be seen that for ½ B wall, each brick has a bed joint and a header joint— for each equal length course the number of joints is the same, because each course will (usually) have alternating half-bricks at its ends. The net volume of mortar required for 1000 bricks without frogs will be: $1000 \times 0.01 \{ (0.215 \times 0.1025) + (0.1025 \times 0.075) \} = 0.297 \text{ m}^3$ which is just under 3.5% more than that shown in Buchan *et al* (2003).

Fig.6.1. BSS Bricks with beds and joints. (with acknowledgements to W.Price-Davies)

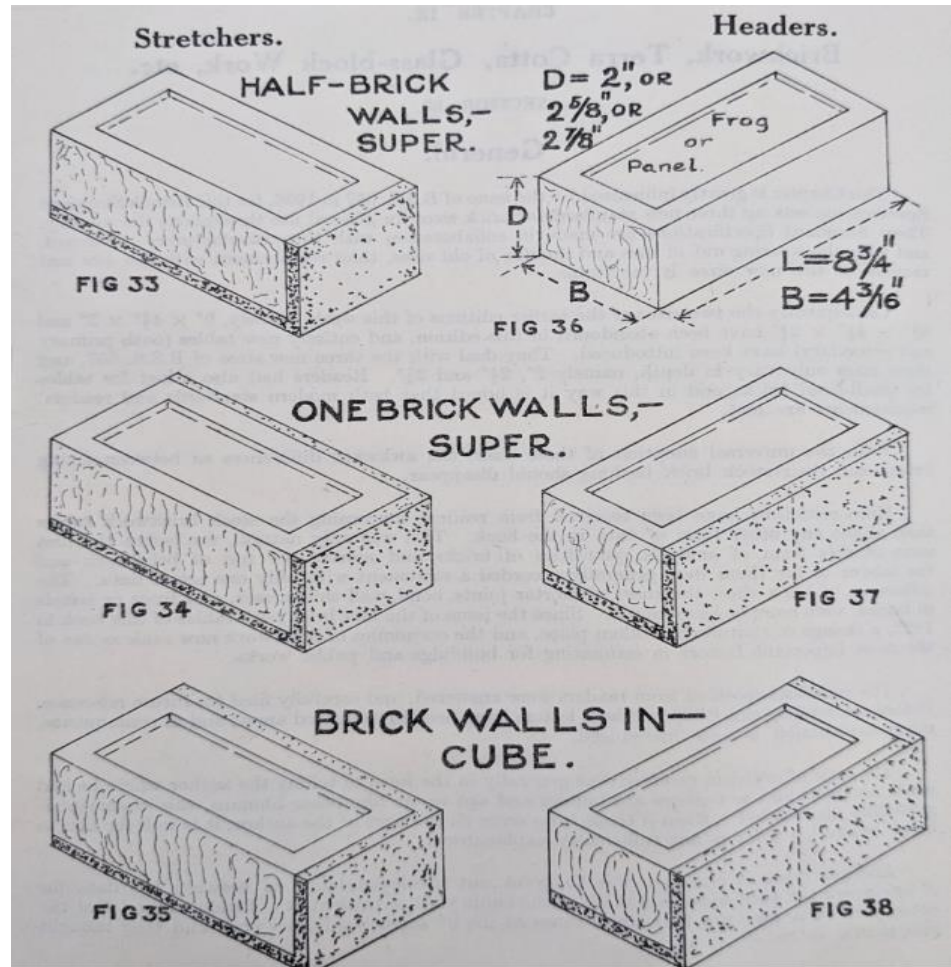


Figure 6.1:

BSS Bricks with beds & joints (acknowledgements to W. Price-Davies)

- For a 1B wall in English bond, 1000 bricks without frogs will require (in two differing courses): $(1000 \times 0.01 \times 0.215 \times 0.1025)$ (bed joints) + $(250 \times 0.01 \times 0.225 \times 0.075)$ (centre joint of upper course) + $(500 \times 0.01 \times 0.1025 \times 0.075)$ (transverse joints of upper course) + $(500 \times 0.01 \times 0.215 \times 0.075)$ (transverse joints of lower course) = 0.343 m³
- For a 1 ½ B wall of the same bricks in English bond, two courses (which are identical), will require: $(333.33 \times 0.225 \times 0.3275 \times 0.01)$ (bed joints) + $(333.33 \times 0.225 \times 0.065 \times 0.01)$ (longitudinal joint) + $(333.33 \times 0.1025 \times 0.065 \times 0.01)$ (transverse stretcher face joints) + $(666.66 \times 0.215 \times 0.065 \times 0.01)$ (transverse header face joints) = 0.41 m³

For all thicknesses of wall other than $\frac{1}{2}$ B there is slightly more mortar used at angles, ends and intersections, and the additional cost of cutting closers. By carrying out the process of 'reducing' the brickwork, the number of bricks measured will remain the same, but the quantity of mortar allowed will be an average of the amounts necessary for the various thicknesses of brickwork, qualified by the quantities of each.

6.3.8. Related, but differing, items of work

Many descriptions stemming from SMM/NRM2 combine items of work which are connected, mainly, it appears, because they involve the same artifact, but are independent of each other because the work involved is not continuous. Examples in this category include much temporary work, i.e., formwork, scaffolding, hop-ups, ladders, temporary lighting, water supply, and so on, cannot be erected and struck in one operation. For 'measured' work, there are many items which are currently included with others just because they are related and dimensions are the same, e.g., pointing edges of dpc, power floating to concrete slabs, beam filling, pointing in flashings (which in SMM7 is deemed to include cutting or forming grooves or chases). There is a delay time between each of the constituents; similar requirements attach to plastering and painting. Whilst it is convenient to group pieces of work together because of same dimensions, it detracts from thinking about them as separate items. Because of the fact that there are pieces of work which are used for a relatively long period before being dismantled and removed, there must be a rule preventing the different operations from being aggregated as one, as in 'erect and dismantle all necessary shoring' and the like. There is additionally the facility, if items are separated, of having them coded separately also, so that they may be programmed separately, just referring to the code.

6.4. Findings arising from site observations

The site observations of work in progress were very rewarding. They demonstrated that SMM/NRM2 measure only the main materials concerned in many operations, but in addition showed that important subsidiary materials, such as the tying wire in reinforced

beams and columns, is 'deemed to be included', therefore is not described, and so a major proportion of the physical work in beams and columns is not included in descriptions. Unfortunately, time and resources precluded any work in depth in this area, but it would make for a fine subsidiary study. The detailed comments on each case study can be found in section 5.

6.5. Findings arising from reconciliation of site observations with NRM2

The reconciliation of the case studies with NRM2 was important because the sites under observation had no b.q. for referral. Consequently, it was felt necessary to demonstrate what would have been measured had the sites been equipped with such documentation, i.e. to prove that SMM/NRM2 did not measure the labour involved and only measured part of the material content. As with the site observations, the detailed comments can be found in section 5, which show that the presumption that all the work observed could have been described by NRM2 (the method replacing SMM7 according to its foreword) was accurate, and that the description of physical work was as it had always been since 1922 , i.e. non-existent.

6.6. The criteria

The overall requirement (not 'overarching') that has become clear in carrying out this study is that the system of description must reflect the practicality of the work. There is no room to allow for concepts which, although they may make measurement easier, do not attempt to describe the way in which the work is done.

It is therefore necessary for the system of description to make plain what is not allowed in order to help to define that which is rational and clear. Doing so, it is possible to group the criteria under a number of headings, which are as follows:

6.6.1. Criteria due to q.s. practices

Criterion 1: The first and possibly the most difficult practice to deal with is the deduction of openings. It is perhaps possible to build a wall, floor or roof which allows for openings to be punched through it in any position required, in which the materials comprising the wall, floor or roof are placed back in the stack from whence they came without sustaining any damage and ready to be re-used. Not only that, but at no labour cost of either putting them there in the first instance, taking them out of the opening or putting them tidily back in their stacks. That is the concept which is currently used for production of openings. The practicality is rather different. The position and size of any opening must be known and marked before the operative reaches the point in the work at which it is required. Supposing the opening to be a window, the last possible point in the work at which the worker has to stop and consider the opening is at the level of sill and one corner of the opening; the next move will be to establish the precise horizontal position of the window, or sill, so that the pieces of work may be continued (now at least two, one each side of the window). The practice of deducting openings is difficult to change merely because it is the easiest way of dealing with them in manual calculation, but that satisfies quantity surveyors' needs, rather than site operatives. It makes no difference to the client.

Openings are not to be treated as if they are pieces of solid work which are not now required – they must be described as they are constructed. Separate items of work so produced must each have a link to the others which expresses their continuity and/or contiguity.

Criterion 2: The process of describing items as 'extra over' others is also a concept which does not reflect practicality. Every piece of work must be described in the way in which it is created, e.g., '1 ½ B walling in Flemish bond showing facings X on one side and commons Y on the other' could be part of a description arising from not measuring the EO for facings. The rule here is that all pieces of work must be fully described, including all materials involved. In addition, 1 ½ B walling has been chosen as an example because the practicality of the situation is that the description can only be achieved in 1 ½ B or thicker walls.

Criterion 3: In general, items should not be aggregated. Items which are exactly similar may be described in a grouping, but each one will have a unique position which must be stated in description so that it may be identified on the drawings.

Criterion 4: No ‘average’ sizes shall be given. There is nothing to be gained by not giving actual sizes except that the BQ is a little slimmer.

Criterion 5: Centre line measurement is a useful tool for the q.s. but results in (e.g.) complex plan shapes not being reflected in dimensions. There are two possible ways in which this situation can be handled – (a) that workpieces be described as a series of straight lines with angles and intersections being given separately, or (b) the workpiece described as continuous and contiguous including x angles and y intersections. The latter is favoured by this study purely because of the impracticality, in many instances, of observation and recording the extra time expended in the first case. Using the latter method would enable rational comparisons to be made.

Criterion 6: Categorisation. A category is defined as a class or division (Oxford University Press, 1978). Whilst there may be a need to use categories such as ‘beams’, ‘columns’, etc., in descriptions, it is considered that these are describing functions of workpieces, and as such are not necessary for describing the work of production. However, it may be found in practice that they are more useful than can currently be imagined, so judgement can be suspended.

Criterion 7: ‘Deemed to be included’ is a device which enables the q.s. to avoid giving any information whatsoever about the item in question, and as such should not be used.

Criterion 8: ‘Reduced brickwork’ is a practice whereby q.s. used to be able to aggregate different thicknesses of walls together, thereby reducing the number of items. In doing so, however, some of the detail was lost. It is not anticipated that the method will return any time soon, but it pays to be forewarned.

Criterion 9: The expression ‘incremental work’ has been used in this study to describe work which is measured as if it is carried out in a continuous manner in one plane when it

is actually produced incrementally over a much longer period of time, often in another plane. The best example is of closing cavities in hollow masonry walls at reveals, where the closing is measured vertically in metres, but the way it happens is for a brick or cut brick to be laid with a cut end abutting the frame in question, usually retaining a strip of dampcourse in the vertical joint. The bricklayer continues around the building, dealing with each reveal in a similar way until perhaps two hours later, (or two days) when the first reveal is reached again.

Then another brick or cut brick is laid on the first mentioned, followed by another course, and so on. It is incremental working and deserves to be described as such because it slows progress at that and every similar point.

6.6.2. Criteria of position, shape and measure of workpieces

Criterion 10: No workpiece is to be 'measured' in any other way than enumeration, which ensures that the dimensions of the workpiece must be given.

Criterion 11: All workpieces are to be measured net. Although this is a requirement of SMM/NRM2, it is not always so in practice. Many small items, airbricks, ends of lintols etc., are not deducted, and this could lead to problems if the same latitude were allowed in a more efficient system. It could cause problems in use jointly with BIM.

Criterion 12: Location of the workpiece to be given in every case.

Criterion 13: The starting level of each workpiece shall be given.

Criterion 14: All changes of direction of the workpiece and the angle turned through shall be described, and whether the turn is curved or rectilinear.

Criterion 15: Curved workpieces must have the radius or radii stated.

Criterion 16: Angles and mitres in workpieces require careful thought. If the workpiece being described is at the first level of a hierarchy, e.g. a length of skirting having a splay cut made across the grain, which will become one half of a mitre, is observed, it will have

to be described with that length if there is some workpiece related reason why the next length of skirting cannot be continued with. Clearly, such items as this are more connected with the production of a working system than with the establishment of the criteria, but the explanation has been given to demonstrate that some thought has been given to the practical problems arising, since the study is intended to deal with practicalities.

Criterion 17: Where materials are placed to a pattern in a workpiece, a description of that pattern must be included with the information.

Criterion 18: Where materials in a workpiece are placed or cut to a slope, rake or batter, the angle or ratio must be described.

Criterion 19: Wherever cutting of a material is required to achieve a workpiece it shall be so stated, and dimensions given.

Criterion 20: Where materials are placed or cut, or a workpiece constructed where the shape cannot be described by reference to a regular geometrical figure, its shape and all dimensions must be shown in the information.

Criterion 21: Where the orientation of the material in a workpiece is changed from the norm, it shall be so stated and described, or may be considered as a separate workpiece.

Criterion 22: Trench widths for excavation might be given as the nearest bucket size compatible with adhering to Building Regulations, i.e., where the width of a trench is the thickness of a wall plus say 300mm, the width of the trench to be stated in the description should be the next available bucket size above that dimension (e.g. see JCB Ltd., 2020). This will affect the quantities of excavation, cart away, concrete, and backfill, and reflect the practicality of the situation. There is no point in designing a trench width which is the minimum allowable under the Regulations, but which cannot be taken out economically with the sort of machinery needed to operate on site. If it is anticipated that trenches will have to be to hand-dig dimensions, the client should expect to pay hand-dig or hand-trim rates for the excavation and tolerate the longer time taken as a consequence, as with other

hand-made commodities. This is one of the reasons why trench sizes need to be given, rather than cubic measure.

Note: Trench widths for brickwork in foundations are dealt with by criteria 24 and 25.

6.6.3. Criteria of workplace

Criterion 23: Access to all workpieces must be provided for in descriptions, i.e., the workplace.

Criterion 24: Allowance must be made for working space in descriptions, including such additional items as excavation, earthwork support, and concrete if necessary. It should be possible for such bodies as Building Research Establishment to carry out quantitative studies into the economics of comparison of previous methods compared with what is here suggested.

Criterion 25: Allowance must be made for materials and plant storage and working space.

Criterion 26: Whenever a material, pack of material, tool, item of plant or workpiece is to be transported, the distance of transportation, size and weight of the unit shall be given.

6.6.4. Criteria of risks

Criterion 27: Bulking percentages for excavation are not the fault of either the client or the contractor. It is the client's land, the building has been designed with specific conditions in mind, so the contractor could and should be given the information that the designer has used so that the risk can be carried between them. Rates for different soil conditions can be quoted against Provisional quantities. Similar allowances can be made for demolition work. All contractors will be tendering on a similar basis, so this is one risk item that can be excluded from the competition, i.e., it doesn't have to be guessed.

Criterion 28: Shrinkage percentages for various concrete and mortar mixes can be agreed before commencement of the work on site. As with bulking, these are not connected with the client or the contractor, and the percentages are well documented.

Criterion 29: Adverse conditions of any nature, e.g., work in water, in extreme temperatures, in compressed air, with explosives, abseiling, work off cradles, etc., shall be stated.

6.6.5. Sundry considerations

All temporary work must be described in the same way as permanent items, e.g., stockpiles, sheds, hoardings, barriers, runways, earthwork support, shuttering and formwork, erecting scaffolding, hoist towers, tower cranes, and the like, and their movement or dismantling treated as completely separate items, i.e., not described as ‘erect and dismantle’. This is because, despite the items being related, their erection and dismantling happens at different times, which may sometimes be months or even years apart. In addition, their initial position at an early stage of a contract may not be suitable for materials storage, etc., at later stages.

‘Cost’ should mean contractors’ cost; for clients it should be called ‘prices.’ To use the word for both clients’ and contractors’ costs leads to misunderstanding and confusion; contractors costs are more basic than those of the client since they are subject to less manipulation.

Work is often carried out on existing or recently incorporated materials, so description of such materials must be included together with descriptions of the new work, e.g., existing brickwork to be plastered, but also further coats of plaster, paint, etc. This is to allow for the time lapse between coatings.

It should be made clear that a requirement for information to be stated does not mean that a ‘blanket clause’ can be given somewhere other than in the description of the item. This is possibly what happened with some items in SMM – that part of the wording of some items was seen to be repeated throughout BQ, and became regarded as being so ubiquitous

that a separate item could be given, in preliminaries or general items, stating that this was the case and applied to all clauses, but by doing so avoided the obligation that the facts should be communicated in every instance. Information should be complete in each item, not spread around with references to other clauses.

As stated earlier, there are also some general statements that require to be made regarding the criteria:

- a. The description must be clear, easily understood.
- b. No part of the description should be left to inference.
- c. Because the descriptions might become part of a contract document, they must be as equitable as possible.
- d. Any difference between one piece of work and another, however slight, must be included in the description and a separate piece of work described.
- e. There may be others found necessary; the criteria apply to what has been established by this study, and as time elapses circumstances may vary.

Quite apart from the criteria for production of the system, there are some areas that have not been specifically examined in this study which nevertheless exert an influence over the whole process. One that stands out is a requirement that Bills of Quantities (which become a contract document) shall have been prepared under the rules of the Standard Method of Measurement/NRM2. That requirement confers quasi-legal status upon SMM/NRM2, which in its turn is responsible for defining the content of descriptions of building works without allowing any other method of description or rules for content to be admissible. All that is necessary is for any existing clauses to be omitted and the method of description to be stated in the contract documents, so that alternative methods of description can be used; all methods of description should have equal legal status.

In addition, SMM/NRM2, in all the editions since inception in 1922, contains a clause that makes it clear that none of the physical work of producing the building, structure, artefact, or whatever may be the subject of the BQ, has been described. NRM2, however, asserts (clause 2.3.1) that the BQ 'provides an extensive and clear statement of the work to be

executed'. There is a conflict between the two statements, depending upon which meaning is assigned to the word 'work'.

In signing a contract, therefore, despite the fact that the word 'work' has not been defined, the main contractor may be agreeing that the work has been fully defined when it has not been defined in a sense which is common usage. That is untenable, but nobody mentions it, and it should be changed. The criteria of descriptions indicated here cannot have this impediment to change imposed upon them.

It can be seen that the criteria listed above provide a solid (and considerably smaller) framework for a method of description that could enable progress in information transmission for the industry.

6.7. Discussion: Describing building work

For this study, it was essential to look at the rules of measurement which were first formally established a century ago and were based on practices which were being used during the 17th century. The formal establishment came about with the publication in 1922 of the first edition of the Standard Method of Measurement of Building Works (SMM). Subsequent changes made to the rules in the various editions of SMM do not appear to have changed its methods or its purpose to any great extent, whilst during its life, the number of items 'deemed to be included' by the contractor have reduced the amount of information passed to the workforce from time of tendering onward. In its turn, that forces the contractor to obtain the remainder of the necessary information during the course of the works with consequent delay, however slight, and possible mistakes, bringing perhaps longer delays.

The rules of measurement are a system of measurement of materials with the express object of providing information for tendering only – they do not attempt either to measure or to describe the physical work. No edition states any other purpose, but NRM2 does make the point that Bills of Quantities 'provide a basis for the valuation of work executed' and also 'for the valuation of varied work'. The building industry at large, however,

appears to believe that BQ are supposed to perform those functions and others, and criticises such documents for not being good enough, thus blaming the messenger for the message.

In that sense, BQ and SMM/NRM2 are inextricably linked, but it is not generally realised that descriptions resulting from the use of SMM permeate the industry, whether or not BQ are used.

6.7.1. The position of the professional body.

The RICS is the premier body in the UK representing professional surveyors in several different spheres of work, such as land surveyors, valuers, estate agents, and quantity surveyors, all of whom are known as chartered surveyors. This position has arisen after many years of amalgamation of differing professional bodies, the first being the conjoining of the Surveyors' Institution with the Quantity Surveyors Association in 1922, and the first edition of the Standard Method of Measurement, (SMM) was published in the same year. It became the Royal Institution of Chartered Surveyors in 1947. Since then, it has amalgamated with a number of other institutions in the same field, e.g. the Institute of Quantity Surveyors (IQS)

Prior to the 1820s, when quantity surveyors were known as 'measurers', there were no contractors. Architects let out parts of the work to the differing trades, and were responsible for the supervision and co-ordination of the works. Within that structure, each trade could peruse the drawings and assess how much time they would take to complete their work taking the interference of other trades into consideration, leaving valuation of materials to the measurers and passing their prices to the architect. As the practice of contracting developed, builders employed many trades, each of whom would communicate their opinion of cost to the builder (Thompson, 1968, p.85). It is not known how the measurers communicated their measures to the architects.

In parallel with the growth of contracting, the measurers were developing the practices of measurement and finding ways in which they could make their task simpler and quicker to

operate. There were at that time two main surveying bodies, the Surveyors' Institution and the Quantity Surveyors' Association, which formed a Joint Committee in 1912 with the express purpose of 'securing greater accuracy of work and uniformity of method' (Surveyors' Institution, 1922). To that committee were added representatives of the building trades, consisting of four contractors, and the process was assisted by interviewing representatives of some trades. The trades involved are not stated, but items are measured for some specialist trades which are not measured for others, which may indicate some degree of influence, e.g., stages of depth described for excavation but not stages of height for bricklayers, carpenters, painters, plasterers, etc.; working space allowed for asphalters but not for other trades.

It is not suggested that omitting those from items in other trades was deliberately done, it is much more likely that they were not discussed, since the bricklayers, carpenters and so on, worked directly for contractors and had no trade associations similar to those of the specialists. Their unions were concerned mainly with wages rather than with measurement principles.

Slaters and tilers apparently came quite late to the discussion, because their amendments had to be the subject of the second edition, six years after the first. It can be seen in that edition that amendments were mostly to add items of cutting and waste on slates and tiles at openings and abutments, thereby conflicting with the requirement of clause 1 of the Preliminaries that 'each unit of measurement shall be deemed to include waste'.

Over the following years, the RICS have continued to develop the practices of measurement, becoming in the process thoroughly institutionalised, holding on to the rules, methods, and practices which have been in existence for more than a century. The industry on the other hand has continued to develop 'contracting' to the point where almost every piece of physical work can be sub-contracted leaving only the main supervisory staff employed by the contractor. Because of this divergence in paths, which probably indicates a difference in function, SMM/NRM2 is only partly catering for the needs of the industry in supplying some of the necessary information regarding materials,

and not helping with information about other cost items. Because of its exclusion of major cost items, SMM/NRM2 is not capable of producing documents which describe work.

The RICS cannot avoid seeing and hearing complaints about SMM, but curiously they appear to make no attempt to explain to its users that they should read the whole of the current edition in order to understand its purpose. NRM2 is quite clear that its purpose is to 'give guidance... and define the information required to enable a BQ to be prepared'. It then sets out the purpose of a bill of quantities, and makes claims regarding the benefits of such a document. (It should be noted that the BQ is not a document which the RICS produces, BQs are produced for individual contracts by the individual q.s. companies engaged for those contracts.)

Clause 3.3.3.13 of NRM2 sets out the items which are deemed to be included in description, i.e. labour, materials, plant, wastage, rough and fair cutting, establishment charges, and cost of compliance with all legislation'. 'Deemed' means that it is not necessary for the q.s. to include such items in descriptions, and it is strange that of that list, only materials are measured, albeit not every material. Not measuring the other items in the list means that none of the physical work of producing a building is measured or described by the document, whatever the 'building public' believe. The figures from the Office for National Statistics give the value of construction materials for 2019 as around £73 billion, with the value of construction output as £177.5 billion, (ONS, 2019) so materials represent around 40% of construction costs, with labour, plant etc., constituting the bulk of the remaining 60%, In all, it appears that more than half the cost of building work is not described, leaving every contractor unable to make accurate assessments of cost of any contracts to which the company is bound. This is inevitably reflected in discrepancies between tenders and final accounts, together with time overruns, but the connection is not generally commented upon.

Furthermore, clause 3.3.3.13 sets out the items which are deemed to be included in description, i.e. labour, materials, plant, wastage, rough and fair cutting, establishment charges, and cost of compliance with all legislation'. 'Deemed' means that it is not necessary for the q.s. to include such items in descriptions, and it is strange that of that

list, only materials are measured, albeit not every material. Not measuring the other items in the list means that none of the physical work of producing a building is measured or described, whatever the ‘building public’ believe. The figures from the Office for National Statistics give the value of construction materials for 2019 as around £73 billion, with the value of construction output as £177.5 billion, so materials represent around 40% of construction costs, with labour and plant constituting the bulk of the remaining 60%. In all, it appears that more than half the cost of building work is not described, leaving every contractor unable to make accurate assessments of cost of any contracts to which the company is bound.

6.7.2. What is involved in describing work?

In what way should building work be described? It is currently described by measuring the materials used, not for individual pieces of work but for what is called a ‘co-ordinated list of items that comprise the works’. Examples of the main headings which comprise the list for Masonry are: 1. Walls; 2. Diaphragm walls; 3. Vaulting; 4. Isolated piers; 5. Isolated projections; and so on, to which are added the quantities and a description which does not identify individual items of work and specifically excludes labour and plant, among other things. The item descriptions tend to be of the function of the finished item rather than of producing the item.

This study has shown that the work of constructing a building should be described in the same way as the work has to be carried out. That is the way in which apprentices, traditionally, were taught to appreciate the problems inherent in any particular piece of work so that they could gain experience and carry it out in an ordered and professional manner. It has nothing whatsoever to do with measurement of the works, which is a separate, contrived process contributing nothing to the execution of the work. Of course, materials have to be ‘measured’ in order to know what to order, but it is more important to recognise, and be able to assess a time against, the carrying out of a piece of work. There is nothing retrograde in this thinking – it has not been used previously. There has been no other method of describing building work except by relating it to measures of materials.

The reason that no other method has been tried is probably connected to the general recognition that the number of pieces of work to be described in any building is far greater than the number of items appearing in a BQ, which is also closely linked to the human effort of producing the document. It is now apparent, however, that the use of computers in taking-off quantities and abstracting can lower substantially the time taken, even without considering changing the method, content, and medium of transmission of information.

It is envisaged by this study that a different method of description, which takes into account many more variables than can be justified with manual methods, can facilitate accurate feedback from identifying its items with the work produced. That, in its turn, will enable time predictions to become more accurate, for materials usage and wastage to be closer examined with consequent feedback to designers and more awareness of how cost variables come about. Those variables are only identified by describing the work fully, so that the finished workpieces (the results of work) can be visualised, not only by the operative carrying it out, but also the estimator, be it person or machine.

6.7.3. Workpieces

The word workpiece has been used throughout this study to identify the product of the physical labour that is being carried out. It is a word which has been used for a considerable time. Merriam-Webster (2023) define it as ‘a piece of work in the process of manufacture’, saying also that the first known use is in 1876. In the UK it has been used mainly in the engineering industry, and Collins English Dictionary (Foreman, 1967) defines it as ‘a piece of metal or other material that is in the process of being worked on or made or has actually been cut or shaped by a hand tool or machine’. Nelson (1969) used it as ‘the result of carrying out a task’.

The point of its use in this document is to ensure that there was no possibility of confusion with architectural ‘elements’, or the ‘building components’ of NRM2. In the case of architects ‘elements’, it is not clear how the divisions are arrived at, but it seems there may be a vague ‘functional’ aspect; in the case of NRM2 ‘building components’ they are

headed 'Item or work to be measured' and there are no clear distinctions. The title of 'workpiece' chosen sits very well with the intention to measure only by enumeration and can also be applied to a broad range of 'products' from a newly erected stanchion to an area cleared of debris or rubbish.

'Work' has different levels in a hierarchy of complexity, resulting in corresponding levels of complexity for workpieces. Because of such considerations, there can be no standard size, standard dimensions or standard descriptions for workpieces. In observing work, it is necessary to identify the workpiece as a complete product, so a starting point is needed. Depending upon circumstances, an observer may need to ask the operative where today's work started, and then it will be the observer's job to see whether the work now being observed continues from yesterday's or is a different task.

Many tasks are repetitive, involving a series of similar actions with similar materials and tools, the pattern repeating quite frequently, as with bricklaying. At other times the bricklayer may need to bed an airbrick or a lintel, different materials which break the pattern of working and probably indicates different workpieces. Different tools or usage of tools can also indicate different workpieces, such as when a piece of hose is used to finish the mortar joint between bricks, or the trowel is used to cut a brick. Careful observation would be necessary to decide whether the different action is a regular part of the pattern or infrequent, signifying a different workpiece.

Workpieces do not necessarily require material to be added; for example, it may be necessary to ram the surface of a layer of sand in order to make it ready for placing a membrane, as in case study No. E.1. Between that work and the laying of the membrane, (case study No. E. 2.) there is inevitably a time lapse whilst sufficient bays are prepared. A time lapse is also an interruption in the pattern of working. There are many other workpieces that require a time allowance for drying, setting, or reaching an intermediate stage where it is just sufficiently set to allow a further process, as with trowelling plaster finishes, power floating concrete, or waiting until brickwork is strong enough for further courses to be laid.

Although it is difficult to make general statements about workpieces because of the number of variables involved in material, finish, degree of shaping, cutting and so on, it can often be of help in identification for 'function' to be considered, i.e., when the item is in a situation and condition where it is entirely ready to perform the function required of it. That may be illustrated by (i) a cast in-situ lintel which has not yet set is in its final position but cannot be considered to be ready to perform its function until it has reached sufficient strength, and (ii) a precast or steel lintol which only has to be in position long enough for the bedding material to set to be capable of fulfilling its function or set of functions.

The set of functions is mentioned because often there is a requirement for more than one function to be satisfied. The glazing of a window is there to perform one or more of the functions of the wall surrounding it, i.e., keeping out the weather but has the functions of allowing light to enter and for the occupants to see out. Sometimes it is necessary for people outside to be prevented from seeing in, so obscured glass is necessary, and so on. Consideration of function can be an important factor in planning and programming – it would not be wise for the shuttering and concrete to an upper floor to be carried out in the week following the concreting of the lower floor – the loadbearing function of the latter has to be considered.

It can be seen that a knowledge of workpieces is an essential part of programming, (and hence costing), all building work, particularly with overruns of time and cost being as they are.

6.7.4. Describing work and hierarchy

It should by now be clear to the reader that to be able to predict the time taken and resources to be used in constructing a building, more than a tally of the main materials to be used is required. It is necessary to consider:

- I. the activities of operatives together with their need for working space and access, adverse conditions, size and weight of the pieces of material they have to handle,
- II. the tools and plant needed to carry out the piece of work, together with getting them to the work location, ensuring that they are fit for purpose, their assembly or erection, dismantling on completion and returning them to whatever storage facility they came from.
- III. all the materials necessary for this particular task, ensuring that they are in the right condition, the correct location, and the right quantity for the task.
- IV. the workpiece to be constructed, its size and position in relation to existing work, what 'interruption' is likely to define the end of the piece of work, or whether that interruption is so short lived that as long as the additional material or tool is readily available, it is possible to continue to the next stage of a hierarchy.
- V. As stated in the previous section, it is often necessary to consider the function or functions of the workpiece.

It can be seen that the above considerations align with an earlier definition of 'building work', (Nelson 1969), stating that 'Building work may be defined by the sentence 'Actions with tools upon materials to produce a workpiece.' That sentence may now be looked at in a slightly different light by extending it to include the function of the workpiece. The sentence is fitting as a broad statement, but it can be seen from the case studies that there is often a hierarchical relationship between items of work which is sometimes relatively simple, but more often is complex and difficult to explain. Inevitably, different researchers may find that relationships which apply to this study do not fit readily with their own results, and in consequence may arrive at a somewhat different hierarchy. For this study, a hierarchy has been built up beginning with Nelson's (1969) sentence but adding a functional factor. That functional factor is arrived at by a not unreasonable assumption that every piece of material incorporated into the building is there for a reason or reasons, ranging from the structural to the decorative, or even

frivolous in some cases - think gargoyles or mice (Sworders, 2023) -which could make the first hierarchical level read:

1. 'Action or repeated actions with tools upon a piece of material (or interdependent materials) to produce a workpiece intended to perform a function (or functions) in the building'.

An example of 'action' at this hierarchical level could be in the repeated strokes of a saw in cutting a piece of skirting to length. The 'functions' of the piece of skirting may perhaps be thought of as (i) protective – protecting the wall plaster from damage by furniture, etc, (ii) decorative – hiding the joint between plaster and floor.

It should be made clear that the reference to materials (plural) in (1) does not apply to multiple pieces of the same material, but where pieces or quantities of two materials, (sometimes more) are interdependent, which is most frequently the case, (i.e. bricks and mortar, tiles and adhesive. boarding and nails, etc.).

It is thought that following levels of the hierarchy should involve multiples of the constituent parts. First, it is possible for a piece of material to have more than one action performed upon it, (not just a repeated action). This can be illustrated by the pieces of binding wire used in case study No. C.1., which are cut to length, bent, placed in position, then twisted to fix. It is possible that the second and /or more following actions might also require the use of different tools, although in the case of the binding wire, the fixer's cutters do the cutting and the twisting, whilst bending and placing are carried out only by the hands. The description of the second level needs to follow the same form as the first, so becomes 'all actions with all necessary tools upon a piece of material to produce a workpiece....' and then comes the question of function. If it can be said that the material has had all the actions performed upon it which are necessary, it must surely be that it is capable of performing all the functions required. Anything less is anomalous. The second level therefore becomes:

2. 'All actions with all necessary tools upon a piece of material or interdependent materials to produce a workpiece which is capable of performing its function or functions in the building'.

The third level of the hierarchy should also follow the previous pattern and will therefore involve all actions, all tools and all pieces of material as in the case of the completed section of cage in C.1.

3. 'All actions with all necessary tools upon all pieces of material to produce a workpiece which is ready to perform its function or functions'.

The cage in C.1. is ready to perform its functions but cannot be considered as carrying them out fully until it is connected to all the other sections of cage and to the piles which make up the complete system. (A similar cage, however, could be the only one required, bearing on only two piles).

The last level of the hierarchy can then be:

4. 'All actions with all necessary tools upon all pieces of material forming a workpiece which is in position and functional'.

At the last level, workpieces could correspond approximately with designers' elements, so it can be seen why 'elements' are often too coarse to be used for descriptions of work. It can also be seen that it is possible for any of the lower hierarchical levels to be the only level necessary to reach. It is perfectly possible for a repeated action on one material to produce a workpiece, (a square hole in the ground, say) which is in its final position and functional, so that in effect level 4 is a paraphrase of level 1.

In the above, a hierarchy has been built up which suits the needs of this study as a useful means of presentation. It may well be that other hierarchies could be constructed in a similar way which are equally effective or better.

6.7.5. Using the method

Because so many pieces of work are involved in constructing a building, it is clear that the sheer quantity of information involved demands use of the computer. The emergence of BIM brought prospects of change, particularly when publications such as Eastman *et al* (2011) wrote glowingly about how it works in the way a building is actually constructed. That is true to some extent, but it was a disappointment to find that in the use of BIM programmes entire walls (and floors and roofs) are erected as if they were a unit, and that openings are ‘punched out’ rather than built around, i.e., they are ‘deducted’. That is a mistake of principle which should be corrected if BIM is to live up to expectations.

Walls can only be erected as units if they are pre-manufactured and lifted into position. Walls built traditionally in brick, block, stone, timber studding, concrete, and so on are composed of a variety of smaller units that should be considered separately in pricing, programming, materials delivery to workplace, and construction, whilst openings have to be built around. Description of the latter method can be synthesised easily into a total description of ‘wall’ simply by adding all the separate pieces of work together; it is almost impossible to analyse a description of ‘all walling’ into its component parts without having to carry out an entire taking-off process, so the two methods are not interchangeable. The concept of ‘walling’ being aggregated into items of similar thickness has no regard for anything other than the material content and the quantity, with no particular attention to function or other facets.

Using the method would of necessity demand that taking off, abstracting and pricing of the items be carried out by computer. The use of the computer would not end there, however, because it will be involved in programming the items, adjusting the programme on a daily basis as work is completed, pricing variations on a much more practical basis than is possible with current methods, producing valuations on the due date, issuing schedules of work for the forthcoming week or month and updating both final account figure and completion date. That can all come about by receiving feedback in the same form as the original description.

Having a standard method of description that is not rigidly bound to gross measurement of materials would allow communication across the industry to become integrated and more comprehensible to all users, be it at design stage or in the maintenance of the finished building.

6.7.6. Silencing the critics

The literature review shows that there has been much criticism of the existing system over the past century, many of the complainants being highly regarded in their respective fields. Of those originating in the UK, almost without exception, there is a shared cry of ‘Somebody ought to do something about it’, with little attempt to identify the ‘somebody’, the ‘something’ or even the ‘it’.

Emmerson (1962), the first Government report to look in detail at the practices of the industry, recommended that more research should be done on contract management, standardisation of materials, and the economics of building, and so was somewhat distanced from the ‘curative’ aspect of investigation. This project has gone some way into meeting his suggestions, focussing particularly on the field of economics.

Banwell (1964) commented that ‘rigid adherence to procedures sanctified by long tradition is not necessarily the best way to take advantage of modern techniques’, with which the results of this study robustly agree.

Jeanes (1966) found that the analysis of building operations ‘requires the consideration of at least the function, the material, the operational method and the instructions given’, all of which are identified and stated in this study.

Ferry and Holes (1967) conclude that ‘the only logical way to price construction work is by unit rates set against cost items’. This study has pointed out that cost items are not commensurate with architectural elements, so they are advocating change toward what this study suggests.

Skoyles (1968) states that if building work 'is to be realistically priced, labour plant and overhead costs must be estimated on a time basis'. Labour and plant are not described under SMM rules, so this study is in agreement with Skoyles in this area.

Nelson (1969) adds the factors of 'geometry of the workpiece', (i.e., its shape position and orientation), sequence, change of material, change of labour or skills (i.e. actions), to Jeanes' list, all of which have been incorporated in the criteria.

Bishop (1969) avers that 'All realistic methods of estimating must represent...conditions...on site'. This is in total agreement with the findings of this study.

Egan (1998) asks 'that the experience of completed projects be fed into the next one', which coincides with the requirement of this study that information and feedback need to be in precisely the same terms.

Koskela (1999) requires a theory of construction, and it is felt that this study goes a considerable way toward satisfying his needs of (a) an explanation of observed behaviour, (b) prediction of future behaviour, (c) tools for analysing, designing and controlling, (d) a common language, and several others.

Fairclough (2002), with strong emphasis on research, recommends that 'the Government as a major client of the industry should challenge professional institutions to collaborate on setting industry standards'. This study is challenging the way in which information is transmitted in the industry, for both the medium and the content.

Staub-French *et al* (2003) recognise that estimators see the need for items of cost to be recognised in all product models, of which the BQ is an example, thus agreeing with one major point of this study.

Among all the criticism of the system that has been published over the last 60 years in the UK, Skoyles's work on 'Operational Bills' was the only attempt at 'doing something' about the system. Unfortunately, the infrastructure was not in place for his ideas to bear fruit. Had he produced the concept in the early days of BIM, he may have found a more receptive audience, and may well have been able to see where to adjust his system in

consequence. In the main, this study agrees with his concept, but cannot subscribe to considering that ‘interruption by the work of another gang’ is an accurate enough definition for the boundary of a ‘piece of work’ because it only deals with work at an ‘architectural element’ level, which is too coarse to be useful in this study.

The above review of comments demonstrates that this study has addressed what are seen as problems in the industry and is able to offer a solution which can assist.

The study is primarily concerned with criteria, so what is involved in describing work is to ensure that those criteria are comprehensive, covering the entire range of building work, that they are in easily understood language so that they are not the prerogative of a control group, that they are fair and acceptable to all, that the reasons for each criterion are clearly stated, and that no single body of people can change the criteria or the method of description.

6.8. Summary and link.

This chapter has looked at and discussed the findings, and at last listed the developed criteria. The discussion has followed several lines, not necessarily connected but hopefully understandable. The next and final chapter reviews the aim and objectives, showing that these have been achieved. The contribution to theory is explained; the contribution to practice is in facilitating the production of a different system, but the worth cannot be judged until it is in operation.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. Introduction

This study has reached its end, and this section summarises what was intended, what has been achieved and looks to what is yet to come. It may well be that what is yet to come involves looking at what might be regarded as more complicated areas than those of excavation, concreting and masonry, but there is still much to deal with in those three.

What has been achieved is hoped to be equivalent to what was intended, but it is believed that the study has anticipated a little more than that in predicting some of the effects that might be expected from use of a different system of description. We shall see.

7.1.1. Summary of research aim and objectives of the study

Achieving the aim of this study came about by the gradual achievement of the objectives, so it seems right to describe the work on objectives first. There were two stages to the work on the objectives, first, the desk exercise of reading the rules of measurement (which form the basis of descriptions) whilst coding the clauses, and secondly, the field work, observation of pieces of work on site and photographing them, together with another desk exercise of reconciling those observations with the extant version of SMM, i.e., NRM2. The coding of the clauses became the basis of the eventual criteria.

7.1.2. Objective 1

The first objective of the study was to examine the rules for producing descriptions, which are all contained in the several editions of SMM/NRM2 and some explanatory documents, (see table 3.2) to see what is described, what is superfluous, and what is not described but is necessary.

7.1.3. Objective 2

The second objective was to code the results of each clause so that necessary information categories can be included in descriptions and that following clauses and following documents may all be examined and categorised in the same way.

This examination was intended to define the area which should be described in addition to describing materials. Coding was carried out for each clause of each of the editions of SMM in conjunction with the examination for objective one; the codes summarising the information needs of the item. There were eventually 34 codes produced over the editions of SMM. The codes became the basis for the criteria.

7.1.4. Objective 3

Using the case study method on site, to observe, identify and record pieces of work at approximately the same level of detail as contained in the rules of description so that they may be identified in the extant rules, and to check that the rules are capable of describing work on site whether or not there is a bill of quantities.

This was necessary because of the intention to compare the physical work with the extant rules. Despite the problems outlined in 3.6.1.2., two sites were obtained and visited frequently, looking for items that were encompassed by the three sections of SMM1 that were chosen early on. Some of the items of work could be observed and recorded in sufficient detail in a relatively short time of minutes, others required repeat visits to the site, one in particular being spread over several weeks. The observations were thereby considered to be as random as could be required.

7.1.5. Objective 4

The fourth objective was to validate the results of the case studies by identifying the applicable clauses, sub-clauses and notes in the current edition of SMM/NRM2, in order to check that all the work observed could be identified under the extant rules.

When observation started on the first site it was found not to have BQ, but instead had a list of what were seen by the company as elements, similar to the Work Sections shown in Figure 2.4 of NRM2 (2013). That was initially seen as a blow, but it was reasoned that since NRM2 is intended to be able to measure any building work, it must be applicable to this building, so what was necessary was to ensure that the observed work could be measured by appropriate items in NRM2, which is what was done, with no problems occurring. All that was required was to refer to NRM2 to identify the item.

7.1.6. Objective 5

The fifth objective develops the criteria by amplifying and elucidating descriptions initiated by the codes in order to be able to describe any building work in a full, precise and uniform manner.

The coding of clauses brought forward a group of ideas that can be seen, almost without exception, as a set of rules applicable to the subject, but necessarily in an abbreviated form. Most of the criteria for describing building work have been produced from the codings. The final criteria were the result of explaining and developing those abbreviations, whilst including a few items which can be regarded as general management rules that would have to be applied to any other subject area (see section 6.12).

7.1.7. Aim of the study

It was stated earlier that the aim of the study was achieved by gradual achievement of the objectives. That is true to a great extent, but the biggest contribution to achieving the aim of developing the criteria for descriptions of building work was in producing the codes which form their basis. All that was necessary was to explain and enlarge upon the meaning of each code, checking and qualifying as necessary, to arrive at a definition of each criterion.

7.2. Summary of key findings

This study has found that SMM/NRM2 is about counting measures of materials rather than counting ‘things’ – pieces of work. That has been the essence of its existence for almost a century. Despite that, it can be seen from early editions that the producers were then aware of, and wished to include for, factors other than materials in their information to constructors – the heights of buildings, access to the site, brickwork at higher levels of the building, where asphalt has to be hoisted, concrete work given separately for each storey, stonework hoisted above 40 ft, and so on, i.e., information about items which made a difference to the contractors’ cost.

Changes in later editions have diluted the content to the point where there is little, or no thought given to contractors’ needs for information. NRM2 takes that one stage further when it asks contractors for information about their overhead and profit margin in the BQ summary. It is difficult to see that there is anything to gain from them having that information. It would not be expected of Aston Martin, Marks and Spencer, Glaxo, ICI, that they should have a standard margin of profit across all items. The contractor should be allowed to make normal commercial judgements and apply higher margins on higher risk items without need to reveal them to others who have an interest in reducing them.

In the course of the study, two main facts have emerged. The first is the SMM/NRM2 stated intention to provide an equal basis for tenderers by describing and measuring the material content of the building. In order for that to be carried out under existing rules, the building has been broken down for SMM/NRM2 in terms of what is convenient to measure. Items which are the most intricate to measure tend to be enumerated, associated items are often ‘deemed to be included’.

The second is that SMM/NRM2 item descriptions are used by contractors and others to provide a basis for programming, costing, valuing, allocating work and other processes, all of which require that the building needs to be thought of as a large number of relatively small pieces of work. The pieces of work that are embodied in descriptions derived from SMM/NRM2 are pieces of designer’s work, foundations, walls, roofs, and other large

items – pieces of the building. The two types of description are not compatible; those produced by SMM have to be broken down into tasks for operatives.

Those conclusions lead to another; items which are in effect measures of fixed material rarely coincide with pieces of work, nor is there any reason why they should. There is no reasonable basis whatsoever for the assumption that SMM is the correct vehicle to use for describing, valuing, and allocating work (except that it is the only one that exists); the reverse could be true; it possibly impedes progress in those fields. The barriers to change are huge, but if the information system of the industry is to keep pace with information developments in other fields, it will have to reject SMM/NRM2 as a basis for anything outside its original purpose – as a ‘level playing field’ for tendering.

Because the descriptions arising from BQ are the only descriptions in use in the UK, it has been assumed by their users that they are capable of all the functions necessary; those who complain seek to amend SMM, but there seems to be no thought that SMM may be intrinsically incapable of performing those functions. There are plenty of studies showing how ineffective BQ are in the field – they do not mention that BQ are not responsible for the rules, neither are the q.s. who produce BQs. No study has ever been made of possible alternatives until now.

The insidious nature of the current process can be gleaned from Nani et al, (2007). The point to be made lies in its title – ‘Classifying construction works for the purpose of measurement’. What is the purpose of measurement? is the first question to be asked. If it is believed that the purpose of measurement is the establishment of an equal base for all tenderers, (which is what SMM/NRM2 states), the current system is adequate, and probably any system of classification would be suitable. If, on the other hand, it is thought desirable to produce a system which can deal with tendering, planning, programming, interim valuation and payment, allocation of tasks to operatives, then the SMM/NRM2 basis is, and will always be, woefully inadequate because it only measures materials, and even then, only partly. It does not deal with work, wastage, plant and equipment, or materials which are of little cost but have a great deal of physical work attached to them,

so that any system of classification allied to SMM/NRM2 would not be dealing with those items.

SMM/NRM2 is quite clear about what is measured. Each edition confirms that it does not measure the items mentioned above. What is therefore required is a system which allows all items necessary for construction to be described, and in such a way that feedback can be obtained from site. That system cannot develop from revising SMM/NRM2 because its principles are too deeply engrained in the construction psyche and education. It must be developed from principles which do not owe their existence to an inflexible concept which says in effect that all building work can be ordered and delivered by reference to net measurement of units of the main materials of which they are composed.

The principles involved in the proposed system are embodied in the criteria. Further work is needed to cover all necessary areas to check whether the criteria developed for the three SMM sections of excavation, concreting and masonry also apply to those, ensuring that further criteria are developed if needed.

7.3. Contribution to theory

There has been an unstated theory in the use of SMM/NRM2 that measurement of materials is the only way to produce accurate building prices; it seems to have been there forever. There is no documentation to show that the theory is logical, reasonable, or even rational, it was just thought up as a way of standardising a job that was getting out of control. This study has challenged such thinking, looking with a practical eye at what is needed by the people who have to use the information, in the following manner.

1. The documents were examined minutely and critically, comparing descriptions derived from the current rules with work being carried out on site, demonstrating the inadequacies, inequities, and inaccuracies of the existing system.
2. Pointing out the need for the results of work, the workpieces, to be the focus of description, at a fine level of detail rather than the somewhat impressionistic viewpoint of architects' elements.

3. Developing criteria for standardising descriptions at a more detailed level which allows for intricacies of the work to be indicated whilst also facilitating feedback of cost-causing data.

7.4. Contribution to practice

This work shows the direction in which the methods of measurement require to move if they are to keep pace with advances in the industry. The RICS could do much to enable development of a system fit for purpose in the new era of digital construction, but they would have to reconsider their stance and change course.

The study produces criteria for describing work that could assist stakeholders such as clients, consultants, contractors, suppliers, subcontractors, and even Local Authorities to communicate in a more successful way, beyond the tender stage, since they are designed to reflect the practical physical work on site and facilitate feedback.

The contribution to practice of this study will not be seen until the system of description is produced. This is an enabling tool which lets the main work go forward. That is its actual contribution, but its worth will not be apparent until the system is working.

7.5. Limitations of the study

The limitations of the study start with the fact that only three areas were examined, excavation, concreting and brickwork. That was certainly enough for one person to handle, but it would have been instructive to have looked at electrical, plumbing and perhaps lift installation and suchlike. These may have produced many more problems of different kinds, but it is still felt that the criteria cover a very large proportion of the necessary information areas. Other kinds of buildings might also have been useful, and may have produced a few specialised criteria, e.g., disabled dwellings, hospitals, shops, banks, and so on could all have been of added interest, with more specialised areas of work.

Those concern limitations of the area to be studied; there are other parts that will have to be examined before the criteria can be used, for example, the background and training of the people who will be operating the system, and those who will be in receipt of the information. It was not practical to consider research of that sort during the time of data collection because of ‘shielding’ during the pandemic. It must be ensured that these people on each end of the information chain are suitably trained to deal with any problems of interpretation. Perhaps that would only apply to gangers, chargehands, foremen and other supervisory staff at the production end of the chain.

7.6. Further research

Further research has been touched on in previous sections, and the possibilities are quite extensive. This study has only dealt with three sections of SMM/NRM2, so there is the possibility of further work to ensure that the criteria apply equally to the remaining areas, and a search for additional codings of perhaps a more subtle kind.

Research will be necessary in creating a system of information collecting, collating and transmitting that accords with the principles outlined, but not detailed, in these pages, paying particular attention to the workpieces that must be the hub of the system, together with a precise ‘language’ for use between the participants in information flow.

In establishing the system there will be a need to work with specialists in other fields, e.g., robotics, because it is their specific, precise, programming that enables the ‘Hadrian’ bricklaying robot, for example, to operate, indicating the sort of level of detail that would be necessary for such a system as this.

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**ESTABLISHING CRITERIA FOR DESCRIPTIONS OF
BUILDING WORK WHICH INCLUDE PRACTICALITY
AND INTRICACY**

APPENDICES

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APPENDIX A. COMPARISONS OF SMM EDITIONS.

Note 1: Few items in the Preliminaries section were coded. All other clauses of that section have been omitted to save space.

Note 2: Letters in brackets are the codes applied to each item.

Note 3: Few items in the Preliminaries section were coded. All other clauses of that section have been omitted to save space.

Note 5: For the Sections examined, SMM1 and SMM2 are identical, so the codings are the same for each

A.1. Comparison of SMM1/2 and 3

SMM 1/2				SMM3		
Clause		Text and comments <i>Comments in italics</i>		Sub- clause	Text and comments <i>Comments in italics</i>	
		Preliminaries			Preliminaries	
3	1	1	The position of the site shall be described with any particulars as to access to same; if adjacent to or abutting upon old buildings, or if the working space is limited, the same shall be stated. (Acc) (Loc) (W)	3	1 (a)in	The position of the site shall be described with any particulars as to access to same; if adjacent to or abutting upon old buildings, or if the working space is limited, the same shall be stated. (Acc) (Loc) (W)
				28	2	Shoring, other than that in connection with cutting openings (where the position and description is included in a Works to be priced on Site Bill) shall be fully described and provisional quantities given where circumstances render it desirable. (Acc) (Loc) (T) (W)
				29	3 (a)	Hoardings, fans, planked footways, and rails shall be given in feet run and described; lighting for the protection of the Public shall be described (Acc) (Loc) (T) (W)

30	2	3	Cutting away and making good, and any other builder's work, shall be described and given separately. (Cut)	32	4 (c)	All cutting away for and making good after nominated Sub-Contractors together with any other Contractor's work in connection, shall be given separately and in detail; alternatively this work may be dealt with by means of provisional sums. (Cut)
						Work In or Under Water

			5		All work executed in or under water shall be separately given and described stating whether canal work, river work, or sea-water work, and giving the levels of High Water and Low Water
		Excavators' and Concretors' Work, Piling, Bricklayers', Asphalters' and Drainlayers' Work, Artificial Stone, Terra Cotta, Faience, and similar work, and Reinforced Concrete. Note.- All work executed in or under water shall be sep given and desc, stating whether canal work, river work, or sea-water work, and giving levels of High Water and Low Water.			<i>The note opposite has the same wording as the last para. above.</i>
		EXCAVATOR			EXCAVATOR
1 3	1	(i)Where practicable the nature of the soil shall be described and attention shall be drawn to any existing trial holes.	1 5	(a)	(i)Where practicable the nature of the soil shall be described; attention shall be drawn to any existing trial holes.
1 4	1	(ii)Excavation in rock shall be given separately.	1 6	(a)	ii)Excavation in rock shall be given separately.
1 5	2	(i)All dimensions of Excavators' Work shall be those before excavating. (D)	1 7	(b)	(i)The quantities of Excavators' Work shall be those before excavating. (D)
1 6	2	(ii)Increase in bulk after excavating shall be allowed for by the Contractor <i>No comparable clause</i>	1 8	(b)	(ii)The increase in bulk after excavating shall be allowed for by the Contractor (ii)In the case of the disposal of excavated material the Contractor's attention shall be drawn to this fact.
		<i>No comparable clause</i>	1 9	(c)	(i) All excavation shall be described as excavate and get out (or excavate and basket out as hereinafter provided)
		<i>See clause 1 (3) (i) below</i>	/	(c)	(ii)the subsequent disposal of the excavated material shall be given as a separate item. (Tpt)

		<i>No comparable clause</i>	1 11	(c)	(iii)This, however, shall not apply to such cases as small manholes, drain and pipe trenches, shallow foundation trenches and the like, in which cases the subsequent disposal may be included with the item of excavation. (Tpt)
1 7	3	(i)The disposal of the spoil shall be described, (Tpt)	10 1	(a)	(i)The disposal of the soil shall be described.(Tpt)
1 8	3	(ii)giving the distance to be moved in yards run if deposited on the site.(Tpt)	10 13	(c)	If spoil is to be deposited on site the distance it is to be moved shall be given in yards run. (Tpt)
1 9	4	Carting of earth from excavation shall include the provision of a shoot, dump or tip by the Contractor, unless otherwise stated. (Tpt)	10 14	(b)	Carting of earth from excavation shall, unless otherwise stated, include the provision of a shoot, dump or tip by the Contractor, (Tpt)
1 10	5	Excavating where it is impracticable to form a wheeling gangway shall be described as 'basketed out'. (Acc) (Ad) (D) (Loc) (SL)	1 15	(d)	Where it is impracticable to form a wheeling gangway for the removal of excavated material the Excavator's work shall be described as Excavate and basket out (Acc) (Ad) (D) (Loc) (SL)
1 11	6	Excavations below surface of site shall be measured in depths of 5 ft. 0 ins., giving the particulars of the commencing level and continuing in successive stages of 5 ft. 0 ins. (Acc) (D) (Enu) (Loc) (SL)	1 16	(e)	All excavations shall be given in stages of 5 feet stating the commencing level and continuing in successive stages of 5 feet. (Acc) (D) (Enu) (Loc) (SL)
1 12	7	(i)Trimming excavations to batter (<i>shall be given in yds sup</i>) (Acc) (D) (Enu) (Loc) (R) (SL)			<i>See clause 5 (b) below</i>
1 13	7	(ii) levelling earth, (<i>shall be given in yds sup</i>), or(Acc) (D) (Enu) (Loc) (SL)	1 17	(f)(a)	The levelling (<i>of bottoms...of excavation</i>) may be described with the item (Acc) (D) (Enu) (Loc) (SL)
1 14	7	(iii)forming to slopes shall be given in yds sup. (Acc) (D) (Loc) (R) (SL) <i>No comparable clause</i>	5 18 19	(b)	(i)The formation of slopes shall be given in yds sup (Acc) (D) (Enu) (Loc) (R) (SL) (ii)and that to cuttings shall be given separately from that to embankments.
1 15	7	(iv)If rammed shall be so described (F)	1 20	(f)(b)	ramming of bottoms of...excavation may be described with the item (F)
		<i>See clause 2.2 below</i>	1 21	(g)	(i) All Excavators' wk (<i>shall, except as hereinafter provided</i>) be given in yds cu (D) (Loc) (Wp)

		<i>See clause 1.3 above</i>	1 22	(g)	(ii)the subsequent disposal of excavated material shall, except as hereinafter provided, be given in yds cu.(Tpt)
2 16	1	Surface excavation not exceeding 1 ft. 0 ins. In depth shall be given in yards superficial and the average depth stated. (Acc) (D) (Enu) (Loc) (SL) (Wp)	2 23	(a)	Surface excavation not exceeding 12" in depth shall be given in yards superficial and the average depth stated. (Acc) (D) (Enu) (Loc) (SL) (Wp)
17	2	All excavations exceeding 1 ft in depth shall be given in yds cu. (D) (Loc) (Wp)			<i>See Clause 1 (g)</i>
18	3	If turf or vegetable soil is to be preserved, the quantity shall be given in yards superficial and the thickness stated. (Acc) (D) (Enu) (Loc) (T) (Tpt) (Wp)	2 24	(b)	If turf or vegetable soil is to be preserved, the quantity shall be given in yards superficial and the average depth stated. (Acc) (D) (Enu) (Loc) (T) (Tpt) (Wp)
19	4	The removal and grubbing up of shrubs, &c., shall be described, cutting down trees and grubbing up roots of same shall be enumerated. (Acc) (D) (Enu) (Loc) (Tpt) (Wp)	2 25	(c)	The removal and grubbing up of shrubs, &c., shall be described; cutting down trees and grubbing up roots of same shall be enumerated. (Acc) (D) (Enu) (Loc) (Tpt) (Wp)
3 20	1	Basement excavation shall be given in yards cube, the dimensions being taken to the outside of the foundations unless otherwise stated. Existing voids shall be deducted, and the quantity of such deductions shall be stated. (Acc) (D) (Enu) (Loc) (SL) (Wp)	3 26	(a)	The measurement of basement and similar excavation shall be given to the outside of the foundations. Existing voids shall be deducted and it shall be stated that this has been done. (Acc) (D) (Enu) (Loc) (SL) (Wp)
21	2	In the event of bst walls being covered ext with a damp-proof covering (not desc as executed o'hand), the excn shall be msd 2 ft. 0 ins. from ext face of wl down to bottom edge of damp-proof covering to allow for wkg space.(Acc) (D) (Enu) (Loc) (SL) (W) <i>No comparable clause</i>	3 27 28	(b)	(i)Where the basement walls are covered externally with a damp-proof covering (not described as executed overhand), allowance shall be made in the measurement for working space of 2 feet from the external face of the wall down to the bottom edge of the damp-proof covering. (Acc) (D) (Enu) (Loc) (SL) (W) (ii)The same working space shall be allowed for where required by the method of construction. ?
4 22	1	Surf trenches tb msd in depths of 5 ft. 0 ins. & given in yds cu, as desc in Clause 1, para 6.(Acc) (C) (D) (Enu) (Loc) (SL)	4 29	(a)	Surface trenches shall be so described and given in stages of 5 feet as set out in clause 1, paragraph (e). (Acc) (C) (D) (Enu) (Loc) (SL)

23	2	Trenches below bst shall be so desc, stating depth at which they commence, & tb msd in depths of 5 ft. 0 ins & given in yds cu, as desc in Clause 1, para 6.(Acc) (C) (D) (Enu) (Loc) (SL)	4 30	(b)	Trenches below basement shall be so described and given as set out in clause 1, paragraph (e). (Acc) (C) (D) (Enu) (Loc) (SL)
24	3	In the case of cuttings and extensive & deep basements, the necessary prelim trenching for ret. wls tb sep given in yds cu, as desc in Clause 1, para 6. (Acc) (D) (Enu) (Loc) (SL)	4 31	(c)	In the case of cuttings and extensive or deep basements, the necessary preliminary trenching for retaining walls shall be given as set out in clause 1, paragraph (e). (Acc) (D) (Enu) (Loc) (SL)
5 25	1	Disposal of earth shall either be desc with ea item of excn, e.g. 'wheeled and deposited,' or 'carted away,' or 'returned filled in and rammed,' as the case may be, or such disposal tb desc & given sep in yds cu. (Acc) (D) (Enu) (Loc) (O) (SL) (T) (U) (Tpt) (Wp)	10 32	(a)	The disposal of the spoil shall be described. <i>This item has been inc earlier (1 c above)</i>
5 26	2	Forming embankments or terraces tb given in yds cu stating if in layers, & giving the thickness of such layers, & whether the earth is brought direct from excn or dug from spoil heap, and also whether rammed and watered. The area of slopes and terraces tb given in yds sup. (Acc) (D) (Enu) (Loc) (R) (SL) (T) (Tpt) (Wp)	5 33	(a)	Forming embankments or terraces shall be given in yards cube; if the earth is to be deposited in layers, this shall be stated giving the thickness of such layers. The source or sources from which the earth is obtained shall be described and it shall be stated whether the deposited earth is to be rammed and watered.(Acc) (D) (Enu) (Loc) (R) (SL) (T) (Tpt) (Wp)
		<i>See 1.7 above</i>	5 34	(b)	The formation of slopes shall be given in yds sup & that to cuttings shall be given sep. (Acc) (D) (Enu) (Loc) (R) (SL) (T) (Tpt) (Wp)
5 27	3	Soiling, seeding, & turfing of surfaces tb given in yds sup & thickness of soil and nature of seed desc. (Acc) (D) (Enu) (Loc) (Wp)	5 35	(c)	Soiling, seeding, and turfing of surfaces shall be given in yards superficial and the thickness of soil and nature of seed described. (Acc) (D) (Enu) (Loc)
6 28		(i)Excavation for pier holes (shall be given sep & so desc) (Acc) (D) (Enu) (Loc) (SL) (T)	6 36	(a)	(i) Excavation for isolated pier holes shall be given separately, (Acc) (D) (Enu) (Loc) (SL) (T)
6 29		(ii)not exceeding five yds sup in area tb given sep & so desc. (Acc) (D) (Enu) (Loc) (SL) (T)			<i>No comparable clause</i>
		(iii)No comparable clause	6 37	(a)	

					(ii)and pier holes & post holes n.e. 1 yd cu shall be enumerated. (Acc) (D) (Enu) (Loc) (SL) (T)
		No comparable clause	6 38	(b)	Where pier holes ex 5 ft in depth a min msmt on plan of 4 ft x 4 ft tb given both for excn and the consequent planking and strutting. (W)
		No comparable clause	7 39	(a)	A description of the work to be underpinned shall be given stating its length and the depth of the under-pinning. An item shall follow in feet run for providing and fixing all necessary supporting timbers to the work underpinned, giving particulars thereof where practicable. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
7 30	1	Excavation for underpinning shall be measured and described as in lengths not exceeding 4 ft. 0 ins.; and 3 ft. 0 ins. in width from face of old wall shall be allowed in the measurement thereof; any preliminary excavation for underpinning down to the bottom of old wall shall be so described and shall be measured the same width. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	7 40 41 42	(b)	Excavation for underpinning shall be measured and described as in lengths not exceeding 4 feet, and the width to be taken from the face of the wall to be underpinned shall vary in proportion to the depth of the trench as follows:- For trenches up to 5 feet deep, the width shall be taken as 3 feet. For trenches exceeding 5 feet deep and not exceeding 10 feet deep, the width shall be taken as 4 feet 6 inches. For trenches exceeding 10 feet deep, the width shall be taken as 6 feet. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
7 31	2	Cutting off projecting footings shall be given in feet run, stating the number of courses. Cutting away old concrete or other foundations shall be given in yards cube.(Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	7 43	(c)	Cutting off projecting footings shall be given in feet run, stating the number of courses or the thickness of the wall. Cutting away old concrete or other foundations shall be given in yards cube. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
8 32	1	(i) Breaking up and removal of surface concrete or other hard substances shall be given in yards superficial and the thickness stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	8 44	(a)	(i) Breaking up and removing surface concrete or other hard substances shall be given in yards superficial and, if known, the thickness stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
8 33	1	(ii)Breaking up and removal of brickwork, concrete, or other hard substances met with in excavating foundations shall be given separately in yards cube and described..(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	8 45	(a)	(ii) Breaking up and removing brickwork, concrete, or other hard substances met with in excavating, shall be given in yards cube as extra over excavation; (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
		(iii)No comparable clause	8 46	(a)	

					(iii) where the quantity cannot accurately be ascertained a provisional quantity shall be given. (P)
8 34	2	Clearing out and removing contents of old cesspools, met with in excavating, shall be given in yards cube..(Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	8 47	(b)	Clearing out and removing contents of old cesspools met with in excavating shall be described..(Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
9 35	1	Excavation to form cuttings shall be separately given in yards cube and the mode of its execution described (Acc) (Cl) (D) (Enu) (Loc) (M) (Sh) (SL) (W) (Wp)	9 48	(a)	Excavation to form cuttings shall be given separately and the mode of its execution described.(Acc) (Cl) (D) (Enu) (Loc) (M) (Sh) (SL) (W) (Wp)
9 36	2	Excavation in tunnelling shall be separately given in yards cube, and the length, width, and height of the tunnel stated.(Acc) (D) (Enu) (IW) (Loc) (Sh) (SL) (Tpt) (W) (Wp)	9 49	(b)	Excavation in tunnelling shall be given separately and the length, width, and height of the tunnel stated..(Acc) (D) (Enu) (IW) (Loc) (Sh) (SL) (Tpt) (W) (Wp)
10 37	1	An item shall be given for keeping the excavations free from water by pumping or otherwise. (U) <i>No comparable clause.</i>	11 50 51		(i)An item shall be given for keeping excavations free from storm and percolating water by pumping or otherwise. (U) (ii)When the excavations extend below the normal water level, the fact shall be stated and, where known, the water level given. Where springs or running water are likely to be encountered a provisional sum shall be included for pumping, or a provisional number of hours shall be given of use of pump with power and attendance (actual pumping hours).. (Acc) (Ad) (Loc) (SL) (W) (Wp)
		<i>No comparable clause.</i>	12 52	(a)	The term planking and strutting shall mean everything requisite to uphold the face of earthwork with the exception of special shoring.
11 38	1	(i) Planking and strutting to basement excavation shall be given in feet or yards superficial, and the depth down to the general level of the excavation shall be stated. (Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (ii) <i>No comparable clause</i>	12 53 12 47	(b)	(i) Planking and strutting to basement excavation shall be given in feet superficial, and the depth down to the general level of the excavation shall be stated.(Acc) (IW) (Loc) (SL) (Tpt) (W) (Wp) (ii)Any special shoring required shall be stated
11 39	2	Planking and strutting shall be measured to both sides of trenches and given in feet or yards superficial, stating the	12 48	(c)	Planking and strutting shall be measured to both sides of trenches and given in feet superficial, stating the depth in stages of 5 ft and whether to surface trenches or to trenches

		depth and whether to surface trenches or to trenches below basement; planking and strutting to trenches over six feet in width shall be separately given and the width stated .(Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)			below basement; planking and strutting to trenches over six feet in width shall be separately given and the width stated (Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)
11 40	3	Alternatively, planking and strutting to trenches may be given in feet or yards run, and the width and depth of the trench stated. (Alt) .(Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)	12 49	(d)	Alternatively the length of the trenches may be given in feet run and the item described as planking and strutting to both sides of trenches, stating the width and depth (Alt) .(Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)
11 41	4	(i) Planking and strutting shall be measured to all sides of pier holes, and given in feet or yards superficial and the depth stated; (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 50	(e)	(i)Planking and strutting to pier holes shall be measured to all sides and given in feet superficial and the depth stated in stages of 5 feet. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
11 42	4	(ii) that to pier holes not exceeding two yards superficial on plan shall be so described and given separately.(Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)			(ii) <i>No comparable clause</i>
11 43	5	In all cases planking and strutting next roadways shall be given separately and so described.(Loc)	12 51	(f)	In all cases planking and strutting next roadways shall be given separately and so described.(Loc)
		<i>No comparable clause</i>	12 52	(g)	Where retaining walls are to be constructed in two thicknesses involving the shortening of struts or shores and re-strutting or re-shoring, the planking and strutting shall be given separately and so described.
11 44	6	(i) Planking and strutting shall be measured (wherever practicable) to excavation for underpinning, and shall be given in feet superficial and the depth stated. The planking and strutting shall be measured around the complete trench, and shall be described as ‘planking and strutting in short or necessary lengths to trenches in underpinning’. Cross lengths of planking and strutting shall be taken for the width and depth of the trench at an average of about four feet apart, and shall be separately described as ‘planking and	12 53	(h)	(i) Planking and strutting shall be measured (wherever practicable) to excavation for underpinning, and shall be given in feet superficial and the depth stated. The planking and strutting shall be measured around the complete trench, and shall be described as ‘planking and strutting in short or necessary lengths to trenches in underpinning.’ Cross lengths of planking and strutting shall be taken for the width and depth of the trench at an average of about four feet apart, and shall be separately described as ‘planking and strutting in short lengths across trenches.’ .(Acc) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)

11 45		strutting in short lengths across trenches.' (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (ii)The description of the work to be underpinned shall be given as fully as practicable, and an item shall be given (following the planking and strutting) of 'Provide and fix all necessary timbering in connection with the foregoing underpinning.' (Acc) (CI) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) (D)			(ii)No comparable clause
11 46	7	Planking and strutting to tunnelling shall be separately given in feet or yards run and described, and the width of the tunnel, the heights to springing and crown, and the girth of the soffit stated. (Acc) (D) (IW) (Loc) (Sh) (T) (Tpt) (W) (Wp)	12 54	(i)	Planking and strutting to tunnelling shall be separately given in yards run and described, and the width of the tunnel, the heights to springing and crown, and the girth of the soffit stated... (Acc) (D) (IW) (Loc) (Sh) (T) (Tpt) (W) (Wp)
11 47	8	Planking and strutting to excavation circular on plan shall be given separately and so described... (Acc) (D) (IW) (Loc) (R) (Sh) (T) (Tpt) (W) (Wp)	12 55	(j)	Planking and strutting to excavation circular on plan shall be given separately and so described... (Acc) (D) (IW) (Loc) (R) (Sh) (T) (Tpt) (W) (Wp)
11 48	9	Planking and strutting and timbering ordered to be left in shall be given separately and described. .. (Acc) (D) (IW) (Loc) (Tpt) (W) (Wp)	12 56	(k)	Planking and strutting and timbering ordered to be left in shall be given separately and described. ... (Acc) (D) (IW) (Loc) (Tpt) (W) (Wp)
12 49	1	Puddling shall be given in yards cube and described. (Acc) (D) (Loc) (Tpt) (W) (Wp) + (Inc) if placed in layers	13 57		Puddling shall be given in yards cube and described. (Acc) (D) (Loc) (Tpt) (W) (Wp) + (IW) if placed in layers
		No comparable clause.	14 58		Hardcore filling exceeding 12 inches thick shall be given in yards cube and described; where 12 inches thick and under it shall be given in yards superficial stating the thickness. (Acc) (D) (Loc) (Tpt) (W) (Wp)
		CONCRETOR <i>The sub-heading has been added in the 1940 Edition. There is also a later section in the 1st Edn. headed 'Reinforced Concrete' which has been added below in bold lettering.</i>			CONCRETOR Including Reinforced Concrete, Reinforcement and Formwork, Fire-Resisting Floors, and Piling.

		<i>Also in bold lettering are clauses added back from 'Carpenter' and 'Smith and Founder' sections where instructed by this document</i>			
					NOTE.- Reinforced concrete, reinforcement and formwork (other than filler joist construction) should be grouped in a separate Bill or Section under the Heading of Reinforced Concrete.
13 1		(i)The nature of the materials used for concrete, and the proportions and the method of mixing, shall be described. (ii)Particulars of any tests required shall be given.	1 1	(a)	(i)The nature of the materials to be used for all forms of concrete, and the proportions and the method of mixing, shall be described. Particulars shall be stated of any tests required both of the materials and of the finished work
13 2	(i)	The materials and labour shall be described	1 2	(b)	<i>No comparable clause</i>
13 3		(i)Concrete, Formwork and Steel in reinforcement shall be given separately unless otherwise herein described; (ii)it will usually be found convenient to give the whole of these items in one Bill headed 'Reinforced Concrete'	1 3	(f)	Concrete, formwork, and steel in reinforcement shall be given separately unless otherwise herein provided <i>No comparable clause</i>
13 4		(i)The system of construction shall be stated and the character of the reinforcement described. (ii)Particulars of any tests required, both of the materials and of the finished work, shall be given			See Concretor 1(d)(iii) See 1(b) above
13 5					
1 6	(iv)	The work of each storey shall be given separately, and the heights above or below a given datum shall be stated (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			No comparable clause
1 7		(i)All work shall be measured net, (N)			<i>(i)See Preliminaries 1 (c)</i>
1 8		ii)but no deduction shall be made for openings 2ft 0ins in area and under			<i>(ii)See 1(g) below</i>

1	9	(ix)	Finishing surfaces of concrete after striking centering or formwork, by removal of excrescences, stopping holes or interstices, rubbing down with carborundum or hacking for plaster key shall be given in yards or feet superficial. (Acc) (D) (Enu) (F) (Loc) (SL) (T) (W) (Wp)			<i>See clause 1 (c) below</i>
1	10	(10)	The centering and formwork generally shall be measured and given in the manner described in ‘Carpenter’ (Clause 5 page 35 as follows:			<i>Centering inc in Carpenter Section of SMM3, formwork inc in Concretor</i>
	11	Carp 5	(i)Formwork shall be given in squares, yds or ft sup. allowance shall be made in the measurements for overlaps and passings at angles (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>See clause 25(ii)</i>
	12	Carp 5	(ii)Raking & circular cutting & waste, splayed rounded or moulded edges, bullnosed angles and fillets shall be given in feet run. Items of fillets shall also be given in ft run as previously desc in Clause 3. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>See clause 26(d)</i>
	13	Carp 5	(iii)Splayed or moulded stoppings shall be enumerated. (Acc) (Cut) (D) (DW) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>(iii)See clause 26 (d)</i>
	14	Carp 5	(iv)Struttings shall be included in the descriptions of formwork. Where beams exceed 8 ft in length a separate item shall be given for supports at every 5 ft. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>(iv)See clause 26 (a)</i>
	15	Carp 5 Carp 5	(v)No deductions shall be made for intersections of columns and stancheons with beams or for similar junctions.			<i>(v)See clause 26 (e)</i>

16	Carp 5	(vi)Notchings shall be enumerated and described. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)		See clause 26 (a)
17		(vii)Formwork generally shall be classified and given separately as follows:		(vii)See clause 27
18		(a)Flat surfaces		See clause 27(1)
19		(b)Vertical work		See clause 27(2)
20		(c)Sloping work		See clause 27(3)
21		(d)Curved work (Acc) (D) (DW) (Enu) (Loc) (R) (Rad) (SL) (T) (Tpt) (W) (Wp)		See clause 27(4)
22		(e)Return edges of openings and breaks in floors and walls. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)		(viii)See clause 27(8)
23		(f)Grooves and chases. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)		See clause 18
24		(g)Cornices and mouldings (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)		See27(9)
25		(h)Small surfaces such as cantilever ends, brackets, sides of mortice holes and the like (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)		See 27(10)
26		(viii)Sheeting shall be measured for b.s. of walls and of work sloping more than 15 degrees with the horizontal, and this shall be stated. (Acc) (D) (Enu) (Loc) (R) (SL) (T) (W) (Wp)		See clause 28
R/c 1 27	(xi)	The steelwork shall be measured and given in the manner described in 'Smith and Founder'		No comparable clause
28		(Possible applicable items in Smith & Founder are as follows:)		

29		<p>Generally (ii) Work fixed in old buildings or between old walls or in positions incurring extra cost shall be specially described (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)</p>			
30		<p>Generally (iii) (a) Unloading, getting in, hoisting and fixing shall be included with the items,</p>			
31		<p>(b)the various levels given separately, (SL)</p>			
32		<p>(c)and the approximate heights stated (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)</p>			
33		<p>Generally (iv) Steel and iron work, with the exceptions hereinafter mentioned, shall be measured net. (N)</p> <p><i>(Note: there are no exceptions that might apply to reinforcement)</i></p>			
34		<p>Generally (v) No allowance shall be made for 'rolling margin' in steelwork and it shall be so stated.</p>			
35		<p>Generally (vi) All items unless otherwise described, shall be given in weight (Enu)</p>			

		<i>See 1(ix) above</i>	1 4	(c)	(i)Any treatment of the finished face of concrete, beyond the ordinary depositing, spreading or levelling, shall be described and given in yards or feet superficial. (Acc) (D) (Enu) (F) (Loc) (SL) (T) (W) (Wp)
		<i>(ii)See 18.1. (ii) below</i>	1 5	(c)	(ii)In the case of concrete measured as a superficial or running item, such finish may be included with the item.
		<i>(ii)See 18.1. (iii) below</i>	1 6	(d)	(i)If concrete is between and around steel joists, <i>(it shall be so stated)</i> (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>R/f conc 1(a)(i)</i>	1 7	(d)	(ii)(<i>If concrete is between and around</i>) rods, or fabric reinforcement it shall be so stated (Acc) (D) (Enu) (F) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	1 8	(d)	(iii)and the system of construction and character of the reinforcement described.
1 36	(vi)	Each member or part of the work shall be given separately and described, and except in the case of walls, floors and roofs, shall be classified according to size as follows:- Those having a sectional area not exceeding 36 inches, those of an area over 36 and not exceeding 72 inches, those over 72 inches and not exceeding 144 inches, those over 144 inches.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	1 9	(e)	Where concrete is reinforced by rods or fabric reinforcement each member or part of the work shall be given separately and described, and (except in the case of walls, floors and roofs) shall be classified according to size as follows:- Those having a sectional area not exceeding 36 inches, those of an area over 36 and not exceeding 72 inches, those over 72 inches and not exceeding 144 inches, those over 144 inches. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
1 37	(vii)	Vertical, horizontal, raking and circular work shall each be given separately. (R) (Rad)			<i>Fmwk 27 (1) – (4)</i>
38 39		The concrete generally shall be measured and given in the manner described in ‘Concretor’; and any additional labour required, such as filling-in in layers and tamping, shall also be described			See concretor clauses 13-23 <i>No comparable clause</i>
		<i>See clause 1 (v) (Reinforced Concrete) above</i>	1 10	(g)	All concrete work shall be measured net but no deductions shall be made for the volume of

					the reinforcement nor for openings 2 feet sup or under in floors, roofs, roadways, &c. (N)
14 40	1	Concrete in trenches shall be given in yards cube, and where in thicknesses of less than 12 inches it shall be separately stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	2 11		Concrete in trenches shall be given in yards cube; where less than 12 inches in thickness it shall be given separately and so described.. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
2 41		Concrete in foundations shall be given in yards cube. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			See clause 7 (a) . (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
2 42	(ii)	Footings shall be given separately and the form described (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			No comparable clause
		No comparable clause.	3 12		Concrete in small bases for fencing posts and the like shall be enumerated and the sizes given. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
15 43	1	Concrete in underpinning shall be given separately and so described. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	4 13		Concrete in underpinning shall be given separately and so described. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
16 44	1	(i)Concrete beds not exceeding 1 ft. 0 ins. thick shall be given in yards superficial, the thickness stated, and (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp) <i>See clause 16.2 below</i>	5 14	(a)	(i)Concrete beds not exceeding 12 inches in thickness shall be given in yards superficial and the thickness stated, (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp) (ii)those exceeding 12 inches in thickness shall be given in yards cube. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp) <i>Surface treatment is given under clause 1 (c) above.</i>
16 45	1	(ii)the mode of treatment of the surface described.	15		
16 46	2	If exceeding 1 ft. 0 ins. thick they shall be given in yds cu, and the mode of treatment of the surface given in yds sup. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>Included in Clause 5 (a) above</i> <i>Surface treatment is given under clause 1 (c)</i>

16 47	3	If formed or laid to falls it shall be so stated. (R) <i>No comparable clause.</i>	5 16 5 17	(b) (b)	(i) Conc beds formed or laid to falls (R) (ii) currents or cambers shall be given separately and so described. (R)
17 48	1	Channels in concrete shall be given in feet run describing the shape, width, average depth, and extra concrete bed where required. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	6 18		Channels in concrete shall be given in ft run desc the shape, width and av depth. Where channels are formed in concrete beds and additional concrete under is required, it shall be so stated. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	7 19	(a)	Concrete in foundations to isolated stanchions and columns shall be given separately in yards cube; where less than 12 inches in thickness it shall be given in yards superficial and the thickness stated. Concrete packed around steel grillages shall be given separately in yards cube. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	7 20	(b)	Cement grouting under steel stanchion bases or under steel grillages to be given in ft sup; if under small base one yd sup the groutings shall be enumerated stating the size. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	7 21	(c)	Wedging up under stanchion bases or under steel grillages shall be enumerated and if steel wedges are to be provided it shall be so stated. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	8 22		The building in of holding down bolts and the temporary boxings or wedges to form the holes for same shall be enumerated; the lengths shall be stated and the grouting included in the description (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
18 49	1	(i) Concrete in floors and roofs shall be given in yards superficial, and the thickness and mode of treatment of the surface and the soffit described. (Acc) (D) (Enu) (F) (Loc) (SL) (T) (Tpt) (W) (Wp)	11 23	(a)	(i) Concrete floors and roofs shall be given in yards superficial and the thickness stated. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
18 50	1	(i) If between or around steel joists, (or) (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			(i) See clause 1 (d) (i)
51		(ii) expanded metal, or (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			(ii) No comparable clause
52					

		(iii) other reinforcement, it shall be so described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			(iii) See clause 1 (d) (ii)
18 53	1	(iv) If finished to falls, it shall be so stated and the average thickness given. (R)	11 24	(a)	(ii) If finished to falls this shall be stated and the average thickness given. The measurement shall be taken across beams. (R)
		No comparable clause	11 25	(a)	(iii) If the panel system of heating is adopted, the area of heating panels shall be stated. (DW)
4 54	1	Floors and roofs shall be given in yards superficial and the thickness stated; the measurement shall be taken across beams . (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			See clause 11 (a) above
18 55	2	If in sloping roofs, it shall be so stated and shall be given separately, and if of sharper pitch than 15 degrees the angle of pitch shall be stated. (R) If floors and roofs are sloping or laid to falls, they shall be so described; and if roofs are of a sharper pitch than 15 degrees, the angle of pitch shall be stated (R)	11 26	(b)	If floors and roofs are sloping this shall be stated and they shall be given separately; if of sharper pitch than 15 degrees the angle of pitch shall be stated. (R) See 11(a) & (b)
4 56	2				
18 57	3	Concrete in tops and cheeks to dormers shall each be given separately . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	11 27	(c)	Concrete in tops and cheeks to dormers shall each be given separately . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		No comparable clause	11 28	(d)	Concrete hearths shall be given in feet superficial. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
18 58	4	The concrete to the various levels shall be given separately and the approximate height of the hoisting stated . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			No comparable clause
19 59	1	Concrete in engine beds shall be given in yards cube. Hand holes and holes for holding down bolts are to be enumerated; no deduction shall be made from the concrete for these. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	9 29		(i) Concrete in engine beds shall be given in yards cube; (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)

		<i>No comparable clause.</i>			(ii)small engine beds shall be enumerated . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
20 60	1	Concrete curbs shall be given in feet run and the size and shape stated; if grooved they shall be so described. . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) <i>No comparable clause.</i>	10 30		(i)Concrete curbs (formed in situ) shall be given in feet cube, except curbs of 54 inches sectional area and under which shall be given in feet run stating the size and including formwork. . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (ii)All labours shall be given separately when curbs are cubed and described with the items when they are given in feet run.
21 61	1	Concrete casing to steel joists as beams, lintels, or stancheons shall be given in feet run and the size stated.(Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 31		The following casings to steel joists shall be given separately in feet cube, viz:- (1)Concrete casing to beams. (2) Concrete casing to lintels. (3)Concrete casing to stanchions. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
22 62	1	(i)Concrete walls and partitions shall be given in yards superficial and the thickness stated. .(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) Those over 12 ins. thick may be given in yards cube. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			(i)Concrete walls in situ shall be given in yards superficial and the thickness stated, the measurements being taken between piers or projections.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (ii)Those over 12 inches thick shall be given in yards cube. <i>See clause 13 (b) below</i> (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
22 63	1	(ii)Concrete in retaining walls shall be separately given.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) Openings shall be deducted, enumerated, and described. Chases shall be given in feet run and described. (MsA)	13 34	(b)	Concrete retaining walls shall be given separately.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) <i>No comparable clause</i>

3 64	(i)	Walls not exceeding 12 ins thick shall be given in yards superficial and the thickness stated. The measurements to be taken between piers and projections. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See clause 13 (a)(i) above</i>
3 65	(ii)	Walls exceeding 12 ins thick shall be given in yards cube (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See clause 13 (a) (ii) above</i>
3 66	(iii)	Projections on walls not exceeding 18 ins in width shall be dealt with as columns, as hereinafter described, and shall be measured through the wall. When projections exceed 18 ins in width, the full thickness of wall and projection shall be dealt with as wall of that thickness. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	13 35	(c)	Projections not exceeding 18 inches in width on walls less than 12 inches thick shall be dealt with as columns as hereinafter described and shall be measured through the wall. When the projections exceed 18 inches in width the full thickness of wall and projection shall be dealt with as wall of that thickness. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)

5 67	0	(i) Independent piers, columns, struts, pilasters and the like shall be given in feet cube and desc. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	14 36		(i) Independent piers, columns, struts, and the like shall be given in feet cube and described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
680		(ii) those exceeding 18 ft in length shall be given separately and the length stated.			<i>No comparable clause</i>
1 69		(iii) Projections on piers and columns shall be given in feet cube and described and the number stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	14 37		(ii) Projections on piers and columns shall be given in feet cube and the number stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
6 70		Beams, braces, cantilevers, and the like shall be given in	15 38		Beams, braces, cantilevers, and the like shall be given in feet cube. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)

		feet cube. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)				
7	71	Strings, cornices and similar projections shall be measured beyond the faces of the concrete walls or beams and given in feet run and described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	16 39		Strings, cornices and similar projections shall be measured beyond the faces of the concrete walls or beams and given in feet run and described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	
8	72	Steps and staircases in situ shall be measured and given as described in Concretors Schedule, Clause 23. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	17 40	(a)	Concrete steps to openings and staircases and strings to same, formed in situ, shall be given in feet cube. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	
8	73	i.e. ‘Concrete steps to openings and staircases shall be given in feet run, stating shapes and sizes.’ (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)			<i>See adjacent clauses</i>	
		<i>No comparable clause.</i>	17	41	(b)	Concrete solid balustrades shall be given in feet superficial and described stating the thickness. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
8	74	i.e. ‘Landings shall be given in feet superficial stating the thickness.’ (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	17	42	(c)	Landings shall be given in feet superficial stating the thickness.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
8	75	i.e. ‘Finishings to steps and landings (except ends of steps and edges of landings) t b desc with the item. ‘ i.e. ‘Finishings to edges of landings shall be given in ft run. Wall ends & outer ends to steps t b enum and desc. Strings t b given in ft run and desc. Stops, mitres, and other labours t b enum and desc.’ (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)				<i>See Clause 1 (c) above</i>
		<i>No comparable clause.</i>	18	43		All labours and details where produced by the formwork shall be measured with the formwork. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)

		<i>No comparable clause.</i>	19 44		Work involving cutting in concrete shall be separately given; grooves, chases, and the like shall be given in feet run, and holes, mortices, and the like enumerated and described. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		CAST CONCRETE WORK			<i>No comparable heading</i>
24 76	1	All cast concrete work shall include for moulds. (T)			<i>See Clause 30 (c)</i>
25 77	1	Cast lintels shall be given in feet run and the size, shape, and finish stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)			<i>See Clause 30 (d)</i>
26 78	1	Cast concrete steps and landings shall be enumerated and the size, shape, and finish stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See Clause 31 (a)</i>
27 79		Cast concrete copings shall be given in feet run, and the size, shape, and finish stated. Mitre blocks, kneelers, bonders, and other similar items shall be enumerated and described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See Clause 30 (d)</i>
		<i>No comparable heading</i>			Reinforcement
		<i>No comparable clause</i>	20 45	(a)	Particulars shall be given of any tests to be applied to samples.
		<i>No comparable clause</i>	20 46	(b)	Any special restrictions in regard to hot or cold bending shall be stated.
		Sub Heading 'Reinforcement' in Reinforced concrete section			
11 80	(i)	Reinforcement shall be given in weight, except sheet reinforcement, which shall be given in yds sup. No allowance shall be made in the weight for 'rolling margin', and this shall be stated in the description.	20 47	(c)	Rod or bar reinforcement shall be described and given in weight classified as hereinafter stated; no allowance shall be made in the weight for rolling margin and this shall be stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)

		(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			
11 81	(v)	Bars exceeding 5/8 ins in diameter shall be given under one description	20 48	(d)	Bars 5/8 inch diameter and over shall be given under one description.
11 82	(vi)	Bars not exceeding 5/8ins in diameter shall be given separately for each size <i>See clause 11 (i) above</i>	21 49 21 50	(e)	Bars under 5/8 inch diameter shall be given separately for each size. (i) Fabric reinforcement shall be given in yds sup and desc; only the net area covered shall be measured. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
83		Raking or circ cutting and waste t b given in ft run. (Cut) (N) (R) (Rad)			(ii) and the description shall include the extra material at laps particulars of which shall be given. Raking and circular cutting and waste shall be given in feet run. (Cut) (N) (R) (Rad)
11 84	(iii)	The work shall be given separately as in Floors, Roofs, Walls, Beams, Columns, and under the following sub-divisions, viz:- (a) Straight bars. (b) Bent bars (c) Indented bars or bars of other special form. (d) Bars exceeding 30 feet in length (the average length of same to be stated) (e) Stirrups, links, and the like. (f) Helical reinforcement (g) Any work requiring special bending	22 52		The reinforcement shall be given separately as in Floors, Roofs, Walls, Beams, Columns, &c., and under the following sub-divisions, viz:- (a) Bars whether straight or bent. (b) Links, stirrups, or bindings. (c) Indented bars or bars of other special form. (d) Bars exceeding 30 feet in length in stages of 10 feet. (e) Helical reinforcement. (f) Work requiring special bending or bending to large radius.

11 85	(iv)	(i) Annealed iron binding wire shall be included with the items. If high carbon steel is used it shall be given separately, and all bends in same shall be enumerated and described as forged bends	23 53		<p>Tying wire and other materials required for supporting the reinforcement shall not be separately given but shall be included with the description of the items together with cutting to lengths, bending, hooking and all other work whatsoever in providing and fixing in position.</p> <p>(Note:- The term tying wire is reserved for the wire tying together reinforcement in contact, and the term links or bindings for the wire forming part of the reinforcement and linking and binding together reinforcement not in contact).</p>
			24 54		If high carbon steel is to be used it shall be given separately and all bends in same shall be enumerated and described as forged bends.
		SMM 1 & 2			SMM3
		<i>See 'Carpenter' Clause 1.,.</i>			Formwork for Concrete
			25 55		<p>(i) Formwork shall be measured the actual surface in contact with the concrete.</p> <p>(ii) It shall be given in yards superficial for the larger areas, such as soffits of floors, otherwise in feet superficial. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)</p> <p>(iii) If wrought formwork is required, it shall be so stated.</p> <p>(iv) Formwork left in shall be so described.</p>
		<i>No comparable clause.</i>	26 56	(a)	The descriptions shall include straight cutting and waste, notchings, allowance for overlaps and passings at angles, battens, strutting, bolting, wedging, easing, striking and removal. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	26 57	(b)	Where the height of the strutting exceeds 13 feet formwork shall be given

					separately and the height stated (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	26 58	(c)	Filleting to form stopped chamfered edges or splayed internal angles not exceeding 2 inches wide shall be included in the description of formwork to beams, &c. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>See 5(ii)</i>	26 59	(d)	Raking or circular cutting and waste, and rounded or moulded edges shall be given in feet run. Moulded stoppings shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>See 1(x)(v).</i>	26 60	(e)	No deductions shall be made for intersections of columns and stanchions with beams or for similar junctions
		Reinf. Concrete 1	27 61		Formwork generally shall be classified and given separately as follows:-
		Carp. 5 (a)			1.Flat surfaces such as soffits of floors and the like; where floors exceed 9 inches in thickness the formwork shall be given separately. Openings under 10 feet superficial shall not be deducted.
		Carp. 5(b)			2.Vertical work such as surfaces of walls and the like.
		Carp. 5(c)			3.Sloping work.
		Carp. 5(d)			4.Curved work (R) (Rad)
		Carp. 1.			5.Tops and cheeks of dormers and the like. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
		Carp 1. (iii) &(iv)			6.Sides and soffits of beams and lintels. (Beams and lintels 30 inches deep and over shall be given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		Carp 1.(iv) & (v)			7.Sides of piers and stanchions (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
		Carp. 5 (e)			8.Edges and breaks in floors and walls (to be given in feet run where under 9 inches in width). (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		Carp. 5 (g)			9.Cornices and mouldings. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		Carp. 5(h)			10.Small surfaces such as cantilever ends, brackets, ends of steps, caps and bases to

					pilasters and columns and the like. (Acc) (D) (Enu) (Loc) (Sh) (SL)(T) (W) (Wp)
		Carp. 5	28 62		Formwork shall be measured to both sides of walls and the surface of work sloping more than 15 degrees from the horizontal.(Acc) (D) (Enu) (Loc) (R) (SL) (T) (W) (Wp)
		No comparable clause.	29 63		All formations in concrete surfaces (other than the chamfered edges and splayed internal angles before mentioned) and details where produced by formwork shall be measured.
		In Reinforced concrete section. No comparable heading			Pre-cast Concrete Work
9 86	(i)	(i)Pre-cast work shall be given sep & msd & classified as desc for Artificial Stone at the end of the Bricklayers' Schedule	30 64	(a)	Pre-cast work shall be given sep & msd the smallest rect cube from which it could be obtained if it were natural stone; fractions of 1" if ½" or over to be measured as a whole inch, those less than ½" shall be neglected.
9 87	(i)	(ii)and shall include for moulds and finished faces and for hoisting and setting (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			See 30 (c)
9 88	(v)	Joints or connections between vertical and horizontal members shall be enumerated and described (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			No comparable clause
9 89	(vi)	Floor or wall slabs shall be given in yds or ft sup and the thickness and average size of the slabs shall be stated. Special jointing or connection between the slabs shall be given in ft run, stating the thickness of the slabs(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			No comparable clause

10 90	(i)	Sundry works such as grooves, chases and the like shall be given in feet run and described (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	30 65	(b)	The labour on each item shall be described. This is the result of labour, not labour
10 91	(ii)	Holes, mortices and the like shall be enumerated and described. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See clause 19 above</i>
10 92	(iii)	Work involving cutting in existing reinforced concrete shall be separately given (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>See clause 19 above</i>
		<i>See clause 9 (i) (ii) above</i>	30 66	(c)	Precast work shall be described as including all moulds, finished faces, and hoisting and setting; the reinforcement shall be described and included with each item.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
9 93	(ii)	Sills, mullions, transoms, lintels, copings, beams, columns and the like, shall be given in feet run; those over 7ft and not exceeding 10 ft in length, and those above 10ft in length shall be given separately and the average length in each of these groups shall be stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	30 67	(d)	Cornices, string courses, plinths, sills, copings, lintels and other similar items shall be given in feet run and the sizes stated: those over 7 feet and not exceeding 10 feet in length and those above 10 feet in length shall be given separately, and the average length and number in each of these groups shall be stated; angle stones, kneelers, bonders, stoolings, and similar items shall be enumerated..(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
9 94	(iii)	Landings shall be enum and desc, steps (other than spandril steps and winders) to be given in ft run & desc; ends to steps to be enum & desc; spandril steps and winders to be enum and the extreme sizes stated. Steps and spandril steps and winders over 7ft and n.e. 10 ft in length, and those above 10 ft in length shall be given sep, and the av. length in each of these groups shall be stated..(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	31 68	(a)	Steps (other than spandril steps and winders) shall be given in feet run and described; ends of steps shall be enumerated and described. Spandril steps, winders and landings shall be enumerated and the extreme sizes stated..(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
9 95	(iv)	(i)Notchings and holes in landings, such as for pipes and the like, shall be enumerated and described; .(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	31 69	(b)	Notchings and holes for pipes and the like shall be enumerated and described.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
9 96	(iv)	(ii)running with cement to joggle joints and the like shall			

		be given in feet run. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)			<i>See Mason, Clause 58 'mortices run with cement...shall be enumerated and described'</i>
		<i>No comparable heading.</i>			Patent Fire-Resisting Floors, Roofs, &c.
		<i>No comparable clause.</i>	32 70	(a)	A general description of the building stating its approximate area, height, and number of storeys and the height of each storey shall be given.
		<i>No comparable clause.</i>	32 71	(b)	Patent fire resisting floors, roofs, &c. shall include for the concrete, hollow tiles & r/f complete; the formwork tb given sep as hereinafter desc. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	32 72	(c)	Floors and roofs, &c. shall be given sep in yds sup giving a desc of the floor finishings; the superimposed load tb stated in lbs per ft sup and in case of floors of normal loads the span tb given in multiples of 6 inches commencing at 6 feet. In floors subject to exceptionally heavy loads the exact span shall be given. Floors subjected to a moving or vibrating load tb given sep, and the nature of the load fully desc. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	32 73	(d)	It shall be clearly stated whether the load is to be taken as inclusive of provision for future partitions or otherwise.
		<i>No comparable clause</i>	33 74	(a)	Sloping floors and roofs, vertical work, &c., shall be given separately in yards superficial, and if circular on plan this shall be stated, giving the radius of the curve.. (Acc) (D) (Enu) (Loc) (R) (Rad) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>		(b)	Dormer cheeks and tops, &c., shall be given in feet superficial.. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	33 76	(c)	Small turrets, small domes, &c., shall be enumerated and described. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	34 77	(a)	Measurements shall be taken to the extreme edge of the construction for its full bearing into chases &c., and from the extreme edge of casing to external beams,

					and shall include for all straight cutting and waste
		<i>No comparable clause.</i>	34 78	(b)	Raking and circular cuttings shall be separately given in feet run. Forming hips and valleys shall be given in feet run.(Acc) (D) (DW) (Enu) (Loc) (R) (Rad) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	34 79	(c)	Deductions shall be made for all openings exceeding 1 yard superficial.
		<i>No comparable clause,</i>	34 80	(d)	For all openings where steel trimmers are not provided an item shall be given of extra labour and material in trimming floor around opening, stating the size of the opening and the span of the floor in which the opening occurs.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	35 81		If the panel system of heating is adopted the area of heating panels shall be stated.
		<i>No comparable clause.</i>	36 82		Where floors are interrupted by the fixing of steel joists in the depth of the floor an item shall be given in feet run of extra labour cutting and waste against both sides of steel joists in floor. In the case of diagonal strengthening this shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	37 83		Channels or chases formed in the floor shall be given in feet run and described and their position in the slab stated; the description shall include the extra formwork necessary.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	38 84		Fixing slips for grounds, slating battens, &c., or metal clips for floor fillets shall be enumerated and described.(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	39 85		Holes shall be enumerated and described and shall include the boxing but no making good in other trades shall be included with the item. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	40 86		Concrete casing to steel joists shall be measured the net cube below the floor and given in feet cube, and shall include for all necessary wiring, binding or stirrups around flanges of joists; any extra rod reinforcement required shall be given separately in weight, as described for reinforced concrete. In measuring casing

					to box girders, the void shall be deducted if it exceeds 48 inches in sectional area. Unless the thickness of the floor is known the quantity of beam casing shall be provisional. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		No comparable clause.	41 87		Concrete curbs shall be given in feet run stating the size and shall include for reinforcement and shuttering. All labours shall be included in the description. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		No comparable clause.	42 88		Formwork shall be measured in accordance with rules for formwork for concrete. (See clauses 25 to 29.) (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		PILING			PILING
12 97	(1)	(i)A general description of the nature of the site (i.e. whether level or irregular) shall be given and (Acc) (Loc) (SL) (T) (Tpt) (W) (Wp)	43 89	(a)	i)A general description of the nature of the site (i.e. whether level or irregular) shall be given. (Acc) (Loc) (SL) (T) (Tpt) (W) (Wp)
98	(1)	(ii)the time in which the work has to be executed shall be stated:			(ii) No comparable clause
99	(1)	(iii)also whether the work is tidal or not (Ad)	90	(a)	iii)In work near rivers or tidal waters the level of the ground surface in relation to high and low water mark and Ordnance datum should be stated, together with records of highest flood water level. (Acc) (Ad) (Loc) (SL) (T) (Tpt) (W) (Wp)
100	(1)	(iv)All available information as to the strata through which the piles are to be driven shall be given, or reference made to any plans showing records of bores. (Acc) (Ad) (Loc) (SL)	91	(a)	(iv)All available information as to the strata through which the piles are to be driven shall be given, or reference made to any plans showing records of bores. (Acc) (Ad) (Loc) (SL)
101	(1)	(v)The permissible weight of hammer, the length of drop, and the set to which the piles are to be driven, shall be stated (Acc) (Ad) (Loc) (R) (SL)			(v)See clause 44 below
		No comparable clause.	43 92	(b)	If piles are to be driven from any other level than ground level this to be stated; if the piling frame is to be lowered or raised the exact height and nature of the work to be described. Driving canted piles shall be given separately. (Acc) (Ad) (D) (Enu) (Loc) (R) (SL) (Tpt) (W) (Wp)

		<i>No comparable clause</i>	43 93	(c)	Any extra excn that may be entailed for the movement of the piling frame about site in order to place hammer over any pile which may be situated in an angle or similar position, to be covered by provisions together with any necessary filling in and ramming afterwards. (Acc) (D) (Enu) (Loc) (P) (PP) (W) (Wp)
12 102	(iv)	The handling, pitching & driving of piles to be classified according to section & length & enum, & the average length of driving to be stated (Acc) (Ad) (Loc) (R) (SL) (W) (Wp)			<i>See clause 44 below</i>
12 103	(v)	Where the general driving has been given to a stated depth, and in some instances a greater depth is required, the number of piles to which this additional driving applies shall be given as 'extra driving only', and the average additional depth shall be stated (Acc) (Ad) (D) (Enu) (IW) (Loc) (R) (SL) (W) (Wp)			<i>See clause 48 (e) below</i>
28 104	1	Wood piles shall be given in feet cube and the size stated. If over 20 ft. 0 ins. long the lengths shall be given in stages of 4 ft. 0 ins. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	46 94	(a)	Wood piles shall be described and given in feet cube and the size stated. If over 20 ft. 0 ins. long the lengths shall be given in stages of 4 ft. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
28 105	2	Shoeing and pointing piles and cutting off tops of same shall be enumerated, and the sizes of piles and weights of shoes stated. If piles are cut off below water level it shall be so stated, and the depth below water level given. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	46 95	(b)	Shoeing and pointing piles shall be enumerated stating the weight of the shoes and the size of the pile.
			46 96	(c)	Cutting off tops of piles and ringing with steel bands shall be enumerated and, if cut off below water level, the depth shall be stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
28 106	3	Driving the piles shall be enumerated, stating the size of the piles, the length of same and depth of driving; if in water it shall be so stated. The price for driving shall include for all staging, driving apparatus, and shifting to the required positions. (Acc) (Ad) (D) (Enu) (Loc) (R) (SL) (Tpt) (W) (Wp) <i>See 12(v) above</i>	44 97		(i) Handling, pitching and driving the piles shall be enumerated, stating whether singly or in clusters and giving the size and length of the piles, and the depth of driving; if in water it shall be so stated. The price for driving shall include for all staging, driving apparatus, and shifting to the required position. (ii) Weight of monkey and maximum amount which the pile is to be driven by last four blows should be stated.

					(Acc) (Ad) (D) (Enu) (Loc) (R) (SL) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	45 98		Piles which are driven close together to form sheeting should be enumerated separately from piles driven not in contact with one another, describing the type and weight of shoe and the type of interlock, if any. (Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
28 107	4	Sheet piling shall be given in feet superficial. All laps shall be added to the superficial measurement. If the total length of driving exceeds 10 ft. 0 ins. the extra depths shall be stated in stages of 5 ft. 0 ins. Strutting and waling to sheet piling shall be given under separate items and described. . (Acc) (D) (Enu) (Loc) (N) (SL) (Tpt) (W) (Wp)	47 99	(a)	Sheet piling shall be described and given in feet superficial: all laps shall be added to the superficial measurement. The driving shall be given in feet superficial and if the total depth of driving exceeds 10 feet the extra depths shall be stated in stages of 5 feet. Strutting and waling to sheet piling shall be described. . (Acc) (D) (Enu) (Loc) (N) (SL) (Tpt) (W) (Wp)
28 108	5	It shall be stated whether the sheet piling is left in or drawn. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	47 100	(b)	It shall be stated whether the sheet piling is left in or drawn.(Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
28 109	6	Corner or junction piles to last named piling shall be given in feet run for extra value. (Acc) (D) (EO) (Enu) (Loc) (SL) (Tpt) (W)(Wp)	47 101	(c)	Corner and junction piles to last-named shall be given in feet run as extra only.(Acc) (D) (EO) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
		<i>No comparable clause.</i>	47 102	(d)	Cutting or burning through sheet piling shall be given in feet run. (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
110		(i)Piles shall be described and given in ft run and classified according to section and length. (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)	103		(i)Conc piles shall be desc & given in ft run and classified according to section and length, the extra strength of the heads being stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
111		(ii)Any requisite moulds shall be included in the description, and also the necessary strappings and bolts (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	104		(ii)Any requisite moulds shall be included in the description, as also the necessary strappings and bolts. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
112		(iii)If piles may be cast at the site this shall be stated (Acc) (Cut) (D) (Enu) (Loc) (T) (Tpt) (W) (Wp)	105		(iii)If piles may be cast at the site this shall be stated (Acc)

					(D) (Enu) (Loc) (T) (Tpt) (W) (Wp)
12 113	(iii)	Heads and shoes shall be enumerated and described and the weight of each given (Acc)(D) (Enu) (Loc) (T) (Tpt) (W)(Wp)	48 106	(b)	Heads and shoes shall be enumerated and described and the weight of each given; rock shoes shall be specially mentioned.(Acc) (D) (Enu) (Loc) (T) (Tpt) (W)(Wp)
12 114	(vi)	Cutting or breaking away heads of piles to required levels shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (T) (Tpt) (W) (Wp)	48 107	(c)	Cutting or breaking away heads of piles to required levels shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (T) (Tpt) (W) (Wp)
12 115	(vii)	Trial piles shall be given separately stating the position of each (Acc) (D) (Enu) (Loc) (T) (Tpt) (W) (Wp)	48 108	(d)	Trial piles shall be given separately stating the position of each and the length to be driven. (Acc) (D) (Enu) (Loc) (T) (Tpt) (W) (Wp)
12 116	(viii)	In view of the possibility of certain of the piles being required to be lengthened in position, provisional quantities for this work should be given separately, and the labour and material in connections enumerated and described. (Acc) (Ad) (D) (Enu) (Loc) (P) (R) (SL) (W) (Wp)	48 109	(e)	Where there is a possibility of certain of the piles being required to be lengthened in position, provisional quantities for this work shall be given separately, and the labour and material in connections enumerated and described. (Acc) (Ad) (D) (Enu) (Loc) (P) (R) (SL) (W) (Wp)
12 117	(ix)	Steel reinforcement shall be classified and given as previously described in Clause 11	48 110	(f)	Steel reinforcement shall be classified and given as before described; forks or struts shall be enumerated and described (see clauses 20 to 24) and the weight given.
		<i>No comparable clause.</i>	49 111		If any special system of piling is required the general principles given above shall apply; in the case of cylinder sinking the total quantity of excavated material brought to the surface for removal shall be given in yards cube.
		BRICKLAYER			BRICKLAYER
29 1	1	The desc of the bricks and of the mortar to be used tb given, also the nature of the bond.	1 1	(a)	The description of the bricks, mortar and bond to be used shall be given.
		<i>No comparable clause.</i>	1 2	(b)	The general height to which the brickwork rises shall be stated
29 2	2	Brickwork generally shall be given in rods superficial of 272 ft reduced to 1 ½ bricks thick, or in yds sup reduced to 1 brick thick, or in the case of work exceeding 3 ½ bricks thick the quantity may be given in yds cu. Brickwork in retaining walls	1 3	(c)	Brickwork generally shall be given in rods superficial of 272 feet reduced to 1 ½ bricks thick, or in yards superficial reduced to 1 brick thick, or in the case of work exceeding 3 ½ bricks thick the quantity may be given in yards cube. (Enu)

		shall be separately given.(Enu) (Loc) (W) (SL)			
29 3	3	Where it is necessary for the work to be executed 'overhand', it shall be so stated. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	1 4	(d)	Where it is necessary for the work to be executed overhand, it shall be given separately and so described. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
29 4	4	All half brick walls shall be given in feet or yards superficial, also one-brick walls if faced or finished fair on both sides.	1 5	(e)	All half brick walls shall be given in feet or yards superficial, also one-brick walls if faced or finished fair on both sides.
		<i>No comparable clause.</i>	1 6	(f)	Brickwork in very small quantities, such as brick supports to sinks, &c., shall be given separately.
		<i>No comparable clause.</i>	1 7	(g)	All labours to existing work shall be given separately and so described.
30 5	1	If footings are required under the London Building Act or the By-Laws of any Local Authority, they shall be msd in accordance therewith & inc with gen bkk. (Loc)	3 8		Footings where required shall be measured and included with the general brickwork. (Loc)
31 6	1	All ddts tb msd the net sizes of openings and recesses, inc the extra width of internal reveals, but no ddt tb made for the ends of lintels, steps, and sills in walls. (D) (Loc) (MsA) (N) (W) (Wp)	2 9	(a)	All deductions shall be measured the net sizes of the openings and recesses, including the extra width of internal reveals (D) (Loc) (MsA) (N) (W) (Wp)
31 7	2	No ddt shall be made for strings, sills, lintels, and the like not exceeding 3 ins. thick. (N) (Loc)	2 10	(c)	No deduction shall be made for strings, sills, lintels, and the like not exceeding 3 ins in height (N) (Loc)
31 8	3	Deductions shall be made for stonework, terra cotta work, and concrete lintels above 3 ins. in height. (N)	2 11	(b)	Deductions shall be made for stonework, terra cotta work, and concrete lintels which exceed 3 ins. in height. (N)
32 9	1	Brickwork in backing to Masonry shall be given separately and so described, and the description shall include all cutting and waste for bonding. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (O) (W) (Wp)	4 12		Brickwork in backing to Masonry shall be given separately and so described, and the description shall include all cutting and waste for bonding. Alternatively, the brickwork shall be added in the general work and a superficial item given of labour and waste, cutting and bonding brickwork to back of stone. . (Acc) (Cut) (D) (Enu) (Inc) (Loc) (O) (W) (Wp)

33 10	1	Brickwork in underpinning shall be given separately and so described. (Acc) (D) (Enu) (Loc) (W) (Wp)	5 13	(a)	Brickwork in underpinning shall be given separately and so described. (Acc) (D) (Enu) (Loc) (W) (Wp)
33 11	2	Wedging up on top of underpinning shall be given in ft sup and desc.(Acc) (D) (Enu) (Inc)(Loc) (W) (Wp)	5 14	(b)	Wedging up on top of underpinning shall be given in feet superficial and described. (Acc) (D) (Enu) (Loc) (W) (Wp)
34 12	1	Rough cutting shall be given in ft sup and include waste. The cuttings to various kinds of bkk shall be given sep.(Acc) (Cut) (D) (Enu) (Loc) (O) (W) (Wp)	17 15		Rough cutting shall be given in feet superficial and shall include waste. The cuttings to various kinds of brickwork shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (O) (W) (Wp)
35 13	1	Bedding plates and sleepers on top of walls tb given in ft run, unless msd in with the bkk; if more than 4 ½ ins, on bed, the width shall be stated.(Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	32 16		Bedding plates and sleepers on top of walls shall be given in feet run, unless measured in with the brickwork; if more than 4 ½ ins, on bed, the width shall be stated. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
36 14	1	Brickwork in raising old walls or on girders shall be given separately, and the height at which the same commences shall be stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	6 17	(a)	The necessary scaffolding for building bkk in raising or off girders tb given in ft run stating the ht above ground at which bkk commences. This shall only be given in cases where there is no bkk immediately below the girders and it shall not apply in the case of steel framed buildings. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
36 15	2	The preparation of tops of old walls for raising shall be given in feet superficial. (Acc) (D) (Enu) (Inc) (Loc) (O) (T) (W) (Wp)	6 18	(b)	The preparation of tops of old walls for raising and the thick bed to flush up the rivet heads, where raising is off girders, shall be given in feet superficial. (Acc) (D) (Enu) (Loc) (O) (T) (W) (Wp)
37 16	1	All brickwork more than 40 ft. 0 ins. above ground level shall be given separately, or an item of extra hoisting given in stages of 20 ft. 0 ins.: otherwise the height of the eaves above ground level and the extreme height to which the brickwork rises shall be stated. (Loc) (Alt)			<i>See clause 1 (b) above and clause 2 (b) of Preliminaries.</i> (Loc) (Alt)
38 17	1	Brickwork in hollow walls shall be given in feet or yards superficial, the thickness of the inner and outer brickwork and the width of the cavity shall be stated; the description and disposition of the ties or the number per yard superficial shall be given. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	7 19	(a)	Brickwork in hollow walls shall be given in feet or yards superficial and the thickness of the inner and outer brickwork and the width of the cavity shall be stated; the description and disposition of the ties or the number per yard superficial shall be given. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)

38 18	2	Alternatively brickwork in hollow walls may be measured net, i.e. exclusive of the cavity and added to the general brickwork, in which case forming the cavity shall be given in superficial yards and shall include the ties, stating their disposition or the number per yard superficial. (Alt) (D) (O) (Inc)	7 20	(c)	Alternatively brickwork in hollow walls may be measured by giving the inner and outer walls as separate items in conformity with Clause 1 (c) and 1 (e), in which case the forming of the cavity shall be given in yards superficial and shall include the ties stating their disposition or the number per yard superficial. In all cases brickwork in hollow walls shall be so described, and shall be given separately from solid brickwork. (Alt) (D) (O) (Inc)
38 19	3	Where the cavity is closed against openings, at ends and the like, the closing shall be given in feet run and the material described. (C) (Enu) (Loc) (IW)	7 21	(b)	Where the cavity is closed against openings, at ends and the like, an item of closing same shall be given in feet run and the material described. (C) (Enu) (Loc) (IW)
39 20	1	Brickwork circular on plan shall be measured the mean length of the wall and shall be described as 'to quick sweep' if to 6 ft. 0 ins. radius or under, and 'to flat sweep' if over 6 ft. 0 ins. radius, and shall include all cutting and waste and templates. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (T) (W) (Wp)	8 22	(a)	Brickwork circular on plan shall be measured the mean length of the wall and shall be described as to quick sweep if to 6 feet radius and under, and to flat sweep if over 6 feet radius; the description shall include all cutting and waste and templates. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (T) (W) (Wp)
39 21	2	When brickwork is circular on one face only, an item of circular rough face of brickwork shall be given in yards superficial, the radius stated and all cutting and waste included. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)	8 23	(b)	When brickwork is circular on one face only, an item of circular rough face of brickwork shall be given in yards superficial stating the radius and including all cutting and waste. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)
39 22	3	Polygonal walls shall be measured the mean length, and squints and birdsmouths measured as hereinafter described (see clause No. 49). (Acc) (Cut) (D) (Enu) (T) (W) (Wp)			<i>No comparable clause.</i>
40 23	1	Tapered walls and walls with one battering face shall be measured the mean thickness of walls and added to the general brickwork. An item of cutting and waste shall be given in feet superficial, stating the rate of taper or batter per foot in length or height as the case may be. (Acc) (Cut) (D) (Enu) (R) (T) (W) (Wp)	9 24		Tapered walls and walls with one battering face shall be measured the mean thickness and added to the general brickwork. An item of cutting and waste shall be given in feet superficial stating the rate of taper or batter per foot in length or height as the case may be. (Acc) (Cut) (D) (Enu) (R) (T) (W) (Wp)

41 24	1	Walls built battering shall be given separately and so described. Rough cutting shall be measured at each change of direction. (Acc) (Cut) (D) (Enu) (R) (T) (W) (Wp)	10 25		Walls built battering shall be given separately and so described. Rough cutting shall be measured at each change of direction. (Acc) (Cut) (D) (Enu) (R) (T) (W) (Wp)
42 25	1	Thickening old walls shall be given separately in feet superficial and the thickness stated. Chimney breasts and piers built against old walls shall be measured in a similar manner and given separately. If any special method of bonding is specified it shall be stated and the extra brickwork added, otherwise a quarter of a brick (2 ¼ ins.) shall be added to the net thickness and the cutting, tothing and bonding included in the description. (Acc) (Cut) (D) (Enu) (T) (W) (Wp)	11 26		Thickening old walls shall be given separately in feet superficial and the thickness stated; chimney breasts and piers built against old walls shall be measured in a similar manner and given separately. If any special method of bonding is specified it shall be stated and the extra brickwork added, otherwise a quarter of a brick (2 ¼ ins.) shall be added to the net thickness and the cutting tothing and bonding included in the description. (Acc) (Cut) (D) (Enu) (T) (W) (Wp)
43 26	1	(i)Brickwork in filling in openings shall be given separately and so described (Acc) (Cut) (D) (Enu) (T) (W) (Wp)	12 27		(i)Brickwork in filling in openings shall be given separately and so described; (Acc) (Cut) (D) (Enu) (T) (W) (Wp)
43 27	1	(ii)and any levelling and any tothing and bonding and pinning up to old shall be measured and given in feet superficial (Acc) (Cut) (D) (Enu) (T) (W) (Wp)	12 28		(ii)any levelling and preparing sill of opening and tothing and bonding and pinning up to old shall be measured and given in feet superficial or in feet run stating the thickness. (Acc) (Cut) (D) (Enu) (T) (W) (Wp)
44 28	1	Rough arches in walls shall be enumerated as an extra over ordinary brickwork, stating the thickness of the wall, the mean girth and the number of rings in height; alternatively, the rough cutting around shall be given in feet superficial. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp) <i>No comparable clause.</i>	36 29	(a)	Rough relieving arches shall be enumerated as an extra over ordinary brickwork stating the thickness of the wall, the mean girth and the number of rings in height. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)
			36 30	(b)	Rough discharging arches shall be measured the mean girth and given in feet run stating the height of the face and the width of the soffit. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)
45 29	1	Trimmer arches shall be enumerated or given in feet superficial, the thickness stated and the skewbacks given in feet	19 31		Trimmer arches shall be given in feet superficial stating the thickness; the skewbacks shall be given in feet run. Alternatively trimmer arches may be

		run. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)			enumerated. (Acc) (Cut) (D) (Enu) (Rad) (T) (W) (Wp)
46 30	1	Brickwork in vaulting shall be given separately in feet or yards superficial and described and all cuttings measured. Cuttings to groin points, intersections and next ribs shall be given in feet run, stating the thickness of the vaulting and shall include waste. (Acc) (Cut) (D) (Enu) (Loc)(IW) (Sh) (SL) (T) (W) (Wp)	13 32		Brickwork in vaulting shall be given separately in feet or yards superficial and described. Cutting and waste to groin points, intersections, or against ribs shall be given in feet run, stating the thickness of the vaulting. (Acc) (Cut) (D) (Enu) (Loc)(IW) (Sh) (SL) (T) (W) (Wp)
47 31		(i)Projections for plinths, pilasters, aprons, friezes and the like of less than 4 ½ ins. shall be given in feet or yards superficial as extra labour and materials, stating the thickness. Where over 4 ½ ins. and not of brick size they shall be measured the net projection, and added to the general brickwork, and rough cutting taken. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	18 33	(a)	Projections of less than 4 ½ inches for plinths, pilasters, aprons, friezes, and the like shall be given in feet or yards superficial as extra labour and materials stating the projections. Where 4 ½ inches or over they shall be measured the net projection and added to the general brickwork; if not of brick size rough cutting shall be measured. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)
	32	(ii)Oversailings shall be given in feet run for extra labour and the material added to the general brickwork, or an item of labour and materials given in feet run stating the height and the projection. (Acc) (Alt) (C) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	18 34	(b)	Oversailings shall be given in feet run for extra labour and the material added to the general brickwork; alternatively an item of labour and materials may be given in feet run stating the height and the projection. (Acc) (Alt) (C) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)
48 33	1	An item of cutting and waste in forming reveals (for those which are not multiples of 4 ½ ins.) shall be given in feet run. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (SL) (T) (W) (Wp)	24 35		An item of cutting and waste in forming reveals shall be given in feet run for all those which are not multiples of 4 ½ inches. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (SL) (T) (W) (Wp)
49 34	1	All squints and birdsmouths to be given in ft run & desc as 'rough' or 'fair' as the case may be, desc of the bks given and if reqd to be purpose made it shall be so stated.(see also clause 76(i) below) (Acc)(Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	25 36	(a)	All squints and birdsmouths shall be given in feet run and described as rough or fair as the case may be, the description of the bricks shall be given stating if these are required to be purpose- made. (see on, clause 48.) (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)

49 35	2	Splays and rdd angles tb given in ft run & width of splays and girth of Ls stated.(Acc)(Cut)(D) (Enu) (IW)(Loc)(Ls)(SL)(T)(W) (Wp)	25 37	(b)	Splays and rounded angles shall be given in feet run and the width of splays and girth of angles stated.(Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
50 36	1	Fair face of brickwork shall be measured on all exposed faces, the pointing described, and the quantity given in yards superficial.(Acc) (D) (DW) (Enu) (Loc) (SL) (W) (Wp)	14 38		Fair face of brickwork shall be measured on all exposed faces, the pointing described, and the quantity given in yards superficial. Arches in fair faced work shall be measured as described in clause 45.(Acc) (D) (DW) (Enu) (Loc) (SL) (W) (Wp)
		<i>No comparable clause.</i>	15 39		Where grooved bricks are to be used for plaster surfaces the area shall be given in yards superficial.
51 37	1	Limewhiting shall be given in yds sup & desc. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	16 40		Limewhiting shall be given in yards superficial and described. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
52 38	1	Where new walls are bonded to old an allowance of 2 ¼ ins. shall be made on the length, and an item of cutting and toothing and bonding new wall to old shall be given in feet superficial, or in feet run stating the thickness of the new wall. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	26 41		Where new walls are bonded to old an allowance of 2 ¼ ins. shall be made on the length, and an item of cutting and toothing and bonding new wall to old shall be given in feet superficial, alternatively this may be given in feet run stating the thickness of the new wall. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
52 39	2	Chasing in the edges of conc or other partitions to bkk tb desc & given in ft run & the width stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	27 42		Chases in brickwork for the edges of concrete or other partitions shall be described and given in feet run stating the thickness of the partition. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
52 40	3	Raking out jts of bkk and hacking face of wall to form key shall be given in yds sup. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	20 43		Raking out joints of brickwork and hacking face of wall to form key shall be given in yards superficial. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
53 41	1	Bkk in beam filling tb inc with general bkk. The labour of beam filling including cutting tb given in ft run stating the thickness of the wall. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)	22 44		Brickwork in beam filling shall be included with the general brickwork; the labour of beam filling shall be given in feet run stating the thickness of the wall and including the cutting (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	23 45		Plumbing to angles shall be measured to all external angles in faced brickwork and shall be given in feet run. (Inc)

54 42	1	Cutting and fitting brickwork up to or around steel joists, girders and stancheons shall be given in feet run, the sizes stated and the nature of the cutting and fitting described. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)	30 46		Cutting and fitting brickwork up to or around steel joists, girders, and stanchions shall be given in feet run stating the sizes and describing the nature of the cutting and fitting; alternatively this may be given in feet superficial. (Acc) (Alt) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)
55 43	1	Raking out for and pointing flashings shall be given in feet run; that for stepped flashings and for work in old walls shall be given separately. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)	31 47		Raking out for and pointing flashings shall be given in feet run; that for stepped flashings and for work in old walls shall be given separately. For wedging see Plumber, clause 1 (f). (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)
56 44	1	Chases n.e. 9 ins. x 4 ½ ins. for pipes, wires, or ducts to be given in feet run, the size and whether vert, horiz or raking stated; those ex 9 ins. x 4 ½ ins. and n.e. 1 ft. 6 ins. x 4 ½ ins. shall not be msd nor the voids ddt (Acc) (Cut) (D) (Enu) (Loc) (R) (SL) (T) (U) (W) (Wp)	28 48	(a)	Chases or ducts for pipes, wires, and the like shall be given in feet run stating the size; vertical, horizontal, or raking chases shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (R) (SL) (T) (W) (Wp)
56 45	2	Chases left for edges of landings or concrete floors shall be given in feet run, the depth into the wall and the thickness of the floors or landings stated, and no deduction of brickwork shall be made. (Acc) (C) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)	28 49	(b)	Chases for edges of concrete floors or landings shall be given in feet run, stating the thickness; no deduction of brickwork shall be made for such chases. (Acc) (C) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	28 50	(c)	Cutting chase for turning in edge of asphalt and pointing shall be given in feet run. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
57 46	1	Cutting and pinning edges of landings shall be given in feet run and the depth into the wall and the thickness stated. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (N) (O) (SL) (W) (Wp)	29 51		Cutting and pinning edges of landings shall be given in feet run and the thickness stated. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (N) (O) (SL) (W) (Wp)
58 47	1	Parging and coring flues shall be enum. Special arrangements for forming throats or wind bafflers shall be enum and desc. No ddt of bkk shall be made for flues of smaller size than 1 ft. 6 ins. x 1 ft. 6 ins. (Acc) (D) (Enu) (Loc) (N) (R) (SL) (T) (W) (Wp)	40 52		Parging and coring flues shall be enumerated. Special arrangements for forming throats or wind bafflers shall be enumerated and described. No deduction of brickwork shall be made for flues of smaller size than 1 ft. 6 ins. x 1 ft. 6 ins. (Acc) (D) (Enu) (Loc) (N) (R) (SL) (T) (W) (Wp)

59 48	1	Brick pavings shall be given in yards superficial, and shall include all straight cutting and waste up to walls. If laid to pattern it shall be so stated. Straight cutting up to channels and the like, and raking and circular cutting and waste shall be given in feet run. (Acc) (Cut) (D) (Enu) (Loc) (N) (Pat) (R) (Rad) (SL) (T) (W) (Wp)	35 53	(a)	<i>For brick pavings see Pavior, clause 6.</i>
		<i>No comparable clause.</i>	35 54	(b)	Brick steps shall be described and given in feet run including all labour and material and stating the width and height; circular steps shall be given separately stating the radius. Fair ends, angles, &c., shall be enumerated. . (Acc) (Cut) (D) (Enu) (Ls) (Loc) (N) (Pat) (R) (Rad) (SL) (T) (W) (Wp)
60 49	1	Horizontal damp-proof courses, except in asphalte (see clause 90) shall be described and given in feet superficial. (D) (Enu) (Ls) (Loc) (N) (SL) (W) (Wp)	21 55	(a)	Horizontal damp-proof courses exceeding 4 ½ inches in width shall be described and given in feet superficial; those 4 ½ inches wide shall be given in feet run. (For asphalte damp-proof courses see Asphalter clause 2.) (D) (Enu) (Ls) (Loc) (N) (SL) (W) (Wp)
60 50	2	Vertical damp-proof linings shall be described and given in yards superficial. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 56	(b)	Vertical damp-proof linings shall be described and given in yards superficial. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
60 51	3	Damp-proof courses or linings on circular walls both horizontal and vertical shall be given separately. (D) (Enu) (Ls) (Loc) (N) (R) (SL) (T) (W) (Wp)	21 57	(c)	Damp-proof courses or linings on circular walls both horizontal and vertical shall be given separately and so described (D) (Enu) (Ls) (Loc) (N) (R) (SL) (T) (W) (Wp)
60 52	4	Damp-proof courses in underpinning shall be given separately and so described. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 58	(d)	Damp-proof courses in underpinning shall be given separately and so described. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
60 53	5	All work done overhead shall be given separately and so described. (Acc) (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 59	(e)	All work done overhead shall be given separately and so described (Acc) (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
61 54	1	Hoop iron bond and building in shall be given in yards run, the gauge, the width, and the total weight shall be stated. If tarred and sanded, it shall be so	34 60		Hoop iron and similar metal bonds and building in shall be described and given in yards run. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)

		described (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp) (Wt)			
		No comparable clause.	37 61		Brick fireplaces shall be measured in detail, and given under a separate heading. (D) (Enu) (Ls) (Loc) (N) (Rad) (SL) (T) (W) (Wp)
		No comparable clause.	38 62		Hearths shall be given in feet superficial stating the number; the screeded bed (if any) shall be given separately. (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
62 55	1 & 2	Setting stoves, grates, and ranges shall be enumerated and shall include all materials. The depths and the average widths of openings formed shall be stated, and the description of stoves, grates and ranges given. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)	39 63	(a)	Setting stoves, grates, mantels, and ranges shall be enumerated and type fully described; the size of the opening in all cases shall be stated. The description shall include for all concrete and brick backings required for setting. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)

62 56	(3)	Setting ranges shall incl forming flues, also any attendance on Hot Water Fitter. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)			See 39 (d)
62 57	(4)(i)	Setting stoves shall include fixing tiles which form part of the stove, (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)			See 39 (b)
62 58	(4)(ii)	but independent tile surrounds to be as desc in 'Plasterer'. (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)			
		No comparable clause	39 64	(b)	The descriptions for setting tile, marble and other surrounds shall state whether slabbed or built up in position, and in either case shall include for cement and sand for fixing and cleaning off and

					washing down on completion. (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
		See 62 (4)(ii) above	39 65	(c)	Tiling to recesses for portable grates, &c., shall be given in feet superficial and described; the screeded bed for same shall be measured separately and it shall be so stated. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
		Partly included in clause 62.1 above. Mention of the hot water fitter in that clause may have been enough to indicate a back boiler	39 66	(d)	The description for setting ranges shall include for setting back boiler (if any) and for forming all short flues and fixing covings. Soffit plates, dampers, &c.; connections of hot water pipes to boiler shall be measured, described, and given separately in the hot water fitter's work. The cutting away for hot water pipes shall be given as hereinafter described. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)
62 59	2	Setting coppers shall be enumerated, stating the size of the pan, and shall include building in ironwork and forming flues. The over-all size of brickwork and finish of same shall be stated, and if circular it shall be so described. (Acc) (D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp) (Wt) No comparable clause	39 67 39 68	(e) (f)	The descriptions for setting portable stoves, coppers, &c., shall include placing in position and the length and diameter of flue pipe shall be stated; the connections with brick flue shall be given separately. (Acc) (D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp) (Wt) Fixing mantels shall be given separately and described. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
63 60	1	(i) Bedding and pointing frames shall be enumerated, keeping door and window frames separate, and stating if pointed on one or both sides and whether	33 69		The bedding and pointing of wood frames shall be given in feet run stating if pointed on one or both sides; where sills are bedded in a different material these shall

63 61	1	<p>to brick or stone reveals; the description of bedding sills of window frames shall be given. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p> <p>(ii) Building in iron windows shall be enumerated, describing the fixing and the pointing around. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p> <p>(iii) Wood or iron frames over 24 ft. 0 ins. superficial shall be described as 'large', those over 36 ft. 0 ins. superficial as 'extra large', those over 54 ft. 0 ins. superficial shall be given separately and the sizes stated.</p>			<p>be given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p> <p><i>See clause 41 (a) below</i></p> <p><i>See Joiner clause 18(a) and Bricklayer 41(a)</i></p>
63 63	2	<p>(i) Building in iron doors and frames shall be enum, stating if on runners or on hinges and if pointed one or both sides, also the sizes to be given & method of fixing desc. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>	41 70	(a)	<p>The fixing of metal window and door frames shall be enumerated stating the sizes; the description shall include for cutting and pinning lugs and for bedding and pointing, stating if pointed one or both sides. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>
63 64	2	<p>(ii) The length and description of runners to sliding doors and the fixing of same shall also be given (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>	41 71	(b)	<p>The fixing of runners to sliding doors and shutters shall be enumerated and described stating the length and the method of fixing. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>
63 65	3	<p>Fixing doors and frames of safes shall be enumerated, and the size and approximate weight and the method of fixing given; if pointed around one or both sides it shall be so stated. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>	00000 41 72	(c)	<p>(i) Fixing doors and frames of safes shall be enumerated and described stating the size, approximate weight, the method of fixing and if pointed around one or both sides;</p> <p>(Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)</p>
63 66	4	<p>The different floors upon which iron or safe doors are fixed shall be stated. (SL)</p>	41 73	(c)	<p>ii) the different floor levels at which iron or safe doors are to be fixed shall also be stated. (SL)</p>

64 67	1	Cutting and pinning or building in ends of timbers, steps, steel joists, &c., shall be enumerated, no deduction of brickwork being made for these. If in fair brickwork or in old walls it shall be so stated (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	42 74	(a)	Cutting and pinning or building in ends of timbers, lintels, steps, steel joists, brackets, &c., shall be enumerated except where no deduction has been made under Clause 2 (c); if in faced brickwork or in old walls they shall be so described and given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)
64 68	2	Ends of steel joists exceeding 10 ins. x 6 ins. section shall be described as 'large'. The size of riveted girders shall be stated.	42 75	(c)	Cutting and pinning or building in ends of steel joists shall be given in stages as follows:- Those not exceeding 6 inches in depth, those exceeding 6 inches and not exceeding 12 inches in depth, and continuing in stages of 6 inches in depth.
64 69	3	Ends of floor joists built in walls shall not be enumerated or given.	42 76	(b)	Ends of floor joists built in walls shall not be enumerated or given.
64 70	4	Holes through walls for pipes and making good shall be enumerated, the thickness of walls stated, and if in faced brickwork the facing described. Those for pipes exceeding 3 ins. diameter shall be given as 'holes for large pipes'. Those in old walls shall be given separately. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)	42 77	(d)	Holes through walls for pipes shall be enumerated and described stating the thickness of walls, the finish to both sides of the wall, and including the making good. Holes for pipes not exceeding 2 inches in diameter shall be described as for small pipes, those for pipes exceeding 2 inches and not exceeding 4 inches diameter as for large pipes, and in the case of holes for pipes exceeding 4 inches diameter the diameter shall be specifically stated. Holes in old walls shall be given separately and so described. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
64 71	5	Eyelets in walls for pipes shall be enumerated, the internal diameter, number of rings, and thickness of walls stated, and if in fair brickwork shall be so	42 78	(e)	Eyelets in walls for pipes shall be enumerated stating the internal diameter, number of rings, and thickness of walls; those in fair brickwork shall be given

		described. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)			separately and so described. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
64 72	6	Air bricks and the building in of ventilating gratings, soot doors &c., shall be enumerated, the thickness of wall in which they are built, the forming of the opening behind same, the lintel and the size thereof, and the shape and finish of the opening shall be described. No deductions shall be made in brickwork for gratings not exceeding 1 ft. 6ins x 1 ft. 6 ins. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	42 79	(f)	Air bricks and the building in of ventilating gratings, soot doors &c., shall be enumerated stating the thickness of wall in which they are built; the forming of the opening behind same, the lintel and the size thereof, and the shape and finish of the opening shall be described. No deductions shall be made in brickwork for gratings not exceeding 1 ft. 6ins x 1 ft. 6 ins. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)
64 73	7	Chimney pots with their setting and flaunching shall be enumerated and described. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp) (Wt)	42 80	(g)	Chimney pots shall be enumerated and described including the setting and flaunching. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp) (Wt)
		<i>No comparable clause.</i>	43 81	(a)	Partitions formed of slabs, concrete blocks, hollow tiles, or patent blocks shall be measured net as fixed and given in yards superficial; the description shall state the thickness and finish of the blocks and the setting mortar. Cutting and pinning at top, cutting at ends, and cutting and bonding to walls, intersections, angles and irregular angles shall be given in feet run; raking and circular cutting shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (R) (Rad) (SL) (T) (W) (Wp)
		<i>No comparable clause.</i>	43 82	(b)	Forming of openings shall be enumerated. (Cut) (D) (Enu) (Loc) (T) (W) (Wp)

	Facings, Arches, &c.			Facings, Arches, &c.
74	(i) Where the term 'extra' or 'extra only' is used, it shall mean extra only over the general brickwork unless otherwise stated. Facings shall be measured on the whole of the faces of walls exposed and the bond described. (EO)			All facings shall be measured to the whole of the faces of walls exposed to view as extra only over common brickwork and shall be given in feet or yards superficial and include the pointing. The nature of the bricks, the pointing, and the bond shall be described. (DW) (EO) (Enu) (Loc) (T) (W) (Wp)
75	(ii) Battering facing shall be given separately and the batter described. (R)			
76				
77	(iii) Circular facings shall be given separately and the radius stated. (Rad)			
78	(iv) All purpose-made bricks shall be so described. (Sh)			
	(v) Where it is necessary for the work to be executed 'overhand', it shall be so stated. (Acc) (Ad) (Enu) (SL) (W) (Wp)			
	<i>Included in 65.1.(v) above.</i>	44 84	(b)	Where it is necessary for the work to be executed overhand the facings shall be given separately and so described. (Acc) (Ad) (Enu) (SL) (W) (Wp)
	<i>Included in 65.1.(ii) above.</i>	44 85	(c)	Battering facings shall be given separately and the batter described. (R)
	<i>Included in 65.1.(iii) above.</i>	44 86	(d)	Circular facings shall be given separately and the radius stated. (Rad)

		3.7 Include d in 65.1 (iv) above	44 87	(e)	All purpose made bricks shall be so described. (Sh) (Wp)
		<i>No comparable clause.</i>	44 88	(g)	Facings to cavity and other walls where snapped headers are required shall be given separately and so described. (Cut) (Wp)
66 79	1	Facing with bricks of a different description from those used in the body of the walls, or with bricks picked for the purpose, shall be given in feet or yards superficial as an extra over the general brickwork, and shall include pointing which shall be described. (DW) (EO)	44 89	(h)	Facing with bricks differing in sizes from the general building brick shall be given separately and the size stated. (D) (Wp)
66 80	2	Returns of facings into reveals shall be measured the net width and shall be given in feet run and the width stated. (D) (Ls) (N) (Wp)	44 90	(f)	Facings to reveals and returns 9 inches wide and under shall be measured the net width and given in feet run; the description shall state the width and include the plumbing to the angle. (D) (Ls) (N) (Wp)
66 81	3	Facings in bands differing from the general facing and not exceeding four courses in height, and facings in small panels, shall be given separately and so described (D) (Sh) (Wp)	44 91	(i)	Facings in bands differing from the general facing and not exceeding four courses in height, and facings in small panels, shall be given separately and so described. (D) (Sh) (Wp)
67 82	1	Arches shall be measured net on face and soffit and given in feet superficial and described. (Acc) (D) (Enu) (Sh) (SL) (W) (Wp)	45 92	(a)	Arches shall be measured net on face and soffit and described and given in feet superficial. (Acc) (D) (Enu) (Sh) (SL) (W) (Wp)

67 83	2	Arches of differing shapes and flewing arches shall be given separately and described. (Acc) (D) (Enu) (Sh) (SL) (W) (Wp)	45 93	(b)	Arches of varying shapes and types and arches of purpose-made bricks shall be given separately and described. (Acc) (D) (Enu) (Sh) (SL) (W) (Wp)
		<i>No comparable clause, but could be deemed to be included in 67(2) above.</i>	45 94	(c)	Arches of unusual outline shall be enumerated. (Acc) (D) (Enu) (Sh) (SL) (W) (Wp)
68 84	1	Raking, skew back, and circular cutting shall be given in feet run and shall include waste. Such cutting shall be taken to include cutting back 4 ½ ins. into thickness of the wall. Any cutting beyond this shall be measured as rough cutting. Skew backs to fair arches shall be given as fair cutting. (Acc) (Cut) (D) (Enu) (R) (Rad) (Sh) (SL) (W) (Wp)	47 95	(a)	Fair cutting shall be given in feet run and shall include waste; such cutting shall be taken to include cutting back 4 ½ inches into thickness of wall and any cutting beyond this shall be measured as rough cutting. Skew backs to fair arches shall be given as fair cutting. (Acc) (Cut) (D) (Enu) (R) (Rad) (Sh) (SL) (W) (Wp)
68 85	2	Fair cutting shall be measured up to bonded stone or terra cotta quoins which are not multiples of 4 ½ ins. on face, otherwise no cutting shall be measured up to square stone dressings. Where panels are formed of bricks of a different description from that of the general facing, causing a vertical straight joint, an item of straight cutting and waste shall be given in feet run. (Acc) (Cut) (D) (Enu) (SL) (W) (Wp)	47 96	(b)	Fair cutting shall be measured up to stone or terra cotta dressings. Where panels are formed of stone or bricks of a different description from that of the general facing causing a vertical straight joint, an item of fair cutting shall be given in feet run. (Acc) (Cut) (D) (Enu) (SL) (W) (Wp)
68 86	3	Cuttings against mouldings shall be enumerated and the girth of moulding stated. (Acc) (Cut) (D) (Enu) (Sh) (SL) (W) (Wp)	47 97	(c)	Cuttings against mouldings shall be enumerated and the girth of moulding stated. (Acc) (Cut) (D) (Enu) (Sh) (SL) (W) (Wp)

69 87	1	Plain oversailing and set-back courses shall be given in feet run, the number of courses and the projection shall be described and the angles enumerated. Over-sailing and set-back courses to chimney stacks shall be given separately. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)	50 98	(a)	Plain oversailing and set back courses shall be given in feet run and described stating the number of courses and the total projection (see clause 18); angles in same shall be enumerated. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)
69 88	2	Dentil courses formed by setting back or setting forward the bricks shall be given in feet run, stating the spacing and enumerating the angles. (Acc) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)	50 99	(b)	Dentil courses formed by setting back or setting forward the bricks shall be given in feet run, stating the spacing; angles shall be enumerated.. (Acc) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)
70 89	1	Projecting plinth courses, strings, cornices, &c., shall be given in feet run, and the number of courses and the projection described. Those to chimney caps shall be given separately. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)	51 100	(a)	Projecting plinth courses, strings, cornices, &c., shall be given in feet run, and the number of courses and the projection described. . (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)
70 90	2	Mouldings shall be described as 'moulded' or cut and rubbed' as the case may be. If built of all headers this shall be stated. (Sh)	51 101	(b)	Mouldings shall be described as 'special made' or cut and rubbed' as the case may be. If built of all headers this shall be stated. (Sh)
70 91	3	All mitres, stoppings, returned ends, &c., to the foregoing shall be enumerated, giving external and internal and irregular angles separately. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)	51 102	(c)	All mitres, stoppings, returned ends, &c., to the foregoing shall be enumerated, giving external and internal and irregular angles separately. . (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)

70 92	4	All circular strings, cornices, &c., shall be given separately and described. (Acc) (Cut) (D) (Enu) (Ls) (Rad) (Sh) (SL) (W) (Wp)	51 103	(d)	All circular strings, cornices, &c., shall be given separately and so described. (Acc) (Cut) (D) (Enu) (Ls) (Rad) (Sh) (SL) (W) (Wp)
71 93	1	Pilasters in facings 14 ins. wide and under shall be given separately in feet run, and the projection stated. (Acc) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)			<i>See Clause 59(a)</i>
72 94	1	Aprons in facings shall be given in feet superficial and the projection stated. The returns shall be given in feet run. Shaping edges of aprons shall be enumerated or given in feet run and shall include all cutting; if enumerated, the girth of cutting shall be stated. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)	46 104		Aprons in facings shall be given in feet superficial and the projection stated (see clause 18); the returns shall be given in feet run. Shaping edges of aprons shall be given in feet run and shall include all cutting; alternatively the shapings may be enumerated stating the girth. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (W) (Wp)
		<i>See clause 49 (of SMM1/2</i>	48 105	(a)	Squints and birdsmouths shall each be given in feet run. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp) <i>(see also clause 25 Bricklayer of this edition).</i>
		<i>See clause 76 (i) below</i>	48 106	(b)	Splays, rounded angles, and moulded angles shall be given in feet run and the width, radius, or girth stated; stops, angles &c., shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (SL) (T) (W) (Wp)
73 95	1	Notches and perforations for pipes through projecting courses shall be enumerated, stating the number of courses through which the pipe passes and the	53 107		Notches and perforations for pipes through projecting courses shall be enumerated stating the number of courses through which the pipe passes and the

		diameter of the pipe. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			diameter of the pipe.(Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
74 96	1	Flush quoins formed with bricks of a different description from those of the general facings shall be given in feet run (each face being measured), stating the average width and whether bonded into the general facings or with a straight joint to same; if cut and rubbed they shall be so described. Projecting quoins shall be similarly measured and given (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	49 108	(a)	Flush quoins formed with bricks of a different description from those of the general facings shall be given in feet run (each face being measured), stating the average width and whether bonded into the general facings or with a straight joint to same; if cut and rubbed they shall be so described. Projecting quoins shall be similarly measured and given. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
74 97	2	Rustications shall be given in feet run and described. (Acc) (Cut) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)	49 109	(b)	Rustications shall be given in feet run and described. (Acc) (Cut) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)
75 98	1	Copings shall be given in feet run, with the tile creasings (one or both sides) and cement fillets where they occur. All mitres, &c., shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	52 110		Copings shall be described and given in feet run and shall include all labour and material; all ramps, angles and ends, coping cramps, &c., shall be enumerated (Acc) (Cut) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)
76 99	1	Moulded or chamfered angles shall be given in feet run and the girth or width stated. If chamfered angles exceed 14 ins. width, two squints shall be measured in lieu of the splay. All stops, mitres, &c., shall be enumerated. (Acc) (Cut) (D)			<i>See clause 48 (b) above</i>

		(Enu) (Loc) (Ls) (Rad) (SL) (T) (W) (Wp)			
77 100	1	Small items, such as key blocks, corbels, panels, under 12 ins. x 12 ins., shall be enumerated and described. Strings not exceeding 12 ins. long shall be enumerated and described complete, including the ends; also breaks around pilasters not exceeding 9 ins. wide. (Acc) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	54 111	(a)	Small items, such as key blocks, corbels, panels, under 12 inches by 12 inches shall be enumerated and described and shall include all rough and fair cuttings. Strings not exceeding 12 inches long shall be enumerated and described including the ends; breaks around pilasters not exceeding 9 inches wide shall also be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)
77 101	2	Tumblings to buttresses shall be enumerated and shall include all cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	54 112	(b)	Tumblings to buttresses shall be enumerated and shall include all cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
		Rubbed and Gauged Facings.			Rubbed and Gauged Facings
78 102	1	Clauses 65 to 77 shall apply generally to msmt of rubbed and gauged facings, The description of the setting shall be given.	55 113		Clauses 44 to 54 shall apply generally to the measurement of rubbed and gauged facings. A description of the setting shall be given,
79 103	1	Facing to niches shall be given in ft sup & radius stated. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)	56 114	(a)	Facing to niches shall be given in ft sup stating the radius. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)
79 104	2	An item of 'extl L of straight and circ facing' shall be msd at edges of niches and given in ft run. (Ls)	56 115	(b)	An item of 'external angle of straight and circular facing' shall be measured at edges of niches and given in feet run. (Ls)

79 105	3	Niche heads shall be enumerated, the shape and size stated, and the superficial area given. (Acc) (D) (Enu) (Loc) (Sh) (T) (W) (Wp)	56 116	(c)	Niche heads shall be enumerated, the shape and size stated, and the superficial area given. (Acc) (D) (Enu) (Loc) (Sh) (T) (W) (Wp)
79 106	4	Faces of arches to niche heads shall be given in feet superficial, the measurement to be the mean girth of the face. (Acc) (D) (Enu) (Loc) (Sh) (T) (W) (Wp)	56 117	(d)	Faces of arches to niche heads shall be measured the mean girth of the face and given in feet superficial. (Acc) (D) (Enu) (Loc) (Sh) (T) (W) (Wp)
79 107	5	An item of 'external angle of edge of arch and facing to niche head' shall be given in feet run. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (T) (W) (Wp)	56 118	(e)	An item of external angle of edge of arch and facing to niche head shall be given in feet run. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (T) (W) (Wp)
79 108	6	The sills of niches shall be given in ft sup, and if weathered they shall be so described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (T) (W) (Wp)	56 119	(f)	The sills of niches shall be given in feet superficial; if weathered they shall be so described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (T) (W) (Wp)
80 109	1	Bands to be given in feet run and the proj stated. All labours on same, such as weatherings, mouldings, or throatings, to be desc. Circ bands to be given sep and radius stated. Ext & int Ls, stops, and similar labours to be enum. (Acc) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)	57 120		Bands shall be given in feet run stating the projection; all labours on same, such as weatherings, mouldings or throatings shall be described. Circular bands shall be given separately stating the radius; external and internal angles, stops and similar labours shall be enumerated. (Acc) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)
81 110	1	Projecting strings and cornices, &c., shall be given in feet run, stating the height and projection and the girth of moulding. External and internal angles, stops, and similar labours shall be enum as described in clause	58 121		Projecting strings and cornices, &c., shall be given in feet run, stating the height and projection and the girth of moulding; external and internal angles, stops, and similar labours shall be enumerated as described in clause 51. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)

		70. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			
82 111	1	Square pilasters shall be measured as described in clause 71. An item of 'cutting and bonding pilaster, with the general facing at internal angle', shall be given in feet run (Acc) (D) (Enu) (Loc) (Ls) (SL) (T) (W) (Wp)	59 122	(a)	Square pilasters shall be given separately in feet run stating the projection, and shall be described as including for cutting and bonding with the general facing at internal angles. (Acc) (D) (Enu) (Loc) (Ls) (SL) (T) (W) (Wp)
82 112	2	Pilasters with an entasis and exceeding 14 ins. wide on face shall be given in feet superficial and so described. Returns to the same shall be given in feet run and the mean width stated, and shall be described as 'including the angle with front and cutting and bonding with the general facing at internal angle'. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	59 123	(b)	Pilasters with an entasis shall be given similarly and the mean width and return stated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
82 113	3	Pilasters with an entasis and not exceeding 14 ins. width shall be given in feet run and the mean dimensions on face and returns stated, and shall be described as including for angles, &c., as in the preceding paragraph. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			<i>Included in 59(b) above.</i>
83 114	1	Caps, bases and neckings to pilasters shall be enumerated, giving the extreme dimensions, the girth of moulding, and the angles and stopped ends, &c.	60 124		Caps, bases and neckings to pilasters shall be enumerated, stating the extreme dimensions, and the girth of moulding; the angles and stopped ends, &c., shall be included in the description. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)

		(Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			
84 115	1	Brickwork for carved panels, corbels, &c., exceeding 3 ft. 0 ins. superficial shall be given in feet superficial and the projection stated. The extra brickwork for the projection shall be included in the description of the item. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	61 125	(a)	Brickwork for carved panels, corbels, &c., exceeding 3 ft. superficial shall be given in feet superficial and the projection stated; the extra brickwork for the projection shall be included in the description of the item.(Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
84 116	2	Smaller items shall be enum, giving extreme sizes and proj, and shall be desc as inc extra bkk. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	61 126	(b)	Smaller items shall be enum, giving extreme sizes and proj, and shall be desc as inc the extra bkk. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
84 117	3	Work set in shellac shall be given separately and so described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	61 127	(c)	Work set in shellac shall be given separately and so described.(Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
85 118	1	Running enrichments and dentil courses shall be given in feet run and described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	62 128	(b)	Running enrichments and dentil courses shall be given in feet run and described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
85 119	2	Surface ornament shall be given in feet superficial and described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	62 129	(a)	Surface ornament shall be given in feet superficial and described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
85 120	3	Corbels and other similar items and small panels not exceeding 12 ins. x 12 ins. shall be enumerated and described. (Acc)	62 130	(c)	Corbels and other similar items and small panels not exceeding 12 ins. x 12 ins. shall be enumerated and described. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)

		(D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			
86 121	1	See 'Preliminaries', Clause 28.	63 131		See 'Preliminaries', Clause 30.
		Glazed Brick Facings.			Glazed Brick Facings.
87 122	1	Glazed brick fcgs tb msd as 'EO general bkk' unless otherwise stated, and given in ft or yds sup; colour and desc of bricks, pointing & bond tb given. 2 ¼ ins. shall be allowed on all int Ls in excess of ext Ls. (Acc) (D) (Enu) (EO) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	64 132	(a)	Glazed brick facings shall be measured and given as described in clauses 44 to 54 (b). An item of extra to cutting and waste at internal angles shall be measured at all internal angles and given in feet run. (Acc) (D) (EO) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
					<i>Note: There is no clause 64 (b) or (c), so the (a) above must have been an error.</i>
87 123	2	Walls faced both sides and ne 9 ins. in thickness tb given in ft or yds sup, inc all lab & materials. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			<i>See Clauses 1 (e) & 44 (a)</i>
87 124	3	Bands and skirtings not exceeding four courses in height shall be given in feet run or alternatively in feet superficial, and described as in bands or skirtings. (Acc) (Alt) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			<i>See clause 44(i)</i>
87 125	4	Projecting strings shall be given in feet run and described; all angles and ends shall be enumerated and described.(Acc)			<i>See clause 51 (a)</i>

		(D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)			
87 126	5	Squints and birdsmouths shall be given in feet run.			See clause 48 (a).
87 127	6	Splays, rdd Ls, and moulded Ls tb given in ft run and width, radius, or girth stated. (Ls) (Rad)			See clause 48 (b)
87 128	7	Cuttings shall be measured as described in Clause 68.			See clause 47
		Boiler Seatings and Flues, and Boiler Shafts or Stacks.			Boiler Seatings and Flues, and Boiler Shafts or Stacks.
88 129	1	All work in connection with boiler seatings & flues, & boiler shafts or stacks, shall be given separately.	65 133	(a)	All work in connection with boiler seatings and flues, and boiler shafts or stacks, shall be given separately and described
88 130	2	Brickwork in boiler seatings and flues tb measured net & given in ft or yds sup & thickness stated. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)	65 134	(b)	Brickwork in boiler seatings and flues shall be measured net and given in feet or yards superficial and the thickness stated. (Acc) (D) (Enu) (Loc) (Ls) (SL) (Sh) (T) (W) (Wp)
88 131	3	Firebrick and fireclay work shall be given separately. Boiler seating blocks and curved flue covers shall be given in feet run and all irregular pieces enumerated. (Acc) (D) (Enu) (Loc) (Rad) (SL) (T) (W) (Wp) All cuttings in bkk, firebricks, fire lumps or tiles, seating blocks, and flue covers shall be given. (Acc) (Cut) (D) (Enu)	65 135	(c)	Firebrick and fireclay work shall be given separately and so described. Boiler seating blocks and curved flue covers shall be given in feet run and all irregular pieces enumerated. (Acc) (D) (Enu) (Loc) (Rad) (SL) (T) (W) (Wp) All cuttings in brickwork, firebricks, fire lumps or tiles, seating blocks, and flue covers shall be given. (Acc) (Cut) (D)

		(Loc) (Rad) (Sh) (SL) (T) (W) (Wp)			(Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)
88 132	4	The bkk of various stages in ch shafts tb given sep, heights and thicknesses stated, & the shape of shaft desc, and if built from an outside scaffold it shall be stated. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)	65 136	(d)	The bkk of various stages in ch shafts t b given sep, the heights and thicknesses stated,& the shape of shaft desc; if built from an outside scaffold it shall be stated. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)
88 133	5	Firebrick linings shall be given in feet superficial and the thickness stated, and if bonded to the backing shall be so described. Irregular angles in firebrick linings shall be given in feet run. (Acc) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)	65 137	(e)	Firebrick linings shall be given in feet superficial and the thickness stated; if bonded to the backing they shall be so described. Irregular angles in firebrick linings shall be given in feet run. (Acc) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)

A.2. Comparison of SMM 3 and 4.

3 rd Edition, 1935			4 th Edition, 1948		
Clause	Sub-clause	Text and comments <i>Comments in italics</i>	Clause	Sub-clause	Text and comments <i>Comments in italics</i>
		<i>No comparable section</i>			General Principles
		<i>As Preliminaries clause 1 (b)</i>	1	1	BQ shall fully describe mats & wkmnship & accurately represent the wk t b executed: work which by its nature cannot be accurately measured shall be described as provisional. (D)
		<i>No comparable clause</i>	2	2	The SMM, whilst it aims at providing uniform units of measurement, is a definition of principle rather than an inflexible document. In particular and exceptional cases the Surveyor is expected to use his discretion and to adopt special methods, provided the principles of measurement laid down are observed and the intention is made clear to the estimator. If it is in the interest of accurate and practical estimating, he may give more detailed information than is demanded by strict adherence to the document
		<i>As clause 1 (c) of Prelims below</i>	4	3	Unless otherwise stated, all work shall be measured net as fixed in place (N)
		<i>As Prelims clause 1 (d)</i>	6	4	The desc given of ea item, unless otherwise stated, tb held to inc conveyance & delivery, unloading, storing, hoisting, all labour setting, fitting & fixing in pos, straight cutting & waste, ret of packings, establishment charges & profit. (Acc) (Ad) (D) (Loc) (SL)
		<i>No comparable clause</i>	7	5	All measurement of cutting shall, unless otherwise stated, be held to include for the consequent waste (Cut)
		<i>No comparable clause</i>	8	6	Where a min area is defined for ddt of voids, e.g. in the case of pavings, plastering, etc., ddt shall refer only to openings or wants detached from boundaries of the space measured. Reductions of area caused by

					projections from the boundary of the space measured shall always be the subject of deduction irrespective of size. (MsA)
		<i>No comparable clause</i>	9 7		Circular work shall be given separately; the term 'circular' shall be deemed to include any form of curve (Rad)
		<i>No comparable clause</i>	10 8		Pipes shall be desc by their int. dia unless otherwise stated. In desc of holes & painting, pipes ne 2" dia classed as small, ex 2" & ne 4" dia as large, those ex 4" tb stated (CU)
		<i>See note immediately bef 'Excavator', below</i>	11 9		All work executed in or under water tb given sep, stating whether canal river or sea water work, & giving levels of high & low water where applicable. Any work carried out in compressed air tb given sep (Ad)
		Preliminaries			Preliminaries
1 1	(b)	BoQ to fully completely & accurately represent the work tb contracted for except in the case of certain items which can only be stated as Prov. (D)			As Gen Principles clause 1 above
1 2	(c)	Unless otherwise stated, all work shall be measured net as fixed in place (N)			<i>As Gen Principles clause 4 above</i>
1 3	(d)	The desc of ea unit of msmt tb held to inc waste on mats, carriage & cartage, carrying in, ret of empties, hoisting, setting, fitting & fixing in pos & all other labour, also for establishment charges & profit ex where otherwise prov for in this Method of Msmt (Acc) (D) (Loc) (SL)			<i>As Gen Principles clause 6 above</i>
3 4	(a)	The position of the site shall be described with any particulars as to access to same; if adjacent to or butting upon old buildings or if the working space is limited, the same shall be stated. (Acc) (Loc) (Tpt) (W)	2 10	(a)	The position of the site shall be described with any particulars as to access. Attention shall be drawn to any adjacent or abutting buildings and to any limitations as to the extent and position of the working space. (Acc) (Loc) (Tpt) (W)
		<i>No comparable clause</i>	4 11	(c)	Any items affecting price which are incidental to or in amplification of such clauses shall be fully desc.
32 5	(c)	All cutting away for and making good after nominated Sub-Contractors, together with any other Contractor's work in conn, shall be given separately and in detail; alternatively this work may	27 12	(b)	General attendance upon nominated sub-contractors; This shall give particulars of any unloading, storing, hoisting, placing in position of mats., clearing away rubbish and the like,

		be dealt with by means of provisional sums (Cut) (Alt)			protecting, and other facilities to be afforded by the Contractor. Cutting away for and making good after nominal sub contracts, together with any other contracts work in connection shall be measured in detail or covered by Provisional Sums. (Cut) (Alt)
6		Work In or Under Water All work executed in or under water shall be separately given and described stating whether canal work, river work, or sea-water work, and giving the levels of High Water and Low Water (Ad)			
		EXCAVATOR			III EXCAVATOR
1 1	(a)	Where practicable the nature of the soil shall be described; attention shall be drawn to any existing trial holes.	1 1	(a)	Where practicable the nature of the soil shall be described; attention shall be drawn to any existing trial holes.
1 2	(a)	(ii)Excavation in rock shall be given separately	1 2	(b)	Excavation in rock shall be given separately or may be described as extra over the various classes of excavation (Alt) (EO)
1 3	(b)	(i) The quantities of all Excavators work shall be those before excavating	1 3	(d)	(i)The measurements of all excavation and subsequent disposal shall be those before excavating (Tpt)
1 4	(b)	(ii)The increase in bulk after excavating shall be allowed for by the Contractor. In the case of the disposal of excavated material the Contractor's attention shall be drawn to this fact. (U)	1 4	(d)	(ii)The increase in bulk and any extra excavation required for planking and strutting shall be allowed for by the contractor. (U)
1 5	(c)	(i) All excavation shall be described as excavate and get out (or excavate and basket out as hereinafter provided);	1 5	(e)	(i) All excavation shall be described as excavate and get out (or excavate and basket out as hereinafter provided);
1 6	(c)	(ii)subsequent disposal of the excavated material shall be given as a separate item. (Tpt)	1 6	(e)	(ii)subsequent disposal of the excavated material shall be given as a separate item, (Tpt)
1 7	(c)	(iii)This, however, shall not apply to such cases as small manholes, drain and pipe trenches, shallow foundation trenches and the like, in which cases subsequent disposal may be included with the item of excavation.(Tpt)	1 7	(e)	(iii)except in the case of trenches referred to in Clause 4 (d) where it shall be described with the item of excavation. (For drain trenches see Drainlayer, Clause 4). (Tpt)

1 8	(d)	Where it is impracticable to form a wheeling gangway for the removal of excavated material the Excavator's work shall be desc as Excavate and basket out. (Acc) (Ad) (D) (Loc) (SL) (Tpt)	1 8	(f)	Where it is impracticable to form a wheeling gangway for the removal of excavated material the excavation shall be described as basketed out. . (Acc) (Ad) (D) (Loc) (SL) (Tpt)
1 9	(e)	All excavations shall be given in stages of 5 feet stating the commencing level and continuing in successive stages of 5 feet (D) (Enu) (Loc) (SL)(Wp)	1 9	(g)	All excavations, except over site to reduce levels, tb given in successive stages of 5 feet, stating the commencing level (D) (Enu) (Loc) (SL)(Wp)
1 10	(f)	The levelling and ramming of bottoms of trench or surface excavation under foundations, beds, pavings &c., may be described with the item (Acc) (D) (Enu) (F) (Loc) (SL)	1 10	(h)	Levelling or grading and ramming of bottoms tb given sep in yds sup except under beds, pavings &c., given as sup items in which cases it may be desc with the item. Levelling bottoms in rock tb given sep(Acc) (D) (Enu) (F) (Loc) (SL)
1 11	(g)	(i) All Excavators' work (<i>shall, except as hereinafter provided</i>) be given in yds cu (D) (Loc) (Wp)	1 11	(c)	All Excavators' work and the subsequent disposal of excavated material shall, except as hereinafter provided, be given in yds cu (D) (Loc) (Tpt) (Wp)
1 12	(g)	(ii)the subsequent disposal of excavated material shall, except as hereinafter provided, be given in yds cu.(Tpt)			<i>See clause 1 (c) above</i>
2 13	(a)	Surface excavation n e 12" dp tb given in yds sup & av dpth stated (Acc) (D) (Enu) (F) (Loc) (SL) (Wp)	2 12	(a)	Surface excavation n e 12" dp tb given in yds sup & av dpth stated (Acc) (D) (Enu) (F) (Loc) (SL) (Wp)
2 14	(b)	If turf or veg soil t b preserved the qty t b given in yds sup & av dpth stated (Acc) (D) (Enu) (Loc) (T) (Wp)	2 13	(b)	If turf or veg soil t b preserved the qty t b given in yds sup stating av dpth & disposition of the mat. (Acc) (D) (Enu) (Loc) (T) (Wp) (Tpt)
2 15	(c)	Removal & grub up of shrubs etc t b desc; cutting down trees & grub up roots of same t b enum. (Acc) (D) (Enu) (Loc) (Tpt) (Wp)	2 14	(c)	Cutting down trees and grubbing up their roots shall be enumerated; trees n e 24" gth at ht of 3ft ab grd shall be classed as small trees, those > 24" gth shall be classified according to gth in multiples of 12". Cutting down hedges and grubbing up their roots shall be given in yds run. The removal & grubbing up of shrubs & undergrowth t b desc (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp)
3 16	(a)	The measurement of basement and similar excavation shall be given to the outside of the foundations. Existing voids shall be deducted and it shall be stated that this has been done. (Acc) (D) (Enu) (Loc) (SL) (Wp)	3 15	(a)	Basement and similar excavation shall be msd to the outside of the foundations. Existing voids shall be deducted (Acc) (D) (Enu) (Loc) (SL) (Wp)

3 17	(b)	Where the basement walls are covered externally with a damp-proof covering (not described as executed overhand), allowance shall be made in the measurement for working space of 2 feet from the external face of the wall down to the bottom edge of the damp-proof covering. The same working space shall be allowed for where required by the method of construction. (Acc) (D) (Enu) (Loc) (SL) (W)(Wp)	3 16	(b)	Where the basement walls are t b covered externally with a damp-proof covering, which is not described as executed overhand, an allowance shall be made for working space of 2 feet from the external face of the wall to be covered. The same allowance shall be made where the method of construction of the wall requires workmen to operate from the outside. (Acc) (D) (Enu) (Loc) (SL) (W)(Wp)
4 18	(a)	Surface trenches shall be so described and given in stages of 5 feet as set out in clause 1, paragraph (e). (Acc) (C) (D) (Enu) (Loc) (SL) (W) (Wp) (DW)	4 17	(a)	Surface trenches shall be so described and given in stages of 5 feet as set out in clause 1 (g). (Acc) (C) (D) (Enu) (Loc) (SL) (W) (Wp) (DW)
4 19	(b)	Trenches below basement shall be so described and given as set out in clause 1, paragraph (e) (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	4 18	(b)	Trenches below basement shall be so described and given as set out in clause 1 (g) (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
4 20	(c)	In the case of cuttings and extensive or deep basements, the necessary preliminary trenching for retaining walls shall be given as set out in clause 1, paragraph (e). (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	4 19	(c)	In the case of cuttings and extensive or deep basements, the necessary preliminary trenching for retaining walls shall be given in stages in accordance with clause 1(g). (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
5 21	(a)	Forming embankments or terraces shall be given in yards cube; if the earth is to be deposited in layers, this shall be stated giving the thickness of such layers. The source or sources from which the earth is obtained shall be described and it shall be stated whether the deposited earth is to be rammed and watered. (Acc) (D) (Enu) (F) (Loc) (R) (SL) (Tpt) (W) (Wp)	5 20	(a)	Forming embankments or terraces and filling to make up levels shall be given in yards cube; if the material is to be deposited in layers, this shall be stated giving the thickness of such layers. The source or sources from which the material is obtained and the methods of consolidation shall be described. (Acc) (D) (Enu) (F) (Loc) (R) (SL) (Tpt) (W) (Wp)
5 22	(b)	The formation of slopes shall be given in yards superficial and that to cuttings shall be given separately (R)	5 21	(b)	The formation of slopes shall be given in yds sup, that to cuttings being given separately from that to embankments.(R)
5 23	(c)	Soiling, seeding & turfing of surfaces t b given in yds sup & thickness of soil & nature of seed desc. (Acc) (D) (F) (Enu) (Loc)(Wp)	5 22	(c)	Soiling, seeding & turfing of surfaces t b given in yds sup & thickness of soil & nature and quantity per yd of seed desc. (D) (F) (Wp)
6 24	(a)	(i) Excavation for isolated pier holes shall be given separately, (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	6 23	(a)	(i)Excn for stanchion bases, isolated piers, manholes and the like shall be given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
6 25	(a)	(ii)and pier holes and post holes not exceeding 1 yard cube shall be enumerated (Enu)	24		(ii) pier holes and post holes not exceeding 1 yard cube shall be enumerated (Enu)

6 26	(b)	Where pier holes exceed 5 feet in depth a minimum measurement on plan of 4 feet by 4 feet shall be given both for excavation and the consequent planking and strutting. (W) (Wp)	6 25	(b)	Where the foregoing exceed 5 feet in depth a minimum measurement on plan of 4 feet by 4 feet shall be given both for excavation and the consequent planking and strutting. (W) (Wp)
7 27	(a)	A description of the work to be underpinned shall be given stating its length and the depth of the underpinning. An item shall follow in feet run for providing and fixing all necessary supporting timbers to the work underpinned, giving particulars thereof where practicable. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	7 26	(a)	A description of the work to be underpinned shall be given stating its length, the depth of the underpinning and the limit of length to be carried out in one operation. An item shall follow in feet run for providing and fixing all necessary supporting timbers to the work underpinned, giving particulars thereof where practicable. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
7 28	(b)	(i)Excavation for underpinning shall be measured and described as in lengths not exceeding 4 feet. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>Included in Clause 7 (a) above</i>
		<i>No comparable clause</i>	7 27	(b)	Preliminary excavation down to the base of the work to be underpinned shall be given separately and so described. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
7 29	(b)	(ii) and the width to be taken from the face of the wall to be underpinned shall vary in proportion to the depth of the trench as follows:-For trenches up to 5 feet deep, the width shall be taken as 3 feet.	7 28	(c)	The width to be taken from the face of the wall to be underpinned shall vary in proportion to the depth of the trench as follows:-For trenches up to 5 feet deep, the width shall be taken as 3 feet.
7 30		(iv)For trenches exceeding 5 feet deep and not exceeding 10 feet deep, the width shall be taken as 4 feet 6 inches.	29		For trenches exceeding 5 feet deep and not exceeding 10 feet deep, the width shall be taken as 4 feet 6 inches.
7 31		(v)For trenches exceeding 10 feet deep, the width shall be taken as 6 feet.	30		For trenches ex10 feet deep, the width shall be taken as 6 feet.
		(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			(Acc)(D)(Enu)(Loc)(SL) (T) (W) (Wp)
7 32	(c)	Cutting off projecting footings shall be given in feet run, stating the number of courses or the thickness of the wall. Cutting away old concrete or other foundations shall be given in yards cube.(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	7 31	(d)	Cutting off projecting footings shall be given in feet run, stating the number of courses or the thickness of the wall. Cutting away old concrete or other foundations shall be given in yards cube..(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)

8 33	(a)	(i) Breaking up and removing surface concrete or other hard substances shall be given in yards superficial and, if known, the thickness stated. .(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	8 32	(a)	(i) Breaking up and removing surface concrete or other hard substances shall be given in yards superficial and, if known, the thickness stated..(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
8 34	(a)	(ii) Breaking up and removing brickwork, concrete, or other hard substances met with in excavating, shall be given in yards cube as extra over excavation; .(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	8 33	(a)	(ii) Breaking up and removing brickwork, concrete, reinforced concrete or other hard substances met with in excavating, shall be given in yards cube as extra only over excavation; .(Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
8 35	(a)	(iii) where the quantity cannot accurately be ascertained a provisional quantity shall be given. (P)	8 34	(a)	(iii) where the quantity cannot accurately be ascertained a provisional quantity shall be given. (P)
8 36	(b)	Clearing out and removing contents of old cesspools met with in excavating shall be described. .(Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)	8 35	(b)	Clearing out and removing contents of old cesspools met with in excavating shall be enumerated. .(Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
8 37	(a)	Excavation to form cuttings shall be given separately and the mode of its execution described..(Acc) (Cl) (D) (Enu) (Loc) (M) (SL) (Tpt) (W) (Wp)	9 36	(a)	Excavation to form cuttings shall be given separately and the mode of its execution described. (Acc) (Cl) (D) (Enu) (Loc) (M) (R) (SL) (Tpt) (W) (Wp)
9 38	(b)	Excavation in tunnelling t b given sep & length, width, & height of tunnel stated. (Acc) (D) (Enu) (IW) (Loc) (Sh) (SL) (Tpt) (W) (Wp)	9 37	(b)	(i) Excavation in tunnelling t b given sep & length, width, & height of tunnel stated. (Acc) (D) (Enu) (IW) (Loc) (Sh) (SL) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	9 38	(b)	(ii) the return and back filling to tunnels shall be given separately in yds cu
10 39	(a)	The disposal of the spoil shall be described. (Tpt)	10 39	(a)	The disposal of the spoil shall be described. (Tpt)
10 40	(b)	Carting earth from excavation shall, unless otherwise stated, include the provision of a shoot, dump or tip by the Contractor. (Tpt)	10 40	(b)	Removal of excavated material from the site shall, unless otherwise stated, include the provision of a shoot, dump or tip by the Contractor (Tpt)
10 41	(c)	If spoil is to be deposited on site the distance it is to be moved shall be given in yards run.(Tpt)	10 41	(c)	If spoil is to be deposited on site the distance it is to be moved shall be given in yards run. (Tpt)
11 42		(i) An item t b given for keeping excn free from storm & percolating water by pumping or otherwise. When excns extend below normal water level, the fact shall be stated &, where known, water level given. (U) (ii) Where springs or running water are likely t b encountered a prov sum t b inc	11 42	(a)	An item t b given for keeping excn free from storm & percolating water by pumping or otherwise. When excns extend below normal water level, the fact shall be stated &, where known, water level given. (U) (ii) Where springs or running water are likely t b encountered a prov sum t b inc

11 43		for pumping, or a prov number of hours given of use of pump with power and attendance (actual pumping hours). (Acc) (Ad) (Loc) (SL) (W) (Wp)	11 43	(b)	inc for pumping, or a prov number of hours given of use of different classes of pumps likely to be reqd with power and attendance (actual pumping hours). (Acc) (Ad) (Loc) (P) (SL) (W) (Wp) .
12 44	(a)	The term planking and strutting shall mean everything requisite to uphold the face of earthwork with the exception of special shoring. <i>No comparable clause</i>	12 44 12 45	(a)	(i)The term planking and strutting shall mean everything requisite to uphold the face of earthwork other than special shoring. (ii)and covers the responsibility for upholding and maintaining the sides of earthwork by whatever means, if any, are considered necessary having regard to the nature of the ground. Items of planking and strutting shall be given under the following rules, whether any is in fact required or not, so that the Contractor's risk may be priced
12 45	(b)	P & s to bst excn t b given in ft sup & depth to gen level of excn t b stated (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 46	(b)	P & s to bst excn t b given in ft sup & depth to gen level of excn t b stated (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
12 46	(b)	(ii) Any special shoring required shall be measured or described.	12 47	(b)	(ii) Any special shoring required shall be measured or described.
12 47	(c)	P & S to trenches t b msd to b s of same & shall be given in ft sup stating depth in stages of 5ft whether to surf trenches or trenches bel bst. P & s to trenches > 6ft wide t b sep given & width stated (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 48	(c)	P & S to trenches t b msd to b s & given in ft sup stating depth in stages of 5ft whether to surf or bst trenches P & s to trenches > 6ft wide t b sep given & width stated (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
12 48	(d)	Alternatively the length of the trenches may be given in feet run and the item described as planking and strutting to both sides of trenches, stating the width and depth (Acc) (Alt) (D) (IW) (Loc) (SL) (Tpt) (W) (Wp)			<i>No comparable clause</i>
12 49	(e)	(i)Planking and strutting to pier holes shall be measured to all sides and given in feet superficial and the depth stated in stages of 5 feet. (Acc) (D) (IW) (Loc) (SL) (Tpt) (W) (Wp)	12 49	(d)	i)Planking and strutting to pier holes shall be measured to all sides and given separately in feet superficial, the depth being stated in stages of 5 feet. (Acc) (D) (IW) (Loc) (SL) (Tpt) (W) (Wp)
12 50	(f)	In all cases, p&s or shoring next roadways tb given sep & so desc. (Loc)	12 50	(e)	In all cases, p&s or shoring next roadways to be given sep & so desc (Loc)

12 51	(g)	Where retaining walls are to be constructed in two thicknesses involving the shortening of struts or shores and re-strutting or re-shoring, the planking and strutting shall be given separately and so described	12 51	(f)	Where retaining walls are to be constructed in two thicknesses involving the shortening of struts or shores and re-strutting or re-shoring, the planking and strutting shall be given separately and so described
12 52	(h)	(i)P & s t b msd (wherever practicable) to excn for u'pin & given in ft sup & depth stated. P & s msd ard comp trench & t b desc as p & s in short or necc lengths to trenches in u'pin (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 52	(g)	(i)P & s t b msd (wherever practicable) to excn for u'pin & given in ft sup & depth stated. P & s msd ard comp trench & t b desc as p & s in short or necc lengths to trenches in u'pin(Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
12 53	(h)	(ii)Cross lengths of p&s shall be taken for the width and depth of trench at av 4 ft apart. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 53	(g)	(ii)Cross lengths of p&s shall be taken for the width and depth of trench at the requisite intervals. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
12 54	(i)	P & s to tunnelling t b sep given in ft run & desc, & width, hts to springing & crown & gth of soff stated. (Acc) (D) (IW) (Loc) (Sh) (SL) (T) (Tpt) (W) (Wp)	12 54	(h)	P & s to tunnelling t b sep given in ft run & width, hts to springing & crown & gth of soff stated. (Acc) (D) (IW) (Loc) (Sh) (SL) (T) (Tpt) (W) (Wp)
12 55	(j)	P&s to excn c o p tb given sep & desc (Acc) (D) (IW) (Loc) (Rad) (SL) (T) (Tpt) (W) (Wp)			<i>No comparable clause</i>
12 56	(k)	P&s and timbering ordered to be left in t b given sep & so desc. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)	12 55	(i)	P&s and timbering required to be left in t b given sep & so desc. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
13 57		Puddling t b given in yds cu & desc (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp) <i>No comparable clause</i>	13 56		(i)Puddling generally t b given in yds cu (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	13 57		(ii)Puddling to dew-ponds, lakes & where less than 12" thick tb given in yds sup stating the nature of the preparatory works, if any (Acc) (D) (IW) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	14 58	(a)	The material used for hardcore and the method of consolidation and any blinding shall be described (F) (M)
14 58		Hardcore filling exceeding 12 inches thick shall be given in yards cube and described; where 12 inches thick and under it shall be given in yards superficial stating the thickness. (Acc) (D) (Loc) (SL) (Tpt) (W) (Wp)	14 59	(b)	Hardcore filling exceeding 12 inches thick shall be given in yards cube ; where n e 12 inches thick it shall be given in yards sup stating the thickness. (Acc) (D) (Loc) (SL) (Tpt) (W) (Wp)

		<i>No comparable clause</i>	14 60	(c)	Where the surface of hardcore is required to be finished to falls or cambers, the extra labour shall be given in yds sup except where the hardcore is given as a superficial item, when the labour may be described with the item (R)
		CONCRETOR			CONCRETOR
		Including Reinforced Concrete, Reinforcement and Formwork, Fire-Resisting Floors, and Piling.			
		NOTE.- Reinforced concrete, reinforcement and formwork (other than filler joist construction) should be grouped in a separate Bill or Section under the Heading of Reinforced Concrete.			

1 1	(a)	(i)The nature of the materials to be used for all forms of concrete, and the proportions and the method of mixing, shall be described.		1 1	(a) (i)The proportions of the materials to be used and the method of mixing, shall be described.
1 2	(b)	Particulars shall be stated of any tests required both of the materials and of the finished work		1 2	(b) Particulars shall be given of any tests required both of the materials and of the finished work
1 3	(c)	(i)Any treatment of the finished face of concrete, beyond the ordinary depositing, spreading or levelling, shall be described and given in yards or feet superficial. (F)		1 3	(c) (i)Any treatment of the finished face of concrete, beyond the ordinary depositing, spreading or levelling, shall be desc and given in yds or ft sup. (F)
1 4	(c)	(ii)In the case of concrete measured as a superficial or running item, such finish may be included with the item.		1 4	(c) (ii)In the case of concrete measured as a superficial or lineal item, such finish may be included with the item.
		<i>No comparable clause</i>		1 5	(d) Concrete required to be vibrated, mechanically tamped, placed in position by a particular method, or poured at stated speeds, shall be given separately (M)
1 5	(d)	(i)If concrete is between and around steel joists, (<i>it shall be so stated</i>). (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)		1 6	(e) (i)If concrete is between and around steel joists, (<i>it shall be so stated</i>) (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
1 6	(d)	(ii)(<i>If concrete is between and around</i>) rods, or fabric reinforcement it shall be so stated. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)		1 7	(e) (ii)(<i>If concrete is between and around</i>) bars or fabric reinforcement it shall be so stated (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
1 7	(d)	(iii)and the system of construction and character of the reinforcement described.		1 8	(e) (iii)and the system of construction and character of the reinforcement described.
1 8	(e)	Where concrete is reinforced by rods or fabric reinforcement each member or part of the work shall be given separately and described, and (except in the case of walls, floors and roofs) shall be classified according to size as follows:- Those having a sectional area not exceeding 36 inches, those of an area over 36 and not exceeding 72 inches, those over 72 inches and not exceeding 144 inches, those over 144 inches. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)		1 9	(f) Where concrete is reinforced by bars or fabric reinforcement each member or part of the work shall be given separately and described, and (except in the case of walls, floors and roofs) shall be classified according to size as follows:- Those having a sectional area not exceeding 36 inches, those of an area over 36 and not exceeding 72 inches, those over 72 inches and not exceeding 144 inches, those over 144 inches. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)

1	9	(f)	Concrete, formwork, and steel in reinforcement shall be given separately unless otherwise herein provided			Concrete, formwork, and reinforcement shall be given separately unless otherwise herein provided	
10		(g)	All concrete work shall be measured net but no deductions shall be made for the volume of the reinforcement nor for openings 2 feet sup or under in floors, roofs, roadways, &c. (N)	1	11	(h)	No deductions shall be made for:- (1) Voids of 1 ft cu or under (2) The volume of the reinforcement (3) Openings in walls, floors, roof slabs, roadways and the like of 2 ft sup or under. (N)
2	11		Concrete in trenches shall be given in yards cube; where less than 12 inches in thickness it shall be given separately and so described (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	2	12		Concrete in trenches shall be given in yards cube; where less than 12 inches in thickness it shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
3	12		Concrete in small bases for fencing posts and the like shall be enumerated and the sizes given.(Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	3	13		Concrete in small bases for fencing posts and the like shall be enumerated and the sizes given. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
4	13		Conc in u'pin t b given sep & so desc. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	4	14		Conc in u'pin t b given sep. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
5	14	(a)	Concrete beds not exceeding 12 inches in thickness shall be given in yards superficial and the thickness stated, those exceeding 12 inches in thickness shall be given in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	5	15	(a)	Concrete beds less than 12 inches in thickness shall be given in yards superficial and the thickness stated, those 12 inches thick and over shall be given in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
5	15	(b)	Concrete beds formed or laid to falls currents or cambers shall be given separately and so described. (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)	5	16	(b)	(i)Concrete beds less than 12" thick formed or laid to falls, currents or cambers shall be given separately and the labour inc in the desc. (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)
			<i>No comparable clause</i>	5	17	(b)	(ii)where such beds are 12" thick and over the labour finishing to falls, etc shall be given separately in yds sup (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)
			<i>No comparable clause</i>	5	18	(c)	If concrete beds are to be laid in bays this shall be stated, and the description shall include the necessary formwork to the joints between bays. Expansion joints, if

					required, shall be given in accordance with clause 19 (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
6 16		Channels in concrete shall be given in feet run describing the shape, width and average depth. Where channels are formed in concrete beds and additional concrete under is required, it shall be so stated. (Acc) (D) (Enu) (Sh) (SL) (Loc) (T) (Tpt) (W) (Wp)		6 19	Channels in concrete shall be given in feet run describing the shape, width and average depth and including the formwork in the description. Where channels formed in concrete beds require additional concrete under, it shall be so stated and the sizes given. (Acc) (D) (Enu) (Sh) (SL) (Loc) (T) (Tpt) (W) (Wp)
7 17	(a)	Concrete in foundations to isolated stanchions and columns shall be given separately in yards cube; where less than 12 inches in thickness it shall be given in yards superficial and the thickness stated. Concrete packed around steel grillages shall be given separately in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		7 20	(a) Concrete in foundations to isolated stanchions and columns shall be given separately in yards cube; where less than 12 inches in thickness it shall be given separately. Foundations less than 6 ft cu shall be given in ft cu and the number stated. Concrete packed around steel grillages shall be given separately in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
7 18	(b)	Cement grouting under steel stanchion bases or under steel grillages shall be given in feet superficial; if under small base not exceeding one yard superficial the groutings shall be enumerated stating the size. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		7 21	(b) Cement grouting under steel stanchion bases or under steel grillages shall be given in feet superficial; if under small base not exceeding one yard superficial the groutings shall be enumerated stating the size. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
7 19	(c)	Wedging up under stanchion bases or under steel grillages shall be enumerated and if steel wedges are to be provided it shall be so stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			<i>No comparable clause</i>
8 20		The building in of holding down bolts and the temporary boxings or wedges to form the holes for same shall be enumerated; the lengths shall be stated and the grouting included in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		8 22	The building in of holding down bolts and the temporary boxings or wedges to form the holes for same shall be enumerated; the lengths shall be stated and the grouting included in the description. (Acc) (D) (DW)(Enu) (SL) (Loc) (Tpt) (W) (Wp)
9 21		Concrete in engine beds shall be given in yards cube; small engine beds shall be enumerated.		9 23	Concrete in engine beds and machine bases shall be given in yards cube; beds and bases less than 6 ft cu shall be given in ft cu

		(Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			and the number stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
10 22		Concrete curbs (formed in situ) shall be given in feet cube, except curbs of 54 inches sectional area and under which shall be given in feet run stating the size and including formwork. All labours shall be given separately when curbs are cubed and described with the items when they are given in feet run. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)		10 24	Concrete curbs formed in situ shall be given in feet run including formwork; angles and fair ends shall be enumerated. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
11 23	(a)	(i)Concrete floors and roofs shall be given in yards superficial and the thickness stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		11 25	i)Concrete floors and roofs shall be given in yards superficial and the thickness stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
11 24	(a)	(ii)If finished to falls this shall be stated and the average thickness given. The measurement shall be taken across beams. (R)		11 26	(ii)If finished to falls this shall be stated, the average thickness being given. The msrmt shall be taken across beams. (R)
11 25	(a)	(iii)If the panel system of heating is adopted, the area of heating panels shall be stated. (DW)		11 27	(iii)If the panel system of heating is adopted, wherein the pipes are embedded in the concrete , the area of heating panels shall be stated. (DW)
11 26	(b)	If floors and roofs are sloping this shall be stated and they shall be given separately; if of sharper pitch than 15 degrees the angle of pitch shall be stated (R)		11 28	If floors and roofs are sloping this shall be stated and they shall be given separately; if of steeper pitch than 15 degrees the angle of pitch shall be stated (R)
11 27	(c)	Conc tops & cheeks of dormers t b each given sep (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		11 29	Conc tops & cheeks of dormers shall each be given sep (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
11 28	(d)	Concrete hearths shall be given in feet superficial (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		11 30	Concrete hearths shall be given in feet superficial and the number stated (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
12 29		The following casings to steel joists shall be given separately in feet cube, viz:- (1)Concrete casing to beams. (2) Concrete casing to lintels. (3)Concrete casing to stanchions. (Acc) (D) (Enu) (SL) (Loc)(Tpt)(W) (Wp)		12 31	The following casings to steel joists shall be given sep in ft cu, viz:- (1)Concrete casing to beams and lintels.(2)Concrete casing to stanchions. (Acc)(D)(Enu)(SL)(Loc)(Tpt)(W)(Wp)
13 30	a	(i)Concrete walls in situ shall be given in yards superficial and the thickness stated, the measurements being taken between piers or projections. Those over 12 inches		13 32	(i)Concrete walls in situ less than 12" thick shall be given in yards superficial and the thickness stated, the measurements being taken between piers or projections.

		thick shall be given in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			Those 12 ins thick & over shall be given in yds cu. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
13 31	b	Concrete retaining walls shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		13 33	(b) Concrete retaining walls shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
13 32	c	Projections not exceeding 18 inches in width on walls less than 12 inches thick shall be dealt with as columns as hereinafter described and shall be measured through the wall. When the projections exceed 18 inches in width the full thickness of wall and projection shall be dealt with as wall of that thickness. (Sep)		13 34	(c) Projections not exceeding 18 inches in width on walls less than 12 inches thick shall be dealt with as columns as hereinafter described and shall be measured through the wall. When the projections exceed 18 inches wide the full thickness of wall and projection shall be dealt with as wall of that thickness. (Sep)
14 33		Independent piers, columns, struts, and the like shall be given in feet cube and described. Projections on piers and columns shall be given in feet cube and the number stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		14 35	Independent piers, columns, struts, and the like shall be given in feet cube and described. Projections on piers and columns t b given in ft cu and the number stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
15 34		Beams, braces, cantilevers, and the like shall be given in feet cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		15 36	Beams, braces, cantilevers, and the like shall be given in feet cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
16 35		Strings, cornices and similar projections shall be measured beyond the faces of the concrete walls or beams and given in feet run and described. (Sep)		16 37	Strings, cornices and similar projections shall be measured beyond the faces of the concrete walls or beams and given in feet run. (Sep)
17 36	(a)	Concrete steps to openings and staircases and strings to same, formed in situ, shall be given in feet cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		17 38	(a) Concrete steps to openings and staircases and strings to same, formed in situ, shall be given in feet cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
17 37	(b)	Concrete solid balustrades shall be given in feet superficial and desc stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		17 39	(b) Concrete solid balustrades shall be given in feet superficial stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
17 38	(c)	Landings t b given in ft sup stating thickness (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		17 40	(c) Landings t b given in ft sup stating thickness (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
18 39		All labours and details where produced by the formwork shall be measured with the formwork. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)		18 41	All labours and details where produced by the formwork shall be measured with the formwork. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)

		<i>No comparable clause</i>		19 42		Expansion joints in beds, suspended floors, walls, etc., including formwork and any labours, shall be given in yds run (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
19 40		Work involving cutting in concrete shall be separately given; grooves, chases, and the like shall be given in feet run, and holes, mortices, and the like enumerated and described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		20 43		Work involving cutting in concrete shall be separately given; grooves, chases, and the like shall be given in feet run, and holes, mortices, and the like enumerated and described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp) The making good of finishings shall be given separately in the appropriate trade
		Reinforcement				Reinforcement
20 41	(a)	Particulars shall be given of any tests to be applied to samples.		21 44	(a)	Particulars shall be given of any tests to be applied to samples.
20 42	(b)	Any special restrictions in regard to hot or cold bending shall be stated.		21 45	(b)	Any special restrictions in regard to hot or cold bending shall be stated.
		<i>See clause 22 below</i>		21 46	(c)	Reinforcement in floors, roofs, walls, beams, columns and the like shall each be given separately
20 43	(c)	Rod or bar reinforcement shall be described and given in weight classified as hereinafter stated; no allowance to be made in wt for rolling margin and this shall be stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		22 47	(a)	Bar r/f shall be given by weight and shall include for cutting to lengths, hooked ends and bending (except as provided by clause 25); no allowance to be made in wt for rolling margin & this shall be stated (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
		<i>See clause 22 (ii) below</i>		22 48	(b)	Bars shall be sub-divided as follows:- (1) General reinforcing bars (2) Links, stirrups or bindings (3) Indented bars or bars of other special form (4) Bars exceeding 30 ft in length, in stages of 5 ft (5) Helical reinforcement (6) Work requiring special bending or bending to large radius. (CU)
20 44	(d)	Bars 5/8 inch diameter and over shall be given under one description. (CU)		22 49	(c)	Bars of 3/8 inch to 1 inch in diameter shall be given under one description (CU)

20 45	(e)	Bars under 5/8 inch diameter shall be given separately for each size. (CU)	22 50	(d)	Bars of less than 5/8 inch and exceeding 1 inch in dia shall be given separately for each size (CU)
21 46		(i) Fabric reinforcement shall be given in yards superficial and described; only the net area covered shall be measured (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	23 51	(a)	i) Fabric reinforcement shall be given in yards superficial and described; only the net area covered shall be measured (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	23 52	(a)	(ii) but no deduction shall be made for openings less than 10 ft sup (N)
		<i>No comparable clause</i>	23 53	(a)	(iii) the description shall include the bending of fabric as necessary (Sh)
21 47		(ii) and the description shall include the extra material at laps particulars of which shall be given. (E) (N)	23 54	(a)	(iv) and the extra material at laps, particulars of which shall be given (E) (N)
		<i>No comparable clause</i>	23 55	(b)	Tension strips shall be given in yds run
21 48		(iii) Raking and circular cutting and waste shall be given in feet run. (Cut) (R) (Rad)	23 56	(c)	(iii) Raking and circular cutting and waste shall be given in feet run. (Cut) (R) (Rad)
22 49		(i) The reinforcement shall be given separately as in Floors, Roofs, Walls, Beams, Columns, &c., and under the following sub-divisions, viz:-			<i>See clause 21 (c) above</i>
22 50		(ii) (1) Bars whether straight or (2) Links, stirrups, or bindings. (3) Indented bars or bars of other special form. (4) Bars exceeding 30 feet in length in stages of 10 feet. (5) Helical reinforcement. (6) Work requiring special bending or bending to large radius. (CU)			<i>See clause 22 (b) above</i>
23 51		Tying wire and other materials required for supporting the reinforcement shall not be separately	24 57		Tying wire required for supporting the reinforcement shall not be separately given but shall be

		given but shall be included with the description of the items together with cutting to lengths, bending, hooking and all other work whatsoever in providing and fixing in position.				included with the description of the items
		(Note:- The term tying wire is reserved for the wire tying together reinforcement in contact, and the term links or bindings for the wire forming part of the reinforcement and linking and binding together reinforcement not in contact).				Note:- The term tying wire is reserved for the wire tying together reinforcement in contact, and the term links or bindings for the wire forming part of the reinforcement and linking and binding together reinforcement not in contact).
24 52		If high carbon steel is to be used it shall be given separately and all bends in same shall be enumerated and described as forged bends.		25 58		If high carbon steel is to be used it shall be given separately and all bends in same shall be enumerated and described as forged bends.
		Formwork for Concrete				Formwork
25 53		(i)Formwork shall be measured the actual surface in contact with the concrete.		26 59	(a)	(i)Formwork shall be measured the actual surface in contact with the concrete
54		(ii)It shall be given in yards superficial for the larger areas, such as soffits of floors, otherwise in feet superficial.		26 60	(a)	ii)It shall be given in yards superficial for the larger areas, such as soffits of floors, otherwise in feet superficial.
		<i>No comparable clause</i>		26 61	(a)	(iii)Formwork to small features shall be enumerated (Enu)
55		(iii)If wrought formwork is required, it shall be so stated. (F)		26 62	(a)	(iii)If wrought formwork is required, it shall be so stated. (F)
56		(iv)Formwork left in shall be so described. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)		26 63	(a)	(iv)Formwork left in shall be so described. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
		<i>No comparable clause</i>		26 64	(b)	Where formwork is required to be lined with wallboard, hardboard, plywood or paper lining or to be coated with mould oil, mould liquid or limewhite, such formwork shall be so described and given separately (F)
		<i>No comparable clause</i>		26 65	(c)	Where lining of wallboard, hardboard, asbestos, cork slab and the like is of a permanent character

					and to be left in, such lining shall be given separately in yds sup, the description to include any necessary fixing to the concrete. . (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
		No comparable clause		26 66	(d) No deductions shall be made for openings less than 10 ft sup (N)
26 57	(a)	The descriptions shall include straight cutting and waste, notchings, allowance for overlaps and passings at angles, battens, strutting, bolting, wedging, easing, striking and removal.		27 67	(a) The descriptions shall include splayed edges, notchings, allowance for overlaps and passings at angles, battens, strutting, bolting, wedging, easing, striking and removal. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
26 58	(b)	Where the height of the strutting exceeds 13 feet form-work shall be given separately and the height stated (CU) (D)		27 68	(b) Where the height of the strutting exceeds 12 feet form-work shall be given separately and the height stated in stages of 2 feet (CU) (D)
26 59	(c)	Filleting to form stopped chamfered edges or splayed internal angles not exceeding 2 inches wide shall be included in the description of formwork to beams, &c.(Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)		27 69	(c) Filleting to form stopped chamfered edges or splayed internal angles not exceeding 2 inches wide shall be included in the description of formwork to beams, &c. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)
26 60	(d)	Raking or circular cutting and waste, and rounded or moulded edges shall be given in feet run. Moulded stoppings shall be enumerated. (R) (Rad) (Wp)		27 70	(d) Raking or circular cutting and rounded or moulded edges shall be given in feet run. Moulded stoppings shall be enumerated. (R) (Rad) (Wp)
26 61	(e)	No deductions shall be made for intersections of columns and stanchions with beams or for similar junctions (N)		27 71	(e) Formwork to secondary beams shall be measured up to the sides of main beams, but no ddt shall be made from the formwork of the main beam where the secondary beam intersects it. Formwork to beams which intersect with stanchion casings or columns shall be measured up to them on all sides. No deduction shall be made from the formwork to stanchion or column casings at these intersections. (Acc) (D) (Enu) (SL) (Loc) (N) (Tpt) (W) (Wp)
27 62		Formwork generally shall be classified and given separately as follows:- (1)Flat surfaces such as soffits of floors and the like; where floors exceed 9 inches in thickness the		28 72	Formwork generally shall be classified and given separately as follows:- (a)Flat surfaces such as soffits of floors and the like; where floors exceed 9 inches in thickness the

63	formwork shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	73	formwork shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
64	Openings under 10 feet superficial shall not be deducted.	74	<i>No comparable clause</i>
65	(2)Vertical work such as surfaces of walls and the like. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	75	(b) Vertical surfaces such as surfaces of walls and the like.. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
66	(3)Sloping work. (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)	76	(c)Sloping surfaces. (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)
67	(4)Curved work. (Acc) (D) (Enu) (Rad) (SL) (Loc) (Tpt) (W) (Wp)	77	(d)Curved surfaces stating the radius. (Acc) (D) (Enu) (Rad) (SL) (Loc) (Tpt) (W) (Wp)
68	(5)Tops and cheeks of dormers and the like. (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)	78	(e)Tops and cheeks of dormers and the like (Acc) (D) (Enu) (R) (SL) (Loc) (Tpt) (W) (Wp)
69	(6)Sides & soffits of beams & lintels. (Beams & lintels 30" deep and over shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	79	(f)Sides & soffits of beams & lintels; that to beams & lintels 30" deep & over tb given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
70	(7)Sides of piers and stanchions. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	80	(g)sides of piers & stanchions. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
71	(8)Edges & breaks in floors & walls (to be given in ft run where < 9" in width). (Acc) (CU) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	81	(h)Edges & breaks in floors & wls (tb given in ft run where under 9" in width. (Acc) (CU) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
72	(9)Cornices and mouldings. (Acc) (D) (Enu) (Sh) (SL) (Loc) (Tpt) (W) (Wp)		(i)Cornices & mouldings. (Acc) (D) (Enu) (Sh) (SL) (Loc) (Tpt) (W) (Wp)
	(10)Small surfaces such as cantilever ends, brackets, ends of steps, caps & bases to pilasters and columns and the like. (Acc) (D) (Enu) (Sh) (SL) (Loc) (Tpt) (W) (Wp)		(j) Small surfaces such as cantilever ends, brackets, ends of steps, caps and bases to pilasters and columns and the like. (Acc) (D) (Enu) (Sh) (SL) (Loc) (Tpt) (W) (Wp)
28 73	Formwork shall be measured to both sides of walls and the surface of work sloping more than 15 degrees from the horizontal. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)	29 82	Formwork shall be measured to both sides of walls and the surface of work sloping more than 15 degrees from the horizontal.. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)
29 74	All formations in concrete surfaces (other than the chamfered edges & splayed int angles before mentioned) and details where produced by formwork shall be measured.	30 83	All formations in concrete surfaces (other than the chamfered edges & splayed int angles before mentioned) and details where produced by formwork shall be measured.

		Pre-cast Concrete Work			Pre-cast Concrete Work
30 75	(a)	Pre-cast work shall be given separately and measured the smallest rectangular cube from which it could be obtained if it were natural stone; fractions of an inch if half an inch or over shall be measured as a whole inch, those less than half an inch shall be neglected.		31 84	(a) Pre-cast work shall be given separately & measured in accordance with rules for the measurement of natural stone
30 76	(b)	The labour on each item shall be described.			<i>No comparable clause</i>
30 77	(c)	Precast work shall be described as including all moulds, finished faces, and hoisting and setting; the reinforcement shall be described and included with each item. (Acc) (D) (Enu) (F) (SL) (Inc) (Loc) (T) (Tpt) (W) (Wp)		31 85	(b) Precast work shall be described as including all moulds, finished faces, and hoisting and setting; the reinforcement shall be described and included with each item. (Acc) (D) (Enu) (F) (SL) (Inc) (Loc) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>		31 86	(c) Slab walling shall be msd in accordance w Bricklayer clause 43
30 78	(d)	Cornices, string courses, plinths, sills, copings, lintels and other similar items shall be given in feet run and the sizes stated: those over 7 feet and not exceeding 10 feet in length and those above 10 feet in length shall be given separately, and the average length and number in each of these groups shall be stated; angle stones, kneelers, bonders, stoolings, and similar items shall be enumerated. (Acc) (CU) (D) (Enu) (SL) (Loc) (Sh) (T) (Tpt) (W) (Wp)		32 87	Cornices, string courses, plinths, sills, copings, lintels and other similar items shall be given in feet run and the sizes stated: those over 7 feet and not exceeding 10 feet in length and those above 10 feet in length shall be given separately, and the average length and number in each of these groups shall be stated; angle stones, kneelers, bonders, stoolings, and similar items shall be enumerated. (Acc) (CU) (D) (Enu) (SL) (Loc) (Sh) (T) (Tpt) (W) (Wp)

		<i>No comparable clause</i>		33 88	Pre-cast concrete pavement & roof lights to be enumerated & the method of bedding & jointing stated. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
31 79	(a)	Steps (other than spandril steps and winders) shall be given in feet run and described ; ends of steps shall be enumerated and described . Spandril steps, winders and landings shall be enumerated and the extreme sizes stated. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)		34 89	Steps (other than spandril steps and winders) shall be given in feet run; ends of steps shall be enumerated Spandril steps, winders and landings shall be enumerated and the extreme sizes stated. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)
31 80	(b)	Notchings and holes for pipes and the like shall be enumerated and described . (Enu)		35 90	Holes & notchings for pipes and the like shall be enumerated (Enu)

		Patent Fire-Resisting Floors, Roofs, &c.			Suspended Floors, Roofs & the like of Special Construction
32 81	(a)	A general description of the building stating its approximate area, height, and number of storeys and the height of each storey shall be given.			<i>No comparable clause</i>
32 82	(b)	Patent fire resisting floors, roofs, &c. shall include for the concrete, hollow tiles and reinforcement complete; (DW) the formwork shall be given separately as hereinafter described.	36 91	(a)	Floors, roofs, &c. shall include for the concrete, hollow tiles or other units and reinforcement. (DW)
32 83	(c)	Floors and roofs, &c. shall be given separately in yards superficial giving a description of the floor finishings; the superimposed load shall be stated in lbs per foot superficial and in case of floors of normal loads the span shall be given in multiples of 6 inches commencing at 6 feet. In floors subject to exceptionally heavy loads the exact span shall be given. Floors subjected to a moving or vibrating load shall be given separately, and the nature of the load fully described. (Acc) (D) (DW) (Enu) (Loc) (Tpt) (W) (Wp)	36 92	(b)	Floors and roofs, &c. shall be given separately in yards superficial giving a description of the floor finishings; the superimposed load shall be stated in lbs per foot superficial and in case of floors of normal loads the span shall be given in multiples of 2 ft commencing at 6 ft. In floors subject to exceptionally heavy loads the exact span shall be given. Floors subjected to a moving or vibrating load shall be given separately, and the nature of the load fully described. (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
84	(d)	It shall be clearly stated whether the load is to be taken as inclusive of provision for future partitions or otherwise.	36 93	(c)	If the load is to be taken as inclusive of provision for future partitions it shall be so stated and particulars given.
33 85	(a)	Sloping floors and roofs, vertical work, &c., shall be given separately in yards superficial, and if circular on plan this shall be stated, giving the radius of the curve. (R) (Rad)	37 94	(a)	Sloping floors and roofs, vertical work, &c., shall each be given separately in yards superficial, and if circular, the radius of the curve shall be stated. (R) (Rad)
		<i>No comparable clause</i>	37 95	(b)	Cantilever work shall be given sep (Acc) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)
33 86	(b)	Dormer cheeks and tops, &c., shall be given in feet superficial. (Acc) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)	37 96	(c)	Dormer cheeks and tops, &c., shall each be given in feet superficial. (Acc) (D) (SL) (Enu) (Loc) (R) (Tpt) (W) (Wp)

33 87	(c)	Small turrets, small domes, &c., shall be enumerated and described. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Tpt) (W) (Wp)	37 97	(d)	Small turrets, small domes, &c., shall be enumerated.(Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Tpt) (W) (Wp)
34 88	(a)	Msmts shall be taken to the extreme edge of the construction for its full bearing into chases &c., & from the extreme edge of casing to ext beams, & shall inc for all str cutting & waste.	38 98	(a)	Measurement shall be taken to the extreme edge of the construction for its full bearing into chases &c., and from the extreme edge of casing to external beams
34 89	(b)	Raking and circular cuttings shall be separately given in feet run. Forming hips & valleys shall be given in ft run.(Cut) (R) (Rad)	38 99	(b)	Raking and circular cuttings shall be separately given in feet run. Forming hips & valleys shall be given in ft run. (Cut) (R) (Rad)
34 90	(c)	Deductions shall be made for all openings exceeding 1 yard superficial. (N)	38 100	(c)	No deductions shall be made for openings of 2 ft sup or under (N)
34 91	(d)	For all openings where steel trimmers are not provided an item shall be given of extra labour and material in trimming floor around opening, stating the size of the opening & span of floor in which the opening occurs. (Acc) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)	38 101	(d)	For all openings where steel trimmers are not provided an item shall be given of extra labour and material in trimming floor around opening, stating the size of the opening and the span of the floor in which the opening occurs. (Acc) (D) (SL) (Enu) (Loc) ((Tpt) (W) (Wp)
35 92		If the panel system of heating is adopted the area of heating panels shall be stated.	39 102		If the panel system of heating is adopted, wherein the pipes are embedded in the floor the area of heating panels shall be stated. (Acc) (D) (SL) (Enu) (Loc) ((Tpt) (W) (Wp)
36 93		Where floors are interrupted by the fixing of steel joists in the depth of the floor an item shall be given in feet run of extra labour cutting and waste against both sides of steel joists in floor. In the case of diagonal strengthening this shall be given separately. (Acc) (Cut) (D) (SL) (Enu) (Loc) ((Tpt) (W) (Wp)	40 103		Where the construction is interrupted by steel joists in the depth of the slab an item shall be given in feet run of extra labour cutting and waste against both sides of steel joists. In the case of diagonal strengthening this shall be given separately. (Acc) (Cut) (D) (SL) (Enu) (Loc) ((Tpt) (W) (Wp)
37 94		Channels or chases formed in the floor shall be given in feet run and described and their position in the slab stated; the description shall include the extra formwork necessary. (D) (Enu) (SL) (Loc) (Sh) (T) (Wp)	41 104		Channels or chases formed in the floor shall be given in feet run and described and their position in the slab stated; the description shall include the extra formwork necessary, (D) (Enu) (SL) (Loc) (Sh) (T) (Wp)
38 95		Fixing slips for grounds, slating battens, &c., or metal clips for floor fillets shall be enumerated and described. (Enu) (Loc)	42 105		Fixing slips for grounds, slating battens, &c., or metal clips for floor fillets shall be enumerated. (Enu) (Loc)

39 96		Holes shall be enumerated and described and shall include the boxing (Enu) (T) but no making good in other trades shall be included with the item.	43 106		Holes shall be enumerated and described and shall include the boxing (Enu) (T)
40 97		Concrete casing to steel joists shall be measured the net cube below the floor and given in feet cube, and shall include for all necessary wiring, binding or stirrups around flanges of joists; any extra rod reinforcement required shall be given separately in weight, as described for reinforced concrete . In measuring casing to box girders, the void shall be deducted if it exceeds 48 inches in sectional area. Unless the thickness of the floor is known the quantity of beam casing shall be provisional. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	44 107		Concrete casing to steel joists shall be measured the net volume below the floor and given in feet cube, and shall include for all necessary wiring, binding or stirrups around flanges of joists; any extra bar reinforcement shall be given separately in weight, as described in clauses 21-25 . In measuring casing to box girders, the void shall be deducted if it exceeds 48 inches in sectional area. Unless the thickness of the floor is known the quantity of beam casing shall be provisional. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
41 98		Concrete curbs shall be given in feet run stating the size and shall include for reinforcement and shuttering . All labours shall be included in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)	45 108		Concrete curbs shall be given in feet run stating the size and shall include for reinforcement and formwork . All labours shall be included in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)
42 99		Formwork shall be measured in accordance with rules for formwork for concrete . (See clauses 25 to 29.) (Acc) (CU) (D) (Enu) (F) (Inc) (SL) (Loc) (N) (R) (Sh) (T) (Tpt) (W) (Wp)	46 109		Formwork, if any, shall be measured in accordance with clauses 26-30 (Acc) (CU) (D) (Enu) (F) (Inc) (SL) (Loc) (N) (R) (Sh) (T) (Tpt) (W) (Wp)
		PILING			PILING
43 100	(a)	(i)A general description of the nature of the site (i.e. whether level or irregular) shall be given. (Acc)	47 110	(a)	(i)A general description of the nature of the site (i.e. whether level or irregular) shall be given. (Acc)
43 101	(a)	(ii)In work near rivers or tidal waters level of the ground surface in relation to high & low water mark & Ordnance datum to be stated, together with records of highest flood water level (Acc) (Ad)	47 111	(a)	(ii)In work near rivers or tidal waters the level of the ground surface in relation to high and low water mark and Ordnance datum should be stated, together with records of highest flood water level. (Acc) (Ad)
43 102	(a)	(iii)All available information as to the strata through which the piles are to be driven to be given, or reference made to any plans showing records of bores.	47 112	(a)	(iii)All available information as to the strata through which the piles are to be driven shall be given, or reference made to any plans showing records of bores.

43 103	(b)	If piles are to be driven from any other level than Ground level this shall be stated; if the piling frame is to be lowered or raised the exact height and nature of the work shall be described. Driving canted piles shall be given separately. (SL) (PP) (R)	47 113	(b)	If piles are to be driven from any other level than Ground level this shall be stated; if the piling frame is to be lowered or raised the exact height and nature of the work shall be described. (SL) (PP)
43 104	(c)	Any extra excavation that may be entailed for the movement of the piling frame about the site in order to place the hammer over any pile which may be situated in an angle or similar position, shall be measured or covered by provisional items together with any necessary filling in and ramming afterwards. (Acc) (D) (Enu) (PP) (P) (Tpt) (W) (Wp)	47 114	(d)	Any extra excavation that may be entailed for the movement of the piling frame about the site in order to place the hammer over any pile situated in an angle or similar position, together with any necessary filling in and ramming afterwards, shall be measured or covered by provisional items. (Acc) (D) (Enu) (PP) (P) (Tpt) (W) (Wp)
44 105		(i) Handling, pitching and driving the piles shall be enumerated, stating whether singly or in clusters and giving the size and length of the piles. (Acc) (D) (Enu) (PP) (P) (Tpt) (W) (Wp)	50 115	(a)	Handling, pitching and driving the piles shall be enumerated, stating whether singly or in clusters and giving the size and length of the piles. (Acc) (D) (Enu) (PP) (P) (Tpt) (W) (Wp)
44 106		(ii) and the depth of driving; if in water it shall be so stated. The price for driving shall include for all staging, driving apparatus, and shifting to the required position. Weight of monkey and maximum amount which the pile is to be driven by last four blows should be stated. (Acc) (Ad) (SL) (PP) (W) (Wp) (Wt)			<i>No comparable clause.</i>
		<i>No comparable clause.</i>	50 116	(b)	The driving of piles, other than sheet piles, shall be given in ft run, measured from the shoe point when pitched to the shoe point when driven, and the set required and any limitation on the method to be used shall be stated. Driving of raking piles and piles driven in water shall be given separately, also the driving of piles exceeding 30 ft in length, in stages of 10 ft. (Acc) (Ad) (CU) (D) (Enu) (SL) (M) (PP) (R) (W) (Wp)
45 107		Piles which are driven close together to form sheeting should be enumerated separately from piles driven not in contact with one another, describing the type and weight of shoe and the type of interlock, if any (Acc) (D) (Enu) (Loc) (SL) (Inc) (N) (PP) (Tpt) (W) (Wp)	50 117	(c)	The driving of piles in close contact to form sheeting shall be given separately from that of piles driven apart from each other, the type of interlock, if any, being described. (Acc) (D) (Enu) (Loc) (SL) (Inc) (N) (PP) (Tpt) (W) (Wp)

46 108	(a)	Wood piles shall be described and given in ft cu and the size stated. If over 20 ft long the lengths shall be given in stages of 4 feet. (Acc) (D) (Enu) (Inc) (Loc) (SL) (N) (PP) (Tpt) (W) (Wp)	48 118	(a)	Wood piles shall be described and given in ft cu and the size stated. If over 20 ft long the lengths shall be given in stages of 4 feet. (Acc) (D) (Enu) (Inc) (Loc) (SL) (N) (PP) (Tpt) (W) (Wp)
46 109	(b)	Shoeing and pointing piles shall be enumerated stating the weight of the shoes and the size of the pile.(Acc) (D) (Enu) Loc) (Sep) (SL) (Wt)	48 119	(b)	Shoeing and pointing piles shall be enumerated stating the weight of the shoes and the size of the pile.(Acc) (D) (Enu) Loc) (Sep) (SL) (Wt)
46 110	(c)	Cutting off tops of piles and rining with steel bands shall be enumerated and, if cut off below water level, the depth shall be stated.(Acc) (Ad) (Cut)(D) (Enu) Loc) (O) (Sep) (SL) (W) (Wp)(Wt)	48 120	(c)	Cutting off tops of piles and rining with steel bands shall be enumerated and, if cut off below water level, the depth shall be stated. (Acc) (Ad) (Cut)(D) (Enu) Loc) (O) (Sep) (SL) (W) (Wp)(Wt)
47 111	(a)	Sheet piling shall be described and given in feet superficial: all laps shall be added to the superficial measurement. The driving shall be given in feet superficial and if the total depth of driving exceeds 10 feet the extra depths shall be stated in stages of 5 feet. Strutting and waling to sheet piling shall be described. (Acc) (CU) (D) (Enu) (Loc) (N) (O) (PP) (Sep) (SL) (T) (Tpt) (W) (Wp)(Wt)	51 121	(a)	Sheet piling shall be described and given in feet superficial; the measurement shall be the net area as placed in position and shall include for laps the amount of which shall be stated. The driving shall be given in feet superficial, and the item shall include for handling and transporting: if the total depth of driving exceeds 10 feet the extra depths shall be stated in stages of 5 feet. Strutting and waling to sheet piling shall be described. (Acc) (CU) (D) (Enu) (Loc) (N) (O) (PP) (Sep) (SL) (T) (Tpt) (W) (Wp)(Wt)
47 112	(b)	It shall be stated whether the sheet piling is to be left in or drawn (Sep)	51 122	(b)	It shall be stated whether the sheet piling is to be left in or drawn (Sep)
47 113	(c)	Corner and junction piles to last-named shall be given in feet run as extra only. (EO) (Ls)	51 123	(c)	Corner and junction piles shall be given in feet run as extra only. (EO) (Ls)
47 114	(d)	Cutting or burning through sheet piling shall be given in feet run. (Cut)	51 124	(d)	Cutting or burning through sheet piling shall be given in feet run. (Cut)
48 115	(a)	(i)Concrete piles shall be described and given in feet run and classified according to section and length, the extra strength of the heads being stated. Acc) (CU) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp) (Wt)	49 125	(a)	(i)Concrete piles shall be described and given in feet run and classified according to section and length, the extra strength of the heads being stated. (Acc) (CU) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp) (Wt)
48 116	(a)	(ii)Any requisite moulds shall be included in the description, as also the necessary strappings and bolts. (Acc) (D) (DW) (Enu) (Sep) (T) (W) (Wp)	49 126	(a)	(ii)Any requisite moulds shall be included in the description, as also the necessary strappings and bolts. (Acc) (D) (DW) (Enu) (Sep) (T) (W) (Wp)

48 117	(a)	(iii)If piles may be cast at the site this shall be stated. (Acc) (D) (DW) (Enu) (Sep) (T) (W) (Wp)	49 127	(a)	(iii)If piles may be cast at the site this shall be stated. (Acc) (D) (DW) (Enu) (Sep) (T) (W) (Wp)
48 118	(b)	Heads and shoes shall be enumerated and described and the weight of each given; rock shoes shall be specially mentioned. (Enu) (Inc) (Wt)	49 128	(b)	Heads and shoes shall be enumerated and the weight of each given; rock shoes shall be specially mentioned. (Enu) (Inc) (Wt)
48 119	(c)	Cutting or breaking away heads of piles to required levels shall be enumerated. (Cut) (Enu) (SL)	49 129	(c)	Cutting or breaking away heads of piles to required levels shall be enumerated. (Cut) (Enu) (SL)
48 120	(d)	Trial piles shall be given separately stating the position of each and the length to be driven. (Acc) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp)	47 130	(c)	Trial piles shall be given separately stating the position of each and the length to be driven. (Acc) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp)
48 121	(e)	Where there is a possibility of certain of the piles being required to be lengthened in position, provisional quantities for this work shall be given separately, and the labour and material in connections enumerated and described . (D) (Enu) (SL) (Loc) (P) (PP) (Tpt) (W) (Wp)	49 131	(d)	Where there is a possibility of certain of the piles being required to be lengthened in position, provisional quantities for this work shall be given separately, and the labour and material in connections enumerated. (Acc) (D) (Enu) (SL) (Loc) (P) (PP) (Tpt) (W) (Wp)
48 122	(f)	Steel reinforcement shall be classified and given as before described ; forks or struts shall be enumerated and described (see clauses 20 to 24) and the weight given. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (N) (P) (PP) (R) (Rad) (Sh) (T) (Tpt) (W) (Wp)	49 132	(e)	Steel reinforcement shall be classified and given as clauses 21-25 ; forks or struts shall be enumerated and the weight given. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (N) (P) (PP) (R) (Rad) (Sh) (T) (Tpt) (W) (Wp)
49 123		If any special system of piling is required the general principles given above shall apply; in the case of cylinder sinking the total quantity of excavated material brought to the surface for removal shall be given in yards cube. (Tpt)	52 133		If any special system of piling is required the general principles given above shall apply; in the case of cylinder sinking the total quantity of excavated material brought to the surface for removal shall be given in yards cube. (Tpt)
		BRICKLAYER			BRICKLAYER
1 1	(a)	The description of the bricks, mortar and bond to be used shall be given.			<i>No comparable clause</i>
1 2	(b)	The general height to which the brickwork rises shall be stated			<i>No comparable clause</i>
1 4	(d)	Where it is necessary for the work to be executed overhand, it shall be given separately and so described . (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	44 2	(b)	Where it is necessary for the work to be executed overhand, the facings shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)

1	5	I	(i)All half brick walls shall be given in feet or yards superficial,	1	3	(b)	Half brick walls shall be given separately in yards superficial,
1	6	I	(ii)also one-brick walls if faced or finished fair on both sides.	1	4	I	One-brick walls if faced or finished fair on both sides, shall be given separately in yds sup
1	7	(f)	Brickwork in very small quantities, such as brick supports to sinks, &c., shall be given separately.				<i>No comparable clause</i>
1	8	(g)	All labours to existing work shall be given separately and so described.	1	5	(d)	Labours to existing work shall be given separately
2	9	(a)	All deductions shall be measured the net sizes of the openings and recesses, including the extra width of internal reveals. (D) (Loc) (MsA) (N) (W) (Wp)	2	6	(a)	Deductions shall be measured the net sizes of the openings and recesses, including the extra width of rebated reveals. No deductions shall be made for openings one ft sup and under. (D) (Loc) (MsA) (N) (W) (Wp)
2	10	(b)	Deductions shall be made for stonework, terra cotta work, and concrete lintels which exceed 3 ins. In height. (N)	2	7	(b)	Deductions shall be made for strings, sills, lintels and the like only when exceeding 3 ins. In height. (N)
2	11	I	No deduction shall be made for strings, sills, lintels, and the like not exceeding 3 ins in height (N) (Loc)				<i>See clause 2 (b) above</i>
3	12		Footings where required shall be measured and included with the general brickwork. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	3	8		Footings shall be measured and included with the general brickwork. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
4	13		Brickwork in backing to Masonry shall be given separately and so described , and the description shall include all cutting and waste for bonding. Alternatively, the brickwork shall be added in the general work and a superficial item given of labour and waste , cutting and bonding brickwork to back of stone. (Acc) (Alt) (Cut) (D) (Enu) (Inc) (Loc) (O) (W) (Wp)	4	9		Brickwork in backing to Masonry shall be given separately; the description shall include all cutting and waste for bonding. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (O) (W) (Wp)
5	14	(a)	Brickwork in underpinning shall be given separately and so described. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	5	10	(a)	Brickwork in underpinning shall be given separately (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
5	15	(b)	Wedging up on top of underpinning shall be given in feet superficial and described. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	5	11	(b)	Wedging up on top of underpinning shall be given in feet superficial.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
6	16	(a)	The necessary scaffolding for building brickwork in raising or off girders shall be given in feet run	6	12	(a)	The necessary scaffolding for building brickwork in raising or off girders shall be given in feet run stating the height

		stating the height above ground at which brickwork commences. This shall only be given in cases where there is no brickwork immediately below the girders and it shall not apply in the case of steel framed buildings. (Acc) (D) (Enu) (SL) (T) (Loc) (W) (Wp)			above ground at which brickwork commences: this item shall only be given in cases where there is no brickwork immediately below the girders and it shall not apply to steel framed buildings.(Acc) (D) (Enu) (SL) (T) (Loc) (W) (Wp)
6 17	(b)	The preparation of tops of old walls for raising and the thick bed to flush up the rivet heads, where raising is off girders , shall be given in feet superficial. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	6 13	(b)	The preparation of tops of existing walls for raising shall be given in feet superficial. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
		<i>See clause 6 (b) above</i>	6 14	I	The thick bed to flush up the rivet heads, where raising is off girders, shall be given in feet superficial.
7 18	(a)	Brickwork in hollow walls shall be given in feet or yards superficial and the thickness of the inner and outer brickwork and the width of the cavity shall be stated; the description and disposition of the ties or the number per yard superficial shall be given. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	7 15	(a)	Brickwork in hollow walls shall be given in yards superficial stating the thickness of the inner and outer casings and the width of the cavity; disposition of the ties shall be described or the number per yard superficial given. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
7 19	I	Alternatively brickwork in hollow walls may be measured by giving the inner and outer walls as separate items in conformity with Clause 1 I and 1 I, in which case the forming of the cavity shall be given in yards superficial and shall include the ties stating their disposition or the number per yard superficial. In all cases brickwork in hollow walls shall be so described, and shall be given separately from solid brickwork. (Alt) (D) (O) (Inc)	7 16	(b)	Alternatively brickwork in hollow walls may be measured by giving the inner and outer walls as separate items in conformity with Clause 1, the brickwork being described as in hollow walls and given separately from other brickwork; the forming of the cavity shall be given in yards superficial and shall include the ties, their disposition or the number per yard superficial being stated. (Alt) (D) (O) (Inc)
7 20	(b)	Where the cavity is closed against openings, at ends and the like, an item of closing same shall be given in feet run and the material described I (Enu) (Loc) (IW)	7 17	I	Where the cavity is closed against openings, at ends and the like, an item shall be given in feet run and the material and method described. (Enu) (Loc) (IW)
8 21	(a)	Brickwork circular on plan shall be measured the mean length of the wall and shall be described as to quick sweep if to 6 feet radius and under, and to flat sweep if over 6 feet radius ; the description shall include all cutting and waste and templets. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	8 18	(a)	Brickwork circular on plan shall be measured the mean length of the wall and the radius stated ; the description shall include all cutting and templets. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)

8 22	(b)	When brickwork is circular on one face only, an item of circular rough face of brickwork shall be given in yards superficial stating the radius and including all cutting and waste. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	8 19	(b)	When brickwork is circular on one face only, an item of circular rough face of brickwork shall be given in yards superficial stating the radius and including all cutting. (Cut) (Rad)
9 23		(i) Tapered walls and walls with one battering face shall be measured the mean thickness and added to the general brickwork. (ii) An item of cutting and waste shall be given in feet superficial stating the rate of taper or batter per foot in length or height as the case may be. (Acc) (Cut) (D) (Enu) (SL) (Loc) I (T) (W) (Wp)	9 20 9 21	(a) (b)	Tapered walls and walls with one battering face shall be measured the mean thickness and added to the general brickwork. An item of cutting shall be given in feet superficial stating the rate of taper or batter per foot in length or height as the case may be. (Acc) (Cut) (D) (Enu) (SL) (Loc)(T) (W) (Wp)
10 24		Walls built battering shall be given separately and so described. Rough cutting shall be measured at each change of direction. (Acc) (Cut) (D) (Enu) (SL) (Loc) I (T) (W) (Wp)	10 22		Walls built battering shall be given separately. Rough cutting shall be measured at each change of direction and given in ft sup. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
11 25		(i) Thickening old walls shall be given separately in feet superficial and the thickness stated; (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	11 23	(a)	Thickening extg wls tb given separately in yards superficial and the thickness stated; the description shall include for extra labour in cutting toothing and bonding to existing wall. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
11 26		(ii) chimney breasts and piers built against old walls shall be measured in a similar manner and given separately (Acc) (Cut) (D) (Enu) (SL) (Loc) I (T) (W) (Wp)	11 24	(b)	chimney breasts and piers built against existing walls shall be measured in a similar manner and given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc)(T) (W) (Wp)
11 27		(iii) If any special method of bonding is specified it shall be stated and the extra brickwork added, otherwise a quarter of a brick (2 ¼ ins.) shall be added to the net thickness and the cutting toothing and bonding included in the description.	11 25	I	If any special method of bonding is specified it shall be stated
12 28		(i) Brickwork in filling in openings shall be given separately and so described; (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	12 26	(a)	Brickwork in filling in openings shall be given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
12 29		(ii) any levelling and preparing sill of opening and toothing and bonding and pinning up to old shall be measured and given in feet superficial or in feet run stating the thickness.	12 27	(b)	Levelling and preparing sill of opening and toothing and bonding to jambs and pinning up to soffits shall be given in feet superficial or in feet run stating the

		(Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			thickness of the wall. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
13 30		Brickwork in vaulting shall be given separately in feet or yards superficial and described. Cutting and waste to groin points, intersections, or against ribs shall be given in feet run, stating the thickness of the vaulting. (Acc) (Cut) (D) (Enu) (SL) (IW)(Loc) (Sh) (T) (W) (Wp)	13 28		Brickwork in vaulting shall be given separately in yards superficial. Cutting to groin points, intersections, or against ribs shall be given in feet run, stating the thickness of the vaulting.
14 31		(i)Fair face of brickwork shall be measured on all exposed faces, the pointing described, and the quantity given in yards superficial.	14 29	(a)	Fair face of brickwork shall be measured on all exposed faces, the pointing described, and the quantity given in yards superficial.
14 32		(ii)Arches in fair faced work shall be measured as described in clause 45..(Acc) (D) (DW) (Enu) (Loc) (SL) (W) (Wp)	14 30	(b)	Arches in fair faced work shall be measured as described in clause 45. (Acc) (D) (DW) (Enu) (Loc) (SL) (W) (Wp)
15 33		Where grooved bricks are to be used for plaster surfaces the area shall be given in yards superficial. (EO)	15 31		Where grooved bricks are to be used for surfaces to be plastered the area shall be given in yards superficial as extra over brickwork. (EO)
16 34		Limewhiting shall be given in yards superficial and described. . (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	16 32		Limewhiting or cement wash shall be given in yards superficial. . (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
17 35		Rough cutting shall be given in feet superficial and shall include waste. The cuttings to various kinds of brickwork shall be given separately. . (Acc) (Cut) (D) (Enu) (Loc) (O) (SL) (W) (Wp)	17 33		Rough cutting shall be given in feet superficial stating the thickness. The cuttings to various kinds of brickwork shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
18 36	(a)	Projections of less than 4 ½ inches for plinths, pilasters, aprons, friezes, and the like shall be given in feet or yards superficial as extra labour and materials stating the projections. Where 4 ½ inches or over they shall be measured the net projection and added to the general brickwork; if not of brick size rough cutting shall be measured. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	18 34	(a)	Projections of less than 4 ½ inches for plinths, pilasters, aprons, friezes, and the like shall be given in yards superficial as extra labour and material, stating the projection. Where 4 ½ inches or over they shall be measured the net projection and added to the general brickwork; if not a multiple of half-a-brick rough cutting shall be measured. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)

18 37	(b)	Oversailings shall be given in feet run for extra labour and the material added to the general brickwork; alternatively an item of labour and materials may be given in feet run stating the height and the projection. (Acc) (Alt) (C) (Cut) (D) (Enu) (Inc) (Loc) (Sh) (SL) (T) (W) (Wp)	18 35	(b)	Oversailing or receding courses in the wall face shall be given in feet run for extra labour, stating the projection and height and any extra material shall be added to the general brickwork (for faced work see clause 50 (a)) (Acc) (C) (Cut) (D) (Enu) (Inc) (Loc) (Sh) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	18 36	(c)	Courses set back or forward as string courses & the like to be given in feet run for extra labour, stating the number of courses & the depth of returns: where projecting the desc shall inc for the extra mat. (for faced work see clause 50 (b)) (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	18 37	(d)	If in fair face the items referred to in sub- clauses (b) & (c) shall be msd in accordance with clause 50.
19 38		Trimmer arches shall be given in feet superficial stating the thickness; the skewbacks shall be given in feet run. Alternatively trimmer arches may be enumerated. (Acc) (Cut) (Alt) (D) (Enu) (Rad) (T) (W) (Wp)	19 38		Trimmer arches shall be given in feet superficial stating the thickness; the skewbacks shall be given in feet run. Alternatively trimmer arches may be enumerated. (Acc) (Alt) (D) (Enu) (Rad) (T) (W) (Wp)
20 39		Raking out joints of brickwork and hacking face of wall to form key shall be given in yards superficial. (Acc) (Cut) (D) (Enu) (DW) (F) (SL) (Loc) (T) (W) (Wp)	20 39		Raking out joints of brickwork and hacking face of wall to form key shall be given in yards superficial. (Acc) (Cut) (D) (Enu) (DW) (F) (SL) (Loc) (T) (W) (Wp)
21 40	(a)	Horizontal damp-proof courses exceeding 4 ½ inches in width shall be described and given in feet superficial; those 4 ½ inches wide shall be given in feet run. (For asphalt damp-proof courses see Asphalt clause 2.) (D) (Enu) (Ls) (Loc) (N) (SL) (W) (Wp)	21 40	(a)	Horizontal damp-proof courses 9" wide or over shall be given in feet superficial; those less than 9" wide shall be given in feet run and the width stated. (D) (Enu) (Ls) (Loc) (N) (SL) (W) (Wp)
21 41	(b)	Vertical damp-proof linings shall be described and given in yards superficial. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 41	(b)	Vertical damp-proof linings shall be given in yards superficial. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
21 42	(c)	Damp-proof courses or linings on circular walls both horizontal and vertical shall be given separately and so described. (Acc) (Cut) (D) (Enu) (Loc) (N) (Rad) (SL) (W) (Wp)	21 42	(c)	Damp-proof courses or linings on circular walls, both horizontal and vertical, shall include all extra cutting and waste. (Acc) (Cut) (D) (Enu) (Loc) (N) (Rad) (SL) (W) (Wp)

21 43	(d)	Damp-proof courses in underpinning shall be given separately and so described. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 43	(d)	Damp-proof courses in underpinning shall be given separately. (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
21 44	(e)	All work done overhand shall be given separately and so described. (Acc) (Ad) (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)	21 44	(e)	All vertical work done overhand shall be given separately. (Acc) (Ad) (D) (Enu) (Ls) (Loc) (N) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	21 45	(f)	Damp-proof course to chimney stacks shall be given separately
22 45		Brickwork in beam filling shall be included with the general brickwork; the labour of beam filling shall be given in feet run stating the thickness of the wall and including the cutting. (Acc) (Cut) (D) (DW) (Enu) (Inc) (SL) (Loc) (W) (Wp)	22 46		Brickwork in eaves filling shall be included with the general brickwork; the labour in eaves filling shall be given in feet run (measured over all) stating the thickness of the wall. (Acc) (Cut) (D) (DW) (Enu) (Inc) (SL) (Loc) (W) (Wp)
23 46		Plumbing to angles shall be measured to all external angles in faced brickwork and shall be given in feet run. (D) (Inc) (Loc) (W) (Wp)	23 47		Plumbing to angles shall be measured to all external angles in facings and fair faced brickwork and shall be given in feet run. (D) (Inc) (Loc) (W) (Wp)
24 47		An item of cutting and waste in forming reveals shall be given in feet run for all those which are not multiples of 4 ½ inches. (Acc) (Cut) (D) (Enu) (Inc) (Loc) (Ls) (SL) (T) (W) (Wp)	24 48		An item of cutting in forming rebated reveals shall be given in feet run except where both dimensions of the rebate are multiples of half a brick. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
25 48	(a)	All squints and birdsmouths shall be given in feet run and described as rough or fair as the case may be, the description of the bricks shall be given stating if these are required to be purpose- made (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	25 49	(b)	Squints and birdsmouths shall be similarly given in feet run; the item shall be deemed to inc cutting 4 ½" in to the thickness of wall, and any cutting beyond this shall be measured as rough cutting in accordance with clause 17 (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
25 49	(b)	Splays and rounded angles shall be given in feet run and the width of splays and girth of angles stated. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	25 50	(a)	Splays and rounded angles shall be given in feet run and described as rough or fair, and the width of splays and girth or radius of angles stated; the description of any special bricks shall be given, stating if they are purpose made. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
26 50		Where new walls are bonded to old an allowance of 2 ¼ ins. shall be made on the length, and an item of cutting and toothing and bonding new wall to old shall be given in feet superficial, alternatively this may be	26 51		Where new walls are bonded to existing an item of labour and material in cutting, toothing and bonding shall be given in feet superficial, alternatively this may be given in feet run stating the thickness of the new wall. (Acc) (Cut)

		given in feet run stating the thickness of the new wall. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)			(D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
27 51		Chases in brickwork for the edges of concrete or other partitions shall be described and given in feet run stating the thickness of the partition. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	27 52	(a)	Chases in brickwork for edges of partitions shall be given in feet run stating the thickness of the partition. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
28 52	(a)	Chases or ducts for pipes, wires, and the like shall be given in feet run stating the size; vertical, horizontal, or raking chases shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (R) (SL) (T) (W) (Wp)	27 53	(b)	Chases for pipes, wires, and the like shall be given in feet run stating the size; (Acc) (Cut) (D) (Enu) (Loc) (R) (SL) (T) (W) (Wp)
28 53	(b)	Chases for edges of concrete floors or landings shall be given in feet run, stating the thickness; no deduction of brickwork shall be made for such chases. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	27 54	(c)	Chases for edges of concrete, hollow tile or similar floors or landings shall be given in feet run, stating the thickness of floor or landing and depth of chase. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
28 54	(c)	Cutting chase for turning in edge of asphalte and pointing shall be given in feet run. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	27 55	(d)	Cutting chase for turning in edge of asphalte and pointing shall be given in feet run. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	27 56	(e)	Vertical, horizontal or raking chases shall each be given separately (R)
		<i>No comparable clause</i>	27 57	(f)	No deduction of brickwork shall be made for such chases (N)
29 55		Cutting and pinning edges of landings shall be given in feet run and the thickness stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)	28 58		Cutting and pinning edges of landings shall be given in feet run and the thickness stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
30 56		Cutting and fitting brickwork up to or around steel joists, girders, and stanchions shall be given in feet run stating the sizes and describing the nature of the cutting and fitting; alternatively this may be given in feet superficial. (Acc) (Alt) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)	29 59		Cutting and fitting brickwork up to or around steel stanchions and concrete columns and around steel joists and girders shall be given in feet run stating the sizes ; alternatively this may be given in feet superficial. (Acc) (Alt) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)
31 57		Raking out for and pointing flashings tb given in ft run; that for stepped flashings & work in old walls shall be given separately. For wedging see Plumber, clause 1 (f). (Acc) (Cut)	31 60		Raking out for and pointing flashings tb given in ft run; that for stepped flashings shall be given separately (Acc) (Cut) (D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)

		(D) (Enu) (Inc) (Loc) (SL) (T) (W) (Wp)			
32 58		Bedding plates and sleepers on top of walls shall be given in feet run, unless measured in with the brickwork; if more than 4 ½ ins, on bed, the width shall be stated. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	32 61	(a)	Bedding plates on top of walls shall be given in feet run, unless brickwork is measured over the plates; if more than 4 ½ ins, on bed, the width shall be stated. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
		<i>No comparable clause</i>	32 62	(b)	Bedding corrugated sheeting and the like on top of walls shall be given in ft run and the width of the bed stated; if required to be pointed on one or both sides this shall be included in the description.
33 59		The bedding and pointing of wood frames shall be given in feet run stating if pointed on one or both sides; where sills are bedded in a different material these shall be given separately. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp) (Wt)	33 63		The bedding and pointing of wood frames shall be given in feet run stating if pointed on one or both sides; where sills are bedded in a different material these shall be given separately. (Enu)
34 60		Hoop iron and similar metal bonds and bldg in shall be described and given in yards run. (Acc) (D) (Enu) (Loc) (Ls) (N) (SL) (W) (Wp)	34 64		Hoop iron and similar metal bonds and building in shall be given in yards run. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
35 61	(a)	For brick pavings see Pavior, clause 6.	35 65		For brick pavings and steps see Pavior, clause 6.
35 62	(b)	Brick steps shall be described and given in feet run including all labour and material and stating the width and height; circular steps shall be given separately stating the radius. Fair ends, angles, &c., shall be enumerated (Acc) (D) (Enu) (Ls) (Loc) (R) (Rad) (W) (Wp)			<i>See clause 35 above</i>
36 63	(a)	Rough relieving arches shall be enumerated as an extra over ordinary brickwork stating the thickness of the wall, the mean girth and the number of rings in height. (Acc) (Cut)(D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp)	36 66		Rough arches shall be measured the mean girth and given in feet run as extra over brickwork, stating the thickness of the wall and the number of rings in height; the items shall include for all cutting except for skewbacks, which shall be measured as rough cutting. (Acc) (Cut)(D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp)
36 64	(b)	Rough discharging arches shall be measured the mean girth and given in feet run stating the height of the face and the width of the soffit. (Acc) (Cut)(D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp)			<i>See clause 36 above</i>

37 65		Brick fireplaces shall be measured in detail, and given under a separate heading. (Acc) (D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp)	37 67		Brick fireplaces shall be measured in detail, and given under a separate heading. (Acc) (D) (Enu) (Loc) (N) (Rad) (SL) (T) (W) (Wp)
38 66		Hearths shall be given in feet superficial stating the number; the screeded bed (if any) shall be given separately. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)	38 68		Hearths shall be given in feet superficial stating the number; the screeded bed (if any) shall be given separately. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
39 67	(a)	Setting stoves, grates, mantels, and ranges shall be enumerated and type fully described; the size of the opening in all cases shall be stated. The description shall include for all concrete and brick backings required for setting. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)	39 69	(a)	Setting stoves, grates, mantels, and ranges shall be enumerated and type fully described; the size of the opening in all cases shall be stated. The description shall include for all concrete and brick backings required for setting. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)
39 68	(b)	The descriptions for setting tile, marble and other surrounds shall state whether slabbed or built up in position, and in either case shall include for cement and sand for fixing and cleaning off and washing down on completion. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)	39 70	(d)	(i) The descriptions for setting tile, marble and other surrounds shall state whether slabbed or built up in position, and in either case shall include mortar for fixing also cleaning off and washing down on completion. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (ii) Tiling to recesses for portable stoves and the like shall be measured in accordance with the rules for wall tiling (see Plasterer, clause 33)
39 69	(c)	Tiling to recesses for portable grates, &c., shall be given in feet superficial and described; the screeded bed for same shall be measured separately and it shall be so stated. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)			<i>See clause 39 (d) (ii) above</i>
39 70	(d)	The description for setting ranges shall include for setting back boiler (if any) and for forming all short flues and fixing covings. Soffit plates, dampers, &c.; connections of hot water pipes to boiler shall be measured, described, and given separately in the hot water fitter's work. The cutting away for hot water pipes shall be given as hereinafter described. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)	39 71	(b)	The description for setting ranges shall include for setting back boiler (if any) and for forming all short flues and fixing covings. Soffit plates, dampers, &c.; connections of hot water pipes to boiler shall be measured, described, and given separately in the hot water fitter's work. The cutting away for hot water pipes shall be given as hereinafter described. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)

39 71	(e)	The descriptions for setting portable stoves, coppers, &c., shall include placing in position and the length and diameter of flue pipe shall be stated; the connections with brick flue shall be given separately. (Acc) (D) (DW) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)	39 72	(c)	The descriptions for setting portable stoves, coppers, &c., shall include placing in position and the length and diameter of flue pipe shall be stated; the connections with brick flue shall be given separately. (Acc) (D) (DW) (Enu) (Loc) (N) (SL) (T) (W) (Wp) (Wt)
39 72	(f)	Fixing mantels shall be given separately and described . (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	39 73	(e)	Fixing mantels shall be given separately.
40 73		(i)Parging and coring flues shall be enumerated. Special arrangements for forming throats or wind bafflers shall be enumerated and described. (Acc) (D) (Enu) (Loc) (N) (R) (SL) (T) (W) (Wp)	40 74	(a)	Parging and coring flues shall be given in ft run. (Acc) (D) (Enu) (Loc) (N) (R) (SL) (T) (W) (Wp)
74		(ii)No deduction of brickwork shall be made for flues of smaller size than 1 ft. 6 ins. x 1 ft. 6 ins. (N)	40 75	(d)	(ii)No deduction of brickwork shall be made for flues of smaller size than 1 ft. 6 ins. x 1 ft. 6 ins. (N)
		<i>No comparable clause</i>	40 76	(b)	Flue linings shall be given in feet run; bends and easings formed by cutting shall be included with the item.
		<i>No comparable clause</i>	40 77	(c)	Pre-cast concrete flue blocks built into brickwork shall be enumerated
41 75	(a)	The fixing of metal window and door frames shall be enumerated stating the sizes; the description shall include for cutting and pinning lugs and for bedding and pointing, stating if pointed one or both sides. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	41 78	(a)	Building in metal window and door frames shall be enumerated stating the sizes; the description shall include for building in fixing lugs and for bedding and pointing, stating if pointed one or both sides. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)
41 76	(b)	The fixing of runners to sliding doors and shutters shall be enumerated and described stating the length and the method of fixing. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	41 79	(b)	Fixing of runners and channels to sliding doors and shutters shall be enum stating the length and the method of fixing. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)
41 77	(c)	Fixing doors and frames of safes shall be enumerated and described stating the size, approximate weight, the method of fixing and if pointed around one or both sides; the different floor levels at which iron or safe doors are to be fixed shall also be stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	41 80	(c)	Building in doors and frames of safes shall be enumerated stating the size, approximate weight, the method of fixing and if pointed on one or both sides; the different floor levels at which safe doors are to be fixed shall also be stated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)

42 78	(a)	Cutting and pinning or building in ends of timbers, lintels, steps, steel joists, brackets, &c., shall be enumerated except where no deduction has been made under Clause 2 (c); if in faced brickwork or in old walls they shall be so described and given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	42 81	(a)	Cutting and pinning or building in ends of timbers, lintels, steps, steel joists, brackets, &c., shall be enumerated except where no deduction has been made under Clause 2 (b); if in faced brickwork or in existing walls they shall be so described and given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
42 79	(b)	Ends of floor joists built in walls shall not be enumerated or given.	42 82	(b)	Where ends of timber floor joists and joists to flat roofs bear on a wall plate, building in of ends shall not be given
42 80	(c)	Cutting and pinning or building in ends of steel joists shall be given in stages as follows:- Those not exceeding 6 inches in depth, those exceeding 6 inches and not exceeding 12 inches in depth, and continuing in stages of 6 inches in depth. (CU)	42 83	(c)	Cutting and pinning or building in ends of steel joists shall be enumerated and classified in groups as follows:- Those not exceeding 6 inches in depth, those exceeding 6 inches and not exceeding 12 inches in depth, and continuing in stages of 6 inches in depth. (CU)
42 81	(d)	Holes through walls for pipes shall be enumerated and described stating the thickness of walls, the finish to both sides of the wall, and including the making good. Holes for pipes not exceeding 2 inches in diameter shall be described as for small pipes, those for pipes exceeding 2 inches and not exceeding 4 inches diameter as for large pipes, and in the case of holes for pipes exceeding 4 inches diameter the diameter shall be specifically stated. Holes in old walls shall be given sep and so desc. (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)	42 84	(d)	Holes through walls for pipes shall be enumerated and classified in accordance with General Principles, clause 10, stating the thickness of the wall, and shall include the making good of common brickwork and fair face (if any) (Acc) (D) (DW) (Enu) (Loc) (SL) (T) (W) (Wp)
42 82	(e)	Eyelets in walls for pipes shall be enumerated stating the internal diameter, number of rings, and thickness of walls; those in fair brickwork shall be given separately and so described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)			<i>No comparable clause</i>
42 83	(f)	Air bricks and the building in of ventilating gratings, soot doors &c., shall be enumerated stating the thickness of wall in which they are built; the forming of the opening behind same, the lintel and the size thereof, and the shape and finish of the opening shall be described. No deductions shall be made in brickwork for gratings ne 1 ft. 6 ins x 1 ft. 6 ins. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)	42 85	(f)	Air bricks and the building in of ventilating gratings, soot doors &c., shall be enumerated stating the thickness of wall in which they are built; the formation of the opening behind, including the lintel, shall be described. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp) (Wt)

42 84	(g)	Chimney pots shall be enumerated and desc including the setting and flaunching. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp) (Wt)	42 86	(g)	Chimney pots including the setting and flaunching, shall be enumerated (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp) (Wt)
43 85	(a)	(i)Partitions formed of slabs, concrete blocks, hollow tiles, or patent blocks shall be measured net as fixed and given in yards superficial; the description shall state the thickness and finish of the blocks and the setting mortar. (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)	43 87	(a)	Partitions or walls formed of slabs, concrete blocks, hollow tiles, or patent blocks shall be given in yards superficial; the description shall state the thickness and finish of the blocks (Acc) (D) (Enu) (Loc) (N) (SL) (T) (W) (Wp)
43 86	(a)	(ii)Cutting and pinning at top, cutting at ends, and cutting and bonding to walls, intersections, angles and irregular angles shall be given in feet run; raking and circular cutting shall be given separately. (Acc) (Cut) (D) (Enu) (Loc) (N) (R) (Rad) (SL) (T) (W) (Wp)	43 88	(b)	(ii)Cutting and pinning at top, cutting at ends and round openings, and cutting and bonding to intersections, angles and irregular angles also purpose made solid ends or filling in exposed ends of hollow blocks shall be given in feet run; raking and circular cutting shall be given separately (Acc) (Cut) (D) (Enu) (Loc) (N) (R) (Rad) (SL) (T) (W) (Wp)
43 87	(b)	Forming of openings shall be enumerated. (Cut) (D) (Enu) (Loc) (T) (W) (Wp)			<i>No comparable clause</i>
		<i>No comparable clause</i>	43 89	(c)	Cutting and bonding to walls of different construction shall be given in feet run and described as including the extra material
		Facings, Arches, &c.			
44 88	(a)	All facings shall be measured to the whole of the faces of walls exposed to view as extra only over common brickwork and shall be given in feet or yards superficial and include the pointing. The nature of the bricks, the pointing, and the bond shall be described. (DW) (EO) (Enu) (Loc) (T) (W) (Wp)	44 90	(a)	All facings shall be measured to the whole of the faces of walls exposed to view as extra only over common brickwork and shall be given in yards superficial except as provided below. The nature of the bricks, the pointing, and the bond shall be described. (DW) (EO) (Enu) (Loc) (T) (W) (Wp)
44 89	(b)	Where it is necessary for the work to be executed overhand the facings shall be given separately and so described. (Acc) (Ad) (D) (Enu) (Loc) (Ls) (N) (SL) (T) (W) (Wp)	44 91	(b)	Where it is necessary for the work to be executed overhand the facings shall be given separately (Acc) (Ad) (D) (Enu) (Loc) (Ls) (N) (SL) (T) (W) (Wp)
44 90	(c)	Battering facings shall be given separately and the batter described. (R) (Wp)	44 92	(c)	Battering facings shall be given separately and the batter described. (R) (Wp)

44 91	(d)	Circular facings shall be given separately and the radius stated. (Rad) (Wp)	44 93	(d)	In the case of circular facings the radius shall be stated. (Rad) (Wp)
44 92	(e)	All purpose made bricks shall be so described. (Sh) (Wp)	44 94	(e)	All purpose made bricks shall be so described. (Sh) (Wp)
44 93	(f)	Facings to reveals and returns 9 inches wide and under shall be measured the net width and given in feet run; the description shall state the width and include the plumbing to the angle. (Acc) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	44 95	(f)	Facings to reveals and returns 9 inches wide and under shall be measured the net width and given in feet run; the description shall state the width and include the plumbing to angle.(Acc) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
44 94	(g)	Facings to cavity and other walls where snapped headers are required shall be given separately and so described. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	44 96	(g)	Facings to cavity and other walls where snapped headers are required shall be given separately. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
44 95	(h)	Facing with bricks differing in sizes from the general building brick shall be given separately and the size stated (D) (Wp)	44 97	(h)	Facing with bricks differing in sizes from the general building brick shall be given separately and the size of the bricks and the method of bonding to general brickwork stated (D) (M) (Wp)
44 96	(i)	(i)Facings in bands differing from the general facing and not exceeding four courses in height, (D) (Enu) (Sh) (Wp)	44 98	(i)	(i)...facings in bands differing from the general facing and not exceeding four courses in height shall be given in ft run (D) (Enu) (Sh) (Wp)
97		(ii)and facings in small panels, shall be given separately and so described. (D) (Enu) (Sh) (Wp)	99		(ii) Facings in panels not exceeding one yd sup, shall be given separately in ft sup and the number stated (D) (Enu) (Sh) (Wp)
45 98	(a)	Arches shall be measured net on face and soffit and described and given in feet superficial. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)	45 100	(a)	Arches shall be measured the mean length on face and given in feet run, stating the height on face and the width of exposed portion of soffit (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)
45 99	(b)	Arches of varying shapes and types and arches of purpose-made bricks shall be given separately and described. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)	45 101	(b)	Arches of varying shapes and types and arches of purpose-made bricks shall be given separately (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)
45 100	(c)	Arches of unusual outline shall be enumerated. (Acc) (D) (Enu) (Sh) (SL) (T) (W) (Wp)	45 102	(c)	Arches of unusual outline shall be enumerated. (Acc) (D) (Enu) (Sh) (SL) (T) (W) (Wp)
46 101		Aprons in facings shall be given in feet superficial and the projection stated (see clause 18); the returns	46 103		Aprons in facings shall be given in feet superficial and the projection stated (see clause 18(a)); the returns shall be given

		shall be given in feet run. Shaping edges of aprons shall be given in feet run and shall include all cutting; alternatively the shapings may be enumerated stating the girth. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (T) (W) (Wp)			in feet run. Shaping edges of aprons shall be given in feet run and shall include all cutting; alternatively the shapings may be enumerated stating the girth. (Acc) (Cut) (D) (Enu) (Ls) (Sh) (SL) (T) (W) (Wp)
47 102	(a)	(i)Fair cutting shall be given in feet run and shall include waste; such cutting shall be taken to include cutting back 4 ½ inches into thickness of wall and any cutting beyond this shall be measured as rough cutting. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp) (ii)Skew backs to fair arches shall be given as fair cutting. (Cut)	47 104	(a)	Fair cutting shall be deemed to include cutting 4 ½ inches into thickness of wall, and any cutting beyond this shall be measured as rough cutting. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp) <i>Inc in clause 47(b) below</i>
103					
47 104	(b)	Fair cutting shall be measured up to stone or terra cotta dressings. Where panels are formed of stone or bricks of a different description from that of the general facing causing a vertical straight joint, an item of fair cutting shall be given in feet run. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp)	47 105	(b)	Fair cutting shall be measured up to stone or terra cotta dressings and to skewbacks of fair arches and given in feet run. Where panels are formed of stone or bricks of a different description from that of the general facing causing a vertical straight joint, an item of fair cutting shall be given in feet run. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp)
47 105	(c)	Cuttings against mouldings shall be enumerated and the girth of moulding stated. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp)	47 106	(c)	Cuttings against mouldings shall be enumerated and the girth of moulding stated. (Acc) (Cut) (D) (Enu) (Sh) (SL) (T) (W) (Wp)
48 106	(a)	Squints and birdsmouths shall each be given in feet run. (Acc) (Cut) (D) (Enu) (IW) (Sh) (SL) (T) (W) (Wp)	48 107	(a)	Squints and birdsmouths shall each be given in feet run, stating whether fair cut and rubbed or special made. (Acc) (Cut) (D) (Enu) (IW) (Sh) (SL) (T) (W) (Wp)
48 107	(b)	Splays, rounded angles, and moulded angles shall be given in feet run and the width, radius, or girth stated; stops, angles &c., shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)	48 108	(b)	Splays, rounded angles, and moulded angles shall be given in feet run, and the width, radius, or girth stated; stops, angles etc., shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)
49 108	(a)	Flush quoins formed with bricks of a different description from those of the general facings shall be given in feet run (each face being measured), stating the average width and whether	49 109	(a)	Flush or projecting quoins formed with bricks of a different description from those of the general facings shall be given in feet run (each face being measured), stating the average width

		bonded into the general facings or with a straight joint to same; if cut and rubbed they shall be so described. Projecting quoins shall be similarly measured and given. (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)			and whether bonded into the general facings or with a straight joint; if cut and rubbed they shall be so described. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)
49 109	(b)	Rustications shall be given in feet run and described. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	49 110	(b)	Rustication shall be given in feet run (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
50 110	(a)	Plain oversailing and set back courses shall be given in feet run and described stating the number of courses and the total projection (see clause 18); angles in same t b enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	50 111	(a)	Oversailing or receding courses in the wall face shall be given in ft run for extra labour and pointing the returns: the total projection and number of courses shall be stated (For unfaced bkk see clause 18(b)); (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
50 111	(b)	Dentil courses formed by setting back or setting forward the bricks shall be given in feet run, stating the spacing; angles shall be enumerated. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	50 112	(b)	Courses set back or forward as string courses and the like shall be given in ft run for extra lab, stating the number of courses and depth of returns: the description shall include for pointing returns and, where projecting, for the extra material. The formation of dentil or other ornamental courses shall be described. (For mouldings see clause 51 (b) and for unfaced work clause 18(c)) (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
51 112	(a)	Projecting plinth courses, strings , cornices, &c., shall be given in feet run, and the number of courses and the projections described. (See clause 18) (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	51 113	(a)	Sills , cornices, plinth courses and the like shall be given in feet run stating the number of courses and projection (if any) <i>For string courses, see clause 50(b) above</i> (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
51 113	(b)	Mouldings shall be described as 'special made' or cut and rubbed' as the case may be. If built of all headers this shall be stated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	51 114	(b)	Mouldings shall be given in ft run and the description shall state whether stock pattern, purpose-made or cut and rubbed and if built of all headers (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
51 114	(c)	All mitres, stoppings, returned ends, &c., to the foregoing shall be enumerated, giving external and	51 115	(c)	All mitres, stops, returned ends, & the like to the foregoing shall be enumerated, external, internal and

		internal and irregular angles separately. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)			irregular angles being given separately. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
51 115	(d)	All circular strings, cornices, &c., shall be given separately and so described (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)	51 116	(d)	In the case of circular work the radius shall be given (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)
52 116		Copings shall be described and given in feet run and shall include all labour and material; all ramps, angles and ends, coping cramps, &c., shall be enumerated (Acc) (Cut) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)	52 117		Copings shall be given in feet run and shall include all labour and material; ramps, angles, ends, pier caps and the like and cramps shall be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (O) (Sh) (SL) (T) (W) (Wp)
53 117		Notches and perforations for pipes through projecting courses shall be enumerated stating the number of courses through which the pipe passes and the diameter of the pipe. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	53 118		Notches and perforations for pipes through projecting courses shall be enumerated stating the number of courses through which the pipe passes and the diameter of the pipe. (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
54 118	(a)	(i)Small items, such as key blocks, corbels, panels, under 12 inches by 12 inches shall be enumerated and described and shall include all rough and fair cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	54 119	(a)	Key blocks, corbels, panels, not exceeding 1 ft sup and the like shall be enumerated and shall include all rough and fair cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
119		(ii)Strings not exceeding 12 inches long shall be enumerated and described including the ends; breaks around pilasters not exceeding 9 inches wide shall also be enumerated. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)			<i>No comparable clause.</i>
54 120	(b)	Tumblings to buttresses shall be enumerated and shall include all cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	54 120	(b)	Tumblings to buttresses shall be enumerated and shall include all cuttings. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
		Rubbed and Gauged Facings			Rubbed and Gauged Facings
55 121		Clauses 44 to 54 shall apply generally to the measurement of rubbed and gauged facings. A description of the setting shall be given.	55 121		Clauses 44 to 54 shall apply generally to the measurement of rubbed and gauged facings. A description of the setting shall be given.

56 122	(a)	Facing to niches shall be given in feet superficial stating the radius. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)	56 122	(a)	Facing to niches shall be given in feet superficial stating the radius. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)
56 123	(b)	An item of external angle of straight and circular facing shall be measured at edges of niches and given in feet run. (Acc) (D) (Enu) (IW) (Ls) (Loc) (SL) (T) (W) (Wp)	56 123	(b)	An item of external angle of straight and circular facing shall be measured at edges of niches and given in feet run. (Acc) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)
56 124	(c)	Niche heads shall be enumerated, the shape and size stated, and the superficial area given. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)	56 124	(c)	Niche heads and sills shall be enumerated, shape & size stated, and the sup area given. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)
56 125	(d)	Faces of arches to niche heads shall be measured the mean girth of the face and given in feet superficial. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)	56 125	(d)	Arches to niche heads shall be measured the mean length on face and given in feet run including the external angle of arch and niche head. (Ls)
56 126	(e)	An item of external angle of edge of arch and facing to niche head shall be given in feet run. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)			<i>Inc in clause 56(d) above</i>
56 127	(f)	The sills of niches shall be given in ft sup: if weathered they shall be so described. (Acc) (D) (Enu) (Loc) (R) (Sh) (SL) (T) (W) (Wp)			<i>Inc in clause 56(c) above</i>
57 128		Bands shall be given in feet run stating proj; all labours on same , such as weatherings, mouldings or throatings t b desc. Circ bands shall be given sep stating radius; external and internal angles, stops and similar labours shall be enumerated. (Acc) (D) (Enu) (Loc) (Ls) (Rad) (Sh) (SL) (T) (W) (Wp)	57 126		Bands shall be given in feet run stating the projection; all labours, such as weatherings, mouldings or throatings shall be described. In the case of circ bands radius t b stated; angles, stops and the like shall be enu, ext, int and irregular Ls being given sep. (Acc) (D) (Enu) (Loc) (Sh) (SL) (T) (W) (Wp)
58 129		Projecting strings and cornices, &c., shall be given in feet run, stating the height and projection and the girth of moulding; external and internal angles, stops, and similar labours shall be enum as desc in clause 51. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	58 127		Projecting string, cornices, & the like tb given in ft run, stating the ht, proj & girth of moulding. In the case of circ work the rad shall be given; angles, stops, and the like shall be enum; external, internal, and irregular angles being given separately. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
59 130	(a)	Square pilasters shall be given separately in feet run stating the projection, and shall be described as including for cutting and bonding with the general facing at internal	59 128	(a)	Square pilasters shall be given separately in feet run stating the projection, and shall include for cutting and bonding with the general facing at

		angles. (Acc) (D) (Enu) (Loc) (Ls) (SL) (T) (W) (Wp)			internal angles. (Acc) (D) (Enu) (Loc) (Ls) (SL) (T) (W) (Wp)
59 131	(b)	Pilasters with an entasis shall be given similarly and the mean width and return stated. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	59 129	(b)	Pilasters with entasis shall be given similarly and the mean width and return stated. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
60 132		Caps, bases and neckings to pilasters shall be enumerated, stating the extreme dimensions, and the girth of moulding; the angles and stopped ends, &c., shall be included in the description. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	60 130		Caps, bases and neckings to pilasters shall be enumerated, stating the extreme dimensions, and the girth of moulding; angles, stopped ends, & the like shall be included in the description. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
61 133	(a)	Brickwork for carved panels, corbels, &c., exceeding 3 ft. superficial shall be given in feet superficial and the projection stated; the extra brickwork for the projection shall be included in the description of the item. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	61 131	(a)	Brickwork for carved panels, corbels, & the like exceeding 3 ft. superficial shall be given in feet superficial and the projection stated; extra bkk for the proj shall be inc in the description of the item. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
61 134	(b)	Smaller items shall be enumerated, giving extreme sizes and projections, and shall be described as including the extra bkk. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	61 132	(b)	Smaller items shall be enumerated, giving extreme sizes and projections, and shall include the extra brickwork. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
61 135	(c)	Work set in shellac shall be given separately and so described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	61 133	(c)	Work set in shellac shall be given separately. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
62 136	(a)	Surface ornament shall be given in feet superficial and described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	62 134	(a)	Surface ornament shall be given in feet superficial. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
62 137	(b)	Running enrichments and dentil courses shall be given in ft run and described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	62 135	(b)	Running enrichments and dentil courses shall be given in ft run. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
62 138	(c)	Corbels and other similar items and small panels not exceeding 12" x 12" shall be enumerated and described. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	62 136	(c)	Corbels and other similar items and small panels not exceeding 12" x 12" shall be enumerated. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
63 139		See Preliminaries, clause 30	63 137		See Preliminaries, clause 21
		Glazed Brick Facings.			Glazed Brick Facings.

64 140	(a)	Glazed brick facings shall be measured and given as described in clauses 44 to 54 (b) . An item of extra to cutting and waste at internal angles shall be measured at all internal angles and given in feet run. (Acc) (D) (Enu) (EO) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	64 138		Glazed brick facings shall be measured and given as described in clauses 44 to 54. An item of extra for at internal angles shall be given in feet run. (Acc) (D) (Enu) (EO) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
		<i>Note: There is no clause 64 (b) or (c), so the (a) above must have been an error.</i>			
		Boiler Seatings and Flues, and Boiler Shafts or Stacks.			Boiler Seatings and Flues, and Boiler Shafts or Stacks.
65 141	(a)	All work in connection with boiler seatings and flues, and boiler shafts or stacks, shall be given separately and described	65 139		All work in connection with boiler seatings and flues, and boiler shafts or stacks, shall be given separately
65 142	(b)	Brickwork in boiler seatings and flues shall be measured net and given in feet or yards superficial and the thickness stated. (Acc) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)			<i>No comparable clause</i>
65 143	(c)	Firebrick and fireclay work shall be given separately and so described . Boiler seating blocks and curved flue covers shall be given in feet run and all irregular pieces enumerated. All cuttings in brickwork, firebricks, fire lumps or tiles, seating blocks, and flue covers shall be given. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)	66 140		Firebrick and fireclay work shall be given separately. Boiler seating blocks and curved flue covers shall be given in feet run and all irregular pieces enumerated. All cuttings in brickwork, firebricks, fire lumps or tiles, seating blocks, and flue covers shall be given. (Acc) (Cut) (D) (Enu) (Loc) (Ls) (Sh) (SL) (T) (W) (Wp)
65 144	(d)	The brickwork of the various stages in chimney shafts shall be given separately, the heights and thicknesses stated, and the shape of shaft described; if built from an outside scaffold it shall be so stated. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)	67 141		The brickwork of the various stages in chimney shafts shall be given separately, the heights and thicknesses stated, and the shape of shaft desc; if built from an outside scaffold it shall be stated. (Acc) (Cut) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)
65 145	(e)	Firebrick linings shall be given in ft sup and the thickness stated; if bonded to the backing they shall be so described. Irregular angles in firebrick linings shall be given in ft run. (Acc) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)	68 142		Firebrick linings shall be given in ft sup and the thickness stated; if bonded to the backing they shall be so described. Irregular angles in firebrick linings shall be given in ft run. (Acc) (D) (Enu) (Loc) (Rad) (Sh) (SL) (T) (W) (Wp)

COMPARISON OF SMM4 AND SMM5

4 th Edition, 1948			5 th Edition, 1963 (amended 1964)		
Clause	Sub-clause	Text and comments <i>Comments in italics</i>	Clause	Sub-clause	Text and comments <i>Comments in italics</i>
					Introduction
		<i>See General Principles, clauses 2 and 3 below.</i>			The Standard Method of Measurement provides a uniform basis for measuring building works and embodies the essentials of good practice but more detailed information than is demanded by this document should be given where necessary in order to define the precise nature and extent of the required work. The Standard Method shall apply equally to the measurement of proposed works and of executed works.
		General Principles			General Rules
1	1	BQ shall fully describe mats & wkmnship & accurately represent the work t b executed: work which by its nature cannot be accurately measured shall be described as provisional (D) (P)	A1	1	BQ shall fully describe & accurately represent the works t b executed. Work which cannot be measured accurately shall be described as provisional (D)(P)
2		The SMM, whilst it aims at providing uniform units of measurement, is a definition of principle rather than an inflexible document. In particular and exceptional cases the Surveyor is expected to use his discretion and to adopt special methods, provided the principles of measurement laid down are observed and the intention is made clear to the estimator. If it is in the interest of accurate and practical estimating, he may give more detailed			<i>See Introduction above</i>

		information than is demanded by strict adherence to the document			
3	2	The methods of measurement laid down to be applicable to the prep of BoQ before work is commenced equally with measurement of finished work			<i>See Introduction above</i>
4	3	Unless otherwise stated, all work shall be measured net as fixed in place (N)	A2	2 (a)	(i) Work shall be measured net as fixed in position (N)
Editions 4 and 5					
		<i>No comparable clause.</i>	A2	3 (a)	(ii) and each measurement shall be taken to the nearest whole inch. Fractions of an inch less than half shall be disregarded and all other fractions shall be regarded as whole inches. This rule shall not apply to the measurement of nominal sizes of structural timber (for which see Clause N3(b) hereof, nor to the measurement of glazing (for which see Clause V2 (c) hereof) nor to any dimensions stated in descriptions.
		<i>No comparable clause.</i>	A2	4 (b)	Where minimum deductions of voids are dealt with in this document they shall refer only to openings or wants which are wholly within the boundaries of the measured areas. Openings or wants which are at the boundaries of measured areas shall always be the subject of deduction irrespective of size. (MsA)
6	4	The description given of each item, unless otherwise stated, to include conveyance & delivery, unloading, storing, hoisting, all labour setting, fitting & fixing in position, straight cutting & waste, return of packings, establishment charges & profit. (Acc) (Ad) (D) (Loc) (SL)	A3	5 (b)	Unless otherwise specifically stated in the bill, or herein, the following shall be deemed to be included with all items:-(i) Labour and all costs in connection therewith. (ii) Materials, goods and all costs in connection therewith (e.g. conveyance; delivery; unloading; storing; returning packings; handling; hoisting; lowering) (iii) Fitting and fixing materials and goods in position (iv) Use of plant (v) Waste of materials (vi) Square cutting

					(vii) Establishment charges, overhead charges and profit. (Acc) (Ad) (D) (Loc) (SL)
		<i>No comparable clause.</i>	A3 6	(c)	Junctions bet str & curved wk shall in all cases be deemed to be included with the work in which they occur
		<i>No comparable clause.</i>	A3 7	(d)	Notwithstanding the provisions in this doc for labs to be given in lin ft or lin yds, such labs may be given in the desc of any lin item of wk on which they occur
		<i>No comparable clause.</i>	A3 8	(e)	Notwithstanding the provisions in this document for labours to be enumerated, such labours may be given in any enumerated item of work on which they occur
Editions 4 and 5					
		<i>No comparable clause.</i>	A3 9	(f)	Labours on old work shall be so described.
		<i>No comparable clause</i>	A4 10	(a)	The rules in this clause apply only when specific reference is made in this document to the following paragraphs of this clause
		<i>No comparable clause</i>	A4 11	(b)	Where this document requires the sizes of steel sections to be stated in accordance with this paragraph, they shall be grouped and described as follows: (i) Small, (ie not more than 6" in depth) (ii) Medium (ie more than 6" but not more than 12" in depth) (iii) Large (ie more than 12" but not more than 18" in depth) (iv) Extra large (ie more than 18" in depth)
8	5	Where a min area is defined for ddt of voids, e.g. in the case of pavings, plastering, etc., ddt shall refer only to openings or voids detached from boundaries of the space measured. Reductions of area caused by projections from the boundary of the space measured shall always be the subject of deduction irrespective of size. (MsA)			<i>No comparable clause</i>

9	6	Circular work shall be given separately; the term 'circular' shall be deemed to include any form of curve (Rad)			<i>No comparable clause</i>	
10	7	Pipes shall be desc by their int. dia unless otherwise stated. In desc of holes & painting, pipes ne 2" dia classed as small, ex 2" & ne 4" dia as large, those ex 4" tb stated (CU)	A4	12	(c)	Where this document requires the sizes of pipes and tubes (measured internally) and of bars, cables, conduits, standards and the like (measured externally) to be stated in accordance with this paragraph, they shall be grouped and described as follows:- (i)Small (ie not exceeding 2" dia.) (ii)Large (ie over 2" but ne 4" dia) (iii)Extra large (ie over 4" dia) (CU)
		<i>No comparable clause</i>	A4	13	(d)	Where this document requires the sizes of panes to be stated in accordance with this paragraph, they shall be grouped and described as follows. Where panes of more than one size occur in any one sash, casement or door, the sizes shall be averaged for this purpose:- (i)Small,(ie ne 1 sq ft each) (ii)Medium (ie >1 sq ft but ne 4 sq ft) (iii)Large (ie >4 sq ft but ne 8 sq ft) (iv)Extra large (ie >8 sq ft) (CU)
		<i>No comparable clause</i>	A5	14	(a)	Extra for forming short lengths (ie lengths not exceeding 12") shall be deemed to be included with the work in which they occur except when specific reference is made in this document to the following paragraph of this clause. (EO)
Editions 4 and 5						
		<i>No comparable clause</i>	A5	15	(b)	Where this document requires short lengths (ie lengths not exceeding 12") to be given in accordance with this paragraph, they shall be enumerated as extra over the work in which they occur irrespective of the actual length. (EO)
		<i>No comparable clause</i>	A6	16	(a)	Where the unit of billing is the ft or yd, quantities shall be billed to the nearest whole unit. Fractions of a unit less than half shall be disregarded and all

					other fractions shall be regarded as whole units
		<i>No comparable clause</i>	A6 17	(b)	Where the unit of billing is the hundredweight, quantities shall be calculated to the nearest stone (ie 14lbs) and stones shall be billed as eighths of a hundredweight. Fractions of a stone less than half shall be disregarded and all other fractions shall be regarded as whole stones.
		<i>No comparable clause</i>	A6 18	(c)	Where the application of this clause would cause an entire item to be eliminated, such item shall be enumerated stating the size or weight as appropriate (Enu)
11 8		(i)All work executed in or under water to be given sep, stating whether canal, river or sea water work, & giving levels of high & low water where applicable. (ii)Any work carried out in compressed air to be given sep (Ad)	A8 19 A9 20		Work executed in or under water shall be so described stating whether canal, river or sea water, & (where applicable) the levels of high & low water. (Ad) Work executed in compressed air shall be so described stating the pressure and the methods of entry and exit (Ad)
		Preliminaries			Preliminaries
		<i>No comparable clause</i>	B1 1		The names and addresses of the employer, the architect and the quantity surveyor shall be stated
1 9		A general description of the works comprised in the Contract shall be given.	B3 2	(a)	A general description of the works shall be given
		The height of the building above and below ground level shall be stated together with the number of storeys. <i>No comparable clause</i>	B3 3	(b)	Where drawings are not supplied with the bill, particulars of the following shall be given:- (i)the size of the building, the height above and below ground level and the number of storeys. (ii)The length and height of external elevations, the total height for each elevation being given separately
2 10	(a)	Pos of site to be desc with any particulars as to access; if adj to or abutting upon old bldgs. or if wkg space limited to be stated (Acc) (Loc) (Tpt) (W)	B2 4	(a)	The pos of the site to be desc stating the mode of access. Attention shall be drawn to any limitations of wkg space

		<i>No comparable clause</i>	B5 5	(a)	For convenience in pricing, items for the following shall be given unless they are covered by the schedules given in accordance with Clause B4 hereof :-
Editions 4 and 5					
7 11	(a)	(i) Plant tools scaffolding & staging. <i>See clause 7 (a) (i) above</i> (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	B5 6 B18 7	(a)	(i) Plant tools and vehicles General scaffolding for the works shall be given as an item, The approximate gross area of floors which have finished ceilings over 11ft but ne 20ft above the floor shall be given in sq yds. Where finished ceilings are over 20 ft above the floor, such floor areas shall be given separately in sq yds stating the actual height of the ceiling. For special scaffolding see clause B20(c) hereof (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	B5 8	(a)	(ii) Safety, health and welfare of workpeople
7 12	(a)	(ii) Special scaffolds if required for nominated sub- cons work, shall be desc. (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	B20 9	(c)	Special attendance on nominated sub contractors t b given as an item in ea case giving particulars (eg Unloading, storing; hoisting; placing in position; providing power; providing special scaffolding) (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	B12 10		Clearing away temporary works and making good after shall be deemed to be included with the items. (T)
7 13	(b)	Offices, sheds messrooms, accomodation and attendances, and other welfare facilities (T)	B14 11	(a)	Tempy sheds, offices, messrooms, san accomm & other tempy bldgs for use of the contractor tb given as an item. Htg, lghtg, furn, eqt and att deemed to be included with the item (T)
Editions 4 and 5					
7 14	(c)	Sanitary conveniences, their maintenance & removal (T)			<i>See clause B14 (a) above</i>
		<i>No comparable clause</i>	B14 12	(b)	Temporary offices for the use of the architect, the quantity surveyor, the clerk of works and any other person acting on behalf of the employer shall be given as an item stating the floor area required. Heating, lighting,

					furniture, equipment and attendance shall be given in the description (T)
7	15	(d)	Temporary screens (area given in squares) (T)	B16 13	Temporary screens and the like shall be given as an item stating the area in sq yds and any requirements regarding construction. Doors and windows in screens shall be given in the description. (T)
7	16	(e)	Telephones to be provided. Telephones other than those for the use of the Contractor to be the subject of a provisional sum. (T)	B15 14	Temporary telephone facilities on the site shall be given as an item. The cost of calls made on behalf of the employer shall be the subject of a provisional or prime cost sum as Clause A7 hereof. The cost of all other calls shall be deemed to be included with the item (T)
21	17	(a)	Protection of the work and materials from weather. (T)	B22 15	Protecting the works from inclement weather shall be given as an item (T)
21	18	(b)	Casing up and protecting shall be given as a clause at the end of each trade in which work requiring it is included. Covering up and protecting floors, pavings and the like shall be given as a clause following the item or groups of items. (T)		See Clause C11
Editions 4 and 5					
26	19		Water for the works, including that for nominated sub-contractors, and any necessary temporary plumbing and storage. When the charge for water is dependent upon the amount of the Contract a note shall be made in the money column to the effect that it is to be priced on the Summary, provision being made therein accordingly. (T)	B7 16	Water for the works and temporary arrangements for storing and distributing about the site shall be given as an item. Where water will be supplied free of cost to the contractor, particulars shall be given as to the available capacity, the source (eg public main; borehole) and the location of the point of free supply. (T)
27	20	(b)	(i) General attendance upon nominated sub-contractors; this shall give particulars of any unloading, storing, hoisting, placing in position of materials, clearing away rubbish and the like, protecting and other facilities to be afforded by the Contractor. (Cut) (T)	B20 17	(b) General attendance on nominated sub-contractors shall be given as an item in each case and shall be deemed to include only allowing use of standing scaffolding, messrooms, sanitary accommodation and welfare facilities; provide space for office accommodation and for storage of plant and materials; providing light and water for their work; clearing away rubbish (Cut) (T)
	21		(ii) Cutting away for and making good after nominated sub contractors, together with any other Contractor's work in connection shall be measured		

		in detail or covered by provisional sums. (Cut)			
27	22	(c)	General attendance upon and cutting away for and making good after artists or tradesmen engaged by the Employer for work not forming part of the contract shall be given in accordance with the principles of sub-clause (b) above. (Cut) (T)		<i>No comparable clause</i>
28	23		The provision of fuel and attendance for drying the building, if required.	B23 18	Prov tempy eqt, fuel & att for drying & controlling humidity of the wks t b given as a prov or p c sum as clause A7 hereof. For temporarily operating the permanent heating system see Clauses S105 and T28 hereof (T)
Editions 4 and 5					
31	24		Shoring, other than that in connection with cutting openings (where the position and description is included in a "Works on Site" bill) shall be fully described, or provisional quantities given, (T)		<i>See Clause C10 below</i>
32	25	(a)	Hoardings, fans, planked footways, and guard rails shall be given in feet run; lighting for the protection of the Public shall be described. (T)	B17 19	(a) Temporary fencing, hoardings, fans, planked footways, guard rails, gantries and the like as may be necessary for protecting the public, for the proper execution of the work and for meeting the requirements of any local or other authority shall be given as an item stating any conditions imposed by the employer regarding such matters as construction, access, decoration and advertising. (T)
			<i>No comparable clause</i>	B17 20	(b) Such temporary works specifically required by the employer shall be given as items stating all relevant particulars. (T)
32	26	(b)	Gantries shall be given in feet run (T)		<i>See clause B17 (a) above</i>
34	27		A description of any demolition shall be given stating which materials are to be removed and credited and which are to remain the property of the		<i>See clauses C1(a)(b)(c) below</i>

		Employer with particulars of their protection and disposal (Acc) (Cut) (D) (Enu) (SL) (Loc) (PP) (T) (Tpt) (W) (Wp)			
35	28	(b)	Temporary roofing and enclosures shall be desc and, where practicable, quantities shall be given. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)		See clause C9 below
Editions 4 and 5					
36	29		An item shall be given for temporary cartways and crossings where required; the distance from the public road to the building shall be stated and any other relevant particulars given (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	B13 21	Temporary roads, tracks, hardstandings, crossings and the like shall be given as an item stating all relevant particulars (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			<i>No comparable heading</i>		DEMOLITION and ALTERATIONS
			<i>No comparable clause</i>	C1 1	(a) The location of demolitions and alterations shall be given in the description of the items (Acc) (Loc) (D) (SL) (PP) (T) (Tpt) (W) (Wp)
			<i>See Preliminaries clause 31 above</i>	C1 2	(b) Shoring and scaffolding incidental to demolitions and alterations shall be given in the description of the items. Other shoring (eg to old buildings left standing) shall be given in accordance with Clause C10 hereof (Acc) (D) (Enu) (Loc)(T)
			<i>See Preliminaries Clause 34</i>	C1 3	(c) Old materials arising from demolitions and alterations shall become the property of the contractor unless otherwise stated. Clearing away such old materials shall be deemed to be included with the items. Provision should be made in the bill for credits. (Tpt)

		<i>See Preliminaries Clause 34</i>	C1 4	(d)	Old materials required to remain the property of the employer shall be so described. Setting aside and storing such materials on site shall be given in the description of the items. (T) (Tpt)
		<i>See Preliminaries Clause 34</i>	C1 5	(e)	Old materials permitted to be re-used in work measured as new shall be so described. No adjustment shall be made to the measured quantities of new work in which such old materials are reused. (Tpt)
		<i>No comparable clause</i>	C2 6	(b)	Demolishing individual structures (or parts thereof) shall be given as items, except that clearing the site of all structures may be given as an item. The lowest level of demolition shall be stated (eg down to the top of surface concrete at the lowest floor level) (Acc) (Cut) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	C2 7	(c)	Leaving parts of old walls temporarily in position to act as buttresses shall be given in the description of demolition items (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)

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		<i>No comparable clause</i>	C4 8	(a)	Cutting openings in old structures shall be given as items stating the nominal finished size of the opening, the type and thickness of the old structure and the treatment around the opening (eg inserting trimmers, lintels arches, cills and the like; quoining up jambs). Extending finishings and making good all work disturbed shall be given in the description. New doors, windows and the like shall be measured in detail in accordance with the appropriate rules. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
		<i>No comparable clause</i>	C5 9		Blocking up openings in old structures shall be given as items stating the size of the opening and the nature and thickness of the new work. Taking out thresholds, lintels, arches sills and the like, bonding or otherwise securing the new work to the old structure, extending finishings on the new work

				and making good all work disturbed shall be given in the description. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)
		<i>No comparable clause</i>	C6 10	Pulling down walls, partitions, floors, roofs, staircases and other parts of old structures shall be given as items. Where practicable quantities and dimensions shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
		<i>No comparable clause</i>	C7 11	Taking down fittings and fixtures (eg doors; windows; sanitary appliances; counters; cupboards) shall be given as items stating the size. Those required to be set aside for refixing shall be so described. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
		<i>No comparable clause</i>	C8 12	Repairing, adapting and refixing old fittings and fixtures shall be given as items stating the size
		<i>See clause 35(b) above</i>	C9 13	Temporary screens and temporary roofs shall each be given separately in sq yds or enum as may be appropriate. Weatherproof screens and dustproof screens shall be so described. Temporary arrangements for dealing with rainwater, temporary doors, temporary windows and the like in screens shall be given in the description. Clearing away temporary work shall be deemed to be included with the items. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
Editions 4 and 5				
		<i>No comparable clause</i>	C10 14	Timber shoring (other than that incidental to demolitions and alterations) shall be given in cubic feet stating the position and type of shoring and the nature of the structure to be shored. Erecting, maintaining, clearing away, cutting holes in the structure, making good all work disturbed, obtaining licences and paying fees shall be given in the description. Providing all necessary nails, wedges and bolts shall be deemed to be included with the items (T)
		<i>No comparable clause</i>	C11 15	Protecting the work in this section shall be given as an item. (T)

		III EXCAVATOR			Excavation & Earthwork
1 1	(a)	Where practicable the nature of the soil shall be described; attention shall be drawn to any existing trial holes.	D1 1	(a)	(i)Any information available concerning the nature of the ground and strata shall be given. Particulars of any trial holes or trial bores on site shall be given stating their location. (ii)The water level in the ground & date when it was msd tb stated but, where this info is not available , it shall be ascertained bef pumping ops are started. The water level so estabd (by either method) deemed tb normal water level in the grd throughout the contract notwithstanding any subseqt changes.
			2		
1 2	(b)	Excavation in rock shall be given separately or may be described as extra over the various classes of excavation (Acc) (Alt) (Cut) (D) (Enu) (EO) (SL) (Loc) (P) (PP) (Tpt) (W) (Wp)	D6 3	(e)	(i)Excavating in rock shall be so described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (P) (PP) (Tpt) (W) (Wp) (ii)Rock is defined as any material met with in excavation which is of such size or position that it can only be removed by means of wedges, compressed air or other special plant, or explosives. (iii)Alternatively breaking up rock may be given as extra over each of the various descriptions of excavation. (Alt) (EO)
			4		
			5		
1 3	(c)	All Excavators' work and subsequent disposal of exc material shall, except as hereinafter provided, be given in yds cu (D) (Loc) (Tpt) (Wp)			<i>No comparable clause, but see clauses D1 (b) and D6 (c) below.</i>
		<i>No comparable clause, but see clause 1 (c) above and 1 (f) below</i>	D1 6	(b)	Work in extg bldgs tb so desc. Handling mats & getting them in or out of such bldgs deemed to be inc (Acc) (Tpt)
1 4	(d)	(i)The measurements of all excavation and subsequent disposal shall be those before excavating (Tpt) (U)	D6 7	(b)	(i)The quants given for excav and subsequent disposal deemed tb the bulk bef exc (Tpt) (U)
Editions 4 and 5					
1 5	(d)	(ii)The increase in bulk and any extra excavation required for planking and	D6 8	(b)	(ii)& no allowance tb made for any subsequent variations in bulk or for any

		strutting shall be allowed for by the contractor (U)			extra space required to accommodate planking and strutting (U)
1 6	(e)	(i) All excavation shall be described as excavate and get out (or excavate and basket out as hereinafter provided); (Tpt)			No comparable clause
		No comparable clause	D6 9	(c)	(i)Getting out excavated materials by any means necessary shall be deemed to be included with the items of excavation (Tpt)
1 7	(e)	(ii)the subsequent disposal of the excavated material shall be given as a separate item. (Tpt)	D6 10	(c)	(ii)Subsequent disposal of excavated material shall be given in accordance with Clause D16 hereof (Tpt)
1 8	(e)	(iii)except in the case of trenches referred to in Clause 4 (d) where it shall be desc with the item of excavation. (For drain trenches see Drainlayer, Clause 4). (Tpt)	11		(iii)(except as otherwise provided in Clause D12)
1 9	(f)	Where it is impracticable to form a wheeling gangway for the removal of excavated material the excavation shall be described as basketed out. (Acc) (Ad) (D) (Loc) (SL) (Tpt)			No comparable clause, replaced by clause D1 (b) above
1 10	(g)	All excavations, except over site to reduce levels, shall be given in successive stages of 5 feet, stating the commencing level (CU) (D) (Enu) (Loc) (SL) (Wp)	D6 12	(f)	Where the depths of excns are required t b stated in accordance with this rule, they shall be grouped & given in successive stages of 5 ft (eg ne 5 ft dp; over 5 ft but not exceeding 10ft dp) (CU) (D) (Enu) (Loc) (SL) (Wp)
		No comparable clause	D6 13	(g)	Allowances for working space(which shall not be subject to adjustment if more or less space is actually required) shall be made in the measurements of excavations as follows:- (i)(i)See on (ii)9” from the face of any work which requires formwork not exceeding 3 ft deep below the starting level of excn.
				14	
				15	

			16		(iii)5ft extra length at each end of trenches which are to receive post tensioned concrete ground beams. (CU) (D) (Enu) (Loc) (SL) (Wp)
		<i>No comparable clause</i>	D6 17	(d)	Exc bel normal water level (as estabd in acc with Clause D1(a) hereof) t b given in cu yds as EO all kinds of excavation irrespective of depth. Excavation in running silt or running sand (grouped together) shall be similarly given; where such work is also below the normal water level it shall be so described. (Ad) (EO)
Editions 4 and 5					
1 11	(h)	(i)Levelling or grading and ramming of bottoms shall be given separately in yds sup except under beds, pavings &c., given as superficial items in which cases it may be described with the item. (Acc) (Alt) (D) (Enu) (F) (Loc) (SL)	D17 18	(a)	(i)Treating the surface of the ground, or the surface of filling, or the bottom of excavation (eg levelling; grading to falls; grading to cambers; (Acc) (D) (Enu) (F) (Loc) (R) (SL)
			19		(ii)blinding; compacting.(Acc) (D) (Enu) (F) (Loc) (R) (SL)
			20		(iii)shall each be given separately in sq yds. Alternatively, such treatments may be given in the description of any superficial item of excavation, earth filling, hardcore filling, concrete or paving. (Acc) (Alt) (D) (Enu) (F) (Loc) (SL)
1 12	(h)	(ii)Levelling bottoms in rock shall be given separately (Acc) (Cut) (Alt) (D) (Enu) (F) (Loc) (SL)			
		<i>No comparable clause</i>	D17 21	(b)	Compacting which is required to be carried out by specific means (eg mechanical punner, roller of specified weight) shall be appropriately desc. (F)(PP)

		<i>No comparable clause</i>	D17 22	(c)	Treating bottoms of excavations in rock shall be so desc.(F)
		<i>No comparable clause</i>	D17 23	(d)	Trimming sides of cuttings and sides of embankments to slope shall each be given separately in sq yds. Curved work shall be so desc. (F) (R) (Rad)
		<i>No comparable clause</i>	D17 2	(e)	Trimming sides of excn in rock to produce fair exposed faces tb given in sq yds. Curved wk shall be so described (F) (Rad)
2 13	(a)	Surface excavation n e 12” dp tb given in yds sup & av dpth stated (Acc) (D) (Enu) (F) (Loc) (SL) (Wp)	D725 26		(i)Excavating surfaces over 12” deep to reduce levels shall be given in cubic yds. (ii)Such work not exceeding 12” deep shall be given in sq yds stating the average depth
		<i>No comparable clauses</i>	D2 27 D6 28 D19 29 D20 30 D22 31	(a) (a) (a) (a) (a)	‘For rules relating to Section D generally see Clause D1 hereof ‘ Ditto Ditto Ditto Ditto
2 14	(b)	If turf or veg soil t b preserved the qty t b given in yds sup stating av dpth & disposition of the mat. (Acc) (D) (Enu) (Loc) (T) (Tpt) (Wp)	D3 32		Lifting turf which is to be preserved shall be given in sq yds stating method of preservation & disposal (Acc) (D) (Enu) (Loc) (T) (Tpt) (Wp)
		<i>See clause 2 (b) above</i> <i>See clause 2 (b) above</i>	D4 33 D4 34		(i)Excavating vegetable soil which is to be preserved shall be given in sq yds stating the av dpth (ii)Soil deposited on site in permanent spoil heaps or spread on site shall each be so described stating the location of such deposits or the average distance from the excavation in linear yds or miles (Loc)
Editions 4 and 5					

2 15	(c)	(i)Cutting down trees and grubbing up their roots shall be enumerated; trees ne 24" gth at ht of 3ft ab grd shall be classed as small trees, those > 24" gth shall be classified according to gth in multiples of 12". (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp)	D5 35	(a)	Cutting down trees and grubbing up their roots shall be enumerated; trees ne 24" gth (msd at ht of 3ft ab grd) shall be grouped together and described as small trees, those > 24" gth shall be classified and given in further stages of 12". (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp)
2 16	(c)	(ii)Cutting down hedges and grubbing up their roots shall be given in yds run. (Acc) (D) (Enu) (Loc) (Tpt) (Wp)	D5 36	(b)	Cutting down hedges and grubbing up their roots shall be given in linear yds stating the nature and height of each hedge or its location. (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp)
2 17	(c)	(iii)The removal & grubbing up of shrubs & undergrowth t b desc (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp) <i>No comparable clause</i>	D5 37 38	(c)	(i)Clearing site of bushes, scrub, undergrowth and the like and grubbing up their roots shall be given in sq yds. (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp) (ii) Cutting down trees ne 24" girth within such areas and grubbing up their roots may be given in the description, but cutting down larger trees shall be dealt with in accordance with paragraph (a) of this clause. (Acc) (CU) (D) (Enu) (Loc) (Tpt) (Wp)
3 18	(a)	Basement and similar excavation shall be msd to the outside of the foundations. Existing voids shall be deducted. (Acc)(D) (Enu) (Loc) (SL) (Tpt) (Wp)	D9 39		Excavating basements and the like (measured to the outside of the foundations subject to clause D6 (g) hereof) shall be given in cu yds stating the starting level and the depth as clause D6 (f) hereof. Existing voids shall be deducted. (Acc) (D) (Enu) (Loc) (SL) (Tpt) (Wp)
3 19	(b)	Where the basement walls are t b covered externally with a damp-proof covering, which is not described as executed overhand, an allowance shall be made for working space of 2 feet from the external face of the wall to be covered. The same allowance shall be made where the method of construction of the wall requires workmen to operate from the outside. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	D6 40	(g)	(i) (Allowance for working space) 2 feet from the face of any work which requires formwork over 3 ft deep below the starting level of excavation, or from the external face of any work which will be covered externally with a damp proof covering at any depth below the starting level of excavation, or from the external face of any work which requires workmen to operate from the outside at any depth below the starting level of excavation. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
4 20	(a)	Surface trenches shall be so desc and given in stages of 5 ft as set out in clause 1 (g). (Acc) (C) (D) (DW) (Enu) (Loc) (SL) (W) (Wp)	D10 41	(a)	(i)Excavating trenches to receive foundations (measured the width of the foundations therein subject to Clause D6 (g) hereof)shall be given in cu yds stating the starting level and the depth

		<i>No comparable clause ></i>	42		as clause D6 (f) hereof. (Acc) (C) (D) (DW) (Enu) (Loc) (SL) (W) (Wp) (ii)In the case of trenches over 3 ft deep, the minimum width measured shall be 2ft 6ins for the full depth and this minimum shall apply also to the concrete foundations therein. (W)
Editions 4 and 5					
4 21	(b)	Trenches below basement shall be so desc and given as set out in clause 1 (g) (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	43		<i>No comparable clause. See clause D10 (a) above</i>
		<i>No comparable clause</i>	D10 44	(b)	Excavating curved trenches shall be so described (foundations) (R)
4 22	(c)	In the case of cuttings and extensive or deep basements, the necessary preliminary trenching for retaining walls shall be given in stages in accordance with clause 1(g). (Acc) (D) (Enu) (Loc) (SL) (W) (Wp) <i>No comparable clause</i> <i>No comparable clause</i>	D10 45 46 47	(a)	(iii)Preliminary trenches for basement retaining walls which are constructed before the basements are excavated shall be so described. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp) (iv)No distinction shall be made between surface trenches and basement trenches. (v)For pipe trenches and the like see clause D12 hereof.
4 23	(d)	Trenches for service pipes, cables, kerbing and the like shall be given in yds run stating the depth, and shall be described as including planking and strutting. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	D12 48 D12 49	(a)	(i)Excavating trenches to receive service pipes, cables, kerbs and the like shall each be given separately in linear yds stating the starting level and the average depth to the nearest 6". (Acc) (D) (Enu) (Loc) (SL) (W) (Wp) (ii)Grading bottoms, planking and strutting, filling in, compacting and disposing of surplus soil shall be given in the description of such trenches. (F)
		<i>No comparable clause</i>	D12 50	(b)	Excavating curved trenches shall be so described (pipe trenches) (Rad)
5 24	(a)	Forming embankments or terraces and filling to make up levels shall be given in yards cube; if the material is to be deposited in layers, this shall be stated giving the thickness of such layers. The source or sources from which the material is obtained and the			<i>No comparable clause</i>

		methods of consolidation shall be described. (Acc) (D) (Enu) (F) (Loc) (R) (SL) (Tpt) (W) (Wp)			
5 25	(b)	The formation of slopes shall be given in yds sup, that to cuttings being given separately from that to embankments. (R)			<i>No comparable clause</i>
5 26	(c)	Soiling, seeding & turfing of surfaces t b given in yds sup & thickness of soil & nature and quantity per yd of seed desc. (D) (F) (Wp)	D18 51		Soiling, seeding, fertilizing & turfing to surfaces shall each be given in sq yds stating the thickness of soil & quantity per sq yd of seed or fertilizer. (D) (F) (Wp)
6 27	(a)	(i)Excavation for stanchion bases, isolated piers, manholes and the like shall be given separately. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	D11 52	(a)	(i)Excavating pits to receive bases of stanchions, isolated piers and the like (measured the size of the base therein subject to clause D6(g) hereof and grouped together) shall be given in cubic yds stating the starting level and the depth as clause D6(f) hereof. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
6 28	(a)	(ii)Pier holes and post holes not exceeding 1 yard cube shall be enumerated. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	D11 53	(b)	Excavating pits not exceeding 1 cu yd each shall be so desc stating the number. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
Editions 4 and 5					
6 29	(b)	Where the foregoing exceed 5 feet in depth a minimum measurement on plan of 4 feet by 4 feet shall be given both for excavation and the consequent planking and strutting. (W) (Wp) <i>No comparable clause</i>	D11 54 55	(a)	(ii)In the case of pits over 5ft dp, the minimum size measured on plan shall be 4 ft in each direction and this minimum shall apply also to planking and strutting in connection therewith (W) (Wp) (iii)and to the concrete foundations therein
		<i>No comparable clause</i>	D1 56	(c)	For work in underpinning see section H hereof.
		<i>No comparable clause</i>	H1 57	(a)	Underpinning work shall be given as a section in the bill

		<i>No comparable clause</i>	H1 58	(b)	Any information available concerning the nature of the site shall be given in accordance with clause D1 (a) hereof.
		<i>No comparable clause</i>	H1 59	(d)	Underpinning reqd to be executed from inside extg bldgs. shall be so desc. Handling mats and getting them in or out of such buildings shall be deemed to be inc with the items.
		<i>No comparable clause</i>	H2 60		For rules relating to Section H generally see clause H1 hereof
7 30	(a)	(i)A description of the work to be underpinned shall be given stating its length, the depth of the under-pinning and the limit of length to be carried out in one operation. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)	H1 61	(c)	(i)A description of the existing structure (eg wall; pier) to be underpinned shall be given stating its location, its length or size on plan, the depth of the new work below the base of the existing foundation and the limit of length to be carried out in one operation. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
7 31	(a)	<i>No comparable clause</i> > (ii)An item shall follow in feet run for providing and fixing all necessary supporting timbers to the work underpinned, giving particulars thereof where practicable. (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)	H1 62	(a)	(ii):Underpinning which is curved on plan shall be so described (Rad) Temporary supports to work to be underpinned shall be given as an item. Particulars of such supports shall be given where practicable (Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
7 32	(b)	Preliminary excavation down to the base of the work to be underpinned shall be given separately and so described (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	H3 64	(c)	Excavation shall be given in accordance with clauses D6 to D18 hereof subject to the following:- (i)Exc n prelim trenches down to level of base of the extg fdn shall be so desc. (ii) Exc n below level of base of extg fdn shall be so desc.
			65		

			66		(Acc) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
			H3 67	(b)	(i) Allowances for working space (which shall not be subject to adjustment if more or less space is actually required) shall be made in the measurements of excavations. (W)
Editions 4 and 5					
7 33	(c)	(i) The width of excavation to be taken from the face of the wall to be underpinned shall vary in proportion to the depth of the trench as follows:-	H3 68	(b)	(ii)(i) The width of the working space (measured horizontally from the face of the wall to be underpinned, or where projecting foundations are to be retained from the face of such projection) shall be related to the total depth of the excavation (measured from the top of the preliminary trench to the underside of the underpinning work). The allowances shall be as follows:-
34		(ii) For trenches up to 5 feet deep, the width shall be taken as 3 feet.	69		(ii)(ii) 3ft from the wall or projecting foundation where the total depth of the excavation does not exceed 5ft.
35		(iii) For trenches exceeding 5 feet deep and not exceeding 10 feet deep, the width shall be taken as 4 feet 6 inches.	70		(ii)(iii) 4ft 6ins from the wall or projecting foundation where the total depth of the excavation is over 5ft but does not exceed 10ft.
36		(iv) For trenches exceeding 10 feet deep, the width shall be taken as 6 feet. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)	71		(ii)(iv) 6ft from the wall or projecting foundation where the total depth of the excavation is over 10ft. (Acc) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
7 37	(d)	Cutting off proj footings to be given in ft run, stating the number of courses or the thickness of the wall. Cutting away old conc or other foundations shall be given in yards cube. (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)	H3 72	(d)	Cutting away projecting foundations shall be given in linear yards stating the number of courses of footings and the dimensions of concrete to be removed (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)

		<i>No comparable clause</i>	H4 73		Disposal of water shall be given in accordance with clause D19 hereof. <i>(below)</i>
		<i>See clause 12 (g) below</i>	H5 74 75		Planking and strutting shall be given in accordance with clauses D20 & D21 hereof subject to the following:- (i)P and s to preliminary trenches shall be so desc. (ii)Planking and strutting below the level of the base of existing foundation (measured to back, front and both ends of the underpinning also between each section of the underpinning) shall be so described. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)
		<i>No comparable clause</i>	H6 76		Conc wk shall be given in accordance with Section F hereof. Brickwork, pinning up and damp-proof courses shall be given in accordance with section G hereof. Asphalt work shall be given in acc w Section L hereof.
8 38	(a)	(i) Breaking up and removing surface concrete or other hard substances shall be given in yards superficial and, if known, the thickness stated. (Acc) (Cut) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)	D14 77		(i)Breaking up surface conc, reinforced surface conc, brick paving, tarmacadam and the like on the surface of the ground shall each be given separately in sq yds stating the thickness and method of disposal. (ii) Alternatively, breaking up such hard materials on the surface may each be given separately in sq yds as EO the various descriptions of excavation. (Acc) (Alt) (Cut) (D) (Enu) (EO) (Loc) (SL) (Tpt) (W) (Wp)
Editions 4 and 5					
8 39	(a)	(ii)Breaking up and removing brickwork, concrete, reinforced concrete or other hard substances met with in excavating, shall be given in yards cube as extra only over excavation; (Acc) (Cut) (D) (Enu) (EO) (Loc) (SL) (Tpt) (W) (Wp)	D13 78		Breaking up concrete, reinforced concrete, brickwork and the like met with in excavation shall each be given separately in cubic yds as extra over the various descriptions of excavation.(Acc) (Cut) (D) (Enu) (EO) (Loc) (SL) (Tpt) (W) (Wp)

8 40	(a)	(iii) where the quantity cannot accurately be ascertained a provisional quantity shall be given. (P)			<i>No comparable clause</i>
8 41	(b)	Clearing out and removing contents of old cesspools met with in excavating shall be enumerated. (Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)	D15 79		Clearing out and removing contents of cesspits shall be enumerated stating the method of disposal. (Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
9 42	(a)	Excavation to form cuttings shall be given separately and the mode of its execution described. (Acc) (Cl) (D) (Enu) (Loc) (M) (R) (SL) (Tpt) (W) (Wp)	D8 80		Excavating cuttings shall be given in cu yds (Acc) (Cl) (D) (Enu) (Loc) (M) (R) (SL) (Tpt) (W) (Wp)
9 43	(b)	(i)Excavation in tunnelling t b given sep & length, width, & height of tunnel stated. (Acc) (D) (Enu) (IW) (Loc) (Sh) (SL) (Tpt) (W) (Wp)			<i>No comparable clause</i>
9 44	(b)	(ii) the return and back filling to tunnels shall be given separately in yds cu (Tpt)			<i>No comparable clause</i>
		<i>No comparable clause</i>	D16 81	(a)	Multiple handling of excavated mats & transporting about the site as necessary shall be deemed to be included with the items of final disposal. Multiple handling which is specifically required shall be given in the description of disposal items (Tpt)
		<i>No comparable clause</i>	D16 82	(b)	Earth filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting.
		<i>No comparable clause</i>	D16 83	(c)	Earth backfilling shall be given in cu yds except as otherwise provided in Clause D12 hereof
		<i>No comparable clause</i>	D16 84	(d)	Earth filling in making up levels over 12" thick shall be given in cu yds. Such work not ex 12" thick shall be given in sq yds stating the average thickness
		<i>No comparable clause</i>	D16 85	(e)	Earth filling required to be deposited and compacted in layers shall be so desc stating the max thickness of the layers.
		<i>No comparable clause</i>	D16 86	(f)	(i)Surplus spoil shall be given in cubic yds

10 45	(a)	The disposal of the spoil shall be described. (Tpt)			See clauses D16(f)(ii) and (iii) below
10 46	(b)	Removal of excavated material from the site shall, unless otherwise stated, include the provision of a shoot, dump or tip by the Contractor (Tpt)	D16 87	(f)	(iii)Spoil removed from the site shall be so described and the provision of a shoot, dump or tip shall be deemed to be included with the items unless otherwise stated. (Tpt)
Editions 4 and 5					
10 47	(c)	If spoil is to be deposited on site the distance it is to be moved shall be given in yards run. (Tpt)	D16 88	(f)	(ii)Spoil deposited on site in permanent spoil heaps or spread on site shall be so described stating the location of such deposits or the average distance from the excavation in linear yards or miles (Tpt)
11 48	(a)	An item t b given for keeping excn free from storm & percolating water by pumping or otherwise. When excns extend below normal water level, the fact shall be stated &, where known, water level given. (U)	D 19 89	(b)	Keeping excns free from general water (ie all water except spring or running water or water below the water level in the ground) shall be given as an item. (U)
11 49	(b)	(ii)Where springs or running water are likely t b encountered a prov sum t b inc for pumping, or a prov number of hours given of use of different classes of pumps likely to be required with power and attendance (actual pumping hours). (Acc) (Ad) (Loc) (P) (SL) (W) (Wp)	D19 90	(d)	Keeping excavations free of spring or running water shall be given as a provisional or prime cost sum as clause A7 hereof or as a provisional number of actual pumping hours for the different classes of pumps likely to be required (Acc) (Ad) (Loc) (P) (SL) (W) (Wp)
		No comparable clause	D19 91	(c)	Keeping excavations free from water below the water level in the ground, where the water level has been stated in accordance with Clause D1(a) hereof, shall be given as an item. Where the water level remains to be ascertained in accordance with the provisions of Clause D1(a) hereof, the work shall be given as a provisional or prime cost sum as Clause A7 hereof or as a provisional number of actual pumping hours for the different classes of pumps likely to be required. (Acc) (Ad) (Loc) (P) (SL) (W) (Wp)

		<i>No comparable clause</i>	D19 92	(e)	Providing pumps and other equipment, power and attendance for pumping and standing time shall be deemed to be included with the items
12 50	(a)	(i) The term planking and strutting shall mean everything requisite to uphold the face of earthwork other than special shoring.	D20 93	(b)	(I) Planking and strutting shall be deemed to mean providing everything requisite to uphold the sides of excavation
12 51	(a)	(ii) and covers the responsibility for upholding and maintaining the sides of earthwork by whatever means, if any, are considered necessary having regard to the nature of the ground.	94		(II) by whatever means are necessary (other than special shoring or steel sheet piling)
12 52	(a)	(iii) Items of planking and strutting shall be given under the following rules, whether any is in fact required or not, so that the Contractor's risk may be priced	95		(III) and shall be measured whether or not any is in fact required (subject to para (c) of this clause) as follows:-
		<i>No comparable clause</i>	D20 96	(b)	(i)To the full depth of any excavation which is over 12" deep (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)
Editions 4 and 5					
		<i>See clause 12(c) below</i>	D20 97	(b)	(ii) To b s of trenches over 12" dp, ex to pipe trenches and the like referred to in clause D12 hereof. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)
		<i>See clause 12(d) below</i>	D20 98	(b)	(iii)To all sides of pits which are over 12" dp subject to the minimum stated in clause D11(a) hereof. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)

12 53	(b)	(i)P & s to bst excn t b given in ft sup & depth to gen level of excn t b stated (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			See clause D21(a)(iii)
12 54	(b)	(ii)Any special shoring required shall be msd or desc	D21 99	(g)	(i)Special shoring to support p & s shall be given in the desc of p & s items. (ii)such shoring may be given in detail as Clause C10 hereof (Alt)
12 55	(c)	(i)P & S to trenches t b msd to b s & given in ft sup stating depth in stages of 5ft whether to surf or bst trenches (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			See clause D21(a)(iv)
12 56	(c)	(ii)P & s to trenches > 6ft wide t b sep given & width stated. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)	D21 101	(c)	Planking and strutting to trenches over 6ft wide shall be so described stating the width of the trench (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)
12 57	(d)	(i)P & s to pier holes shall be msd to all sides & given sep in ft sup, the depth being stated in stages of 5 ft. (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			See clause D21(a)(v)
12 58	(e)	In all cases, p&s or shoring next roadways tb given sep & so desc (Loc)	D21 102	(b)	Planking and strutting next roadways shall be so described (Loc)
12 59	(f)	Where ret wls are t b constructed in two thicknesses involving the shortening of struts or shores & re-strutting or re-shoring, p & s shall be given separately and so described	D21 103	(h)	Shortening struts or shores and re-strutting or reshoring shall be given in the desc of p & s to trenches which are to receive in-situ conc wls or which are to rec ret wls const in two thicknesses
12 60	(g)	(i)P & s t b msd (wherever practicable) to excn for u'pin & given in ft sup & depth stated. P & s msd ard comp trench & t b desc as p & s in short or necc lengths to trenches in u'pin (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			See clause H5 above

12 61	(g)	(ii)Cross lengths of p&s shall be taken for the width and depth of trench at the requisite intervals. (Acc) (D) (IW) (Loc) (Sh) (SL) (T) (Tpt)(W) (Wp)			<i>No comparable clause</i>
12 62	(h)	P & s to tunnelling t b sep given in ft run & width, hts to springing & crown & gth of soff stated. (Acc) (D) (IW) (Loc) (Sh) (SL) (T) (Tpt)(W) (Wp)			<i>No comparable clause</i>
12 63	(i)	P&s and timbering ordered to be left in t b given sep & so desc. (Acc) (D) (IW) (Loc) (Sh) (SL) (T) (Tpt)(W) (Wp)	D21 104	(f)	Planking and strutting left in shall be so described

Editions 4 and 5

		<i>No comparable clause</i>	D20 105	(c)	Planking and strutting shall not be measured to any excavation which does not exceed 12” in depth, nor to the sloping side of any excavation where them angle of inclination does not exceed 45 degrees from the horizontal, nor not the side of any excavation which abuts an existing wall, pier or other structure.
		<i>No comparable clause</i>	D20 106	(d)	Curved planking and strutting shall be so described (Rad)
		<i>No comparable clause</i>	D21 107	(a)	(i)Planking and strutting shall be given in sq yds stating the starting level. Except in the case of p & s to basement excn, the total depth of the p&s shall be stated in multiples of 5ft (eg not ex 5ft total depth; not ex 10ft total depth). (SL)
		<i>No comparable clause</i>	D21 108	(a)	(ii) In the case of p & s to sides of bst excn, total depth of excn t b stated & depth of any trench immediately below the side of a bsmt shall be inc in the total depth of such side. (D)

		<i>No comparable clause, i.e. no general classification</i>	D21 109	(a)	(iii)Classification of p & s shall be as follows:- (iii)(i)To sides of excn to reduce levels over site. (iii)(ii)To sides of excn to form cuttings (iii)(iii)To sides of bst excn (iii)(iv)To sides of trenches (Sides which are immediately below sides of basements shall be deemed to be sides of bst excn) (iii)(v)To sides of pits (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)
		<i>No comparable clause</i>	D21 110	(d)	Planking and strutting which extends wholly or partly below the normal water level (as established in accordance with clause D1(a) hereof) shall be so described and measured from the starting level of the excavation to the full depth. Planking and strutting which extends wholly or partly into running silt or running sand (grouped together) shall be so described and similarly measured: where such work also extends below the normal water level it shall be so described. (Ad) (SL)
		<i>No comparable clause</i>	D21 111	(e)	No distinction shall be made in respect of planking and strutting to excn in rock
		<i>No comparable clause</i>	D21 112	(j)	For steel sheet piling see section E hereof.
13 64		(i)Puddling generally t b given in yds cu (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			<i>No comparable clause</i> <i>No comparable clause</i>
13 65		(ii)Puddling to dew-ponds, lakes & where less than 12” thick tb given in yds sup stating the nature of the preparatory works, if any (Acc) (D) (IW) (Loc) (SL) (T) (Tpt)(W) (Wp)			
Editions 4 and 5					
14 66	(a)	The material used for hardcore and the method of consolidation and any blinding shall be described (M) (F)			<i>No comparable clause</i>

		<i>No comparable clause</i>	D22 113	(a)	For rules relating to section D generally, see clause D1 hereof
		<i>No comparable clause</i>	D22 114	(b)	Hardcore filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting
14 67	(b)	Hardcore filling exceeding 12 inches thick shall be given in yards cube; where n e 12 inches thick it shall be given in yards superficial stating the thickness. (Acc) (D) (Loc) (SL) (Tpt) (W) (Wp)	D22 115	(c)	Hardcore filling in making up levels over 12" thick shall be given in cubic yds. Such work not ex 12" thick shall be given in sq yds stating the average thickness. (Acc) (D) (Enu) (Tpt) (Wp) (W)
		<i>No comparable clause</i>	D22 116	(d)	Hardcore filling required to be deposited and compacted in layers shall be so desc stating the max thickness of the layers. (Acc) (D) (Enu) (IW) (Loc) (Tpt) (SL) (W)(Wp)
14 68	(c)	Where the surface of hardcore is required to be finished to falls or cambers, the extra labour shall be given in yds sup except where the hardcore is given as a superficial item, when the labour may be described with the item (R)	D22 117	(e)	Treating the surface of the hardcore shall be given in accordance with clauses D17 (a) and (b) hereof (F)
		<i>No comparable clause</i>	D22 118	(f)	Hand packing hardcore to form vertical or battering face over 12" wide shall be given in sq yds. Such work not exceeding 12" wide shall be given in linear yds stating the width. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
		<i>No comparable clause</i>	D22 119	(g)	Hand packing hardcore to form sinking shall be given in linear yds stating the size. No deduction of hardcore shall be made. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
		CONCRETOR			F. CONCRETE WORK The unit of billing shall be the yard except where the unit is required to be the hundredweight
					Generally to Section F
			F1 1	(a)	<i>Particulars shall be given of:</i> (i) Kind and quality of materials for concrete.

1	1	(a)	(i)The proportions of the materials to be used and the method of mixing, shall be described.	F1 2	(a)	<i>Particulars shall be given of:</i> (iv)Composition and mix (or strength requirements) of the concrete
1	2	(b)	Particulars shall be given of any tests required both of the materials and of the finished work	F1 3	(a)	<i>Particulars shall be given of:</i> (ii)Any tests of the materials (iii)Any tests of the finished work
Editions 4 and 5						
			<i>See clauses 1(c) (i) and 1 (c) (ii) below</i>	F62 4		Hacking faces of concrete shall be given in sq yds stating the purpose for which the key is required. Hacking by special means shall be so described. (Acc) (D) (Enu) (F) (Loc) (SL) (W) (Wp)
			<i>See clauses 1(c) (i) and 1(c) (ii) below</i>	F63 5		Grinding, sand-blasting and the like treatments to the face of concrete shall each be given sep in sq yds. Such work to soffits shall be so desc. Such work to soffits over 11 ft above floor shall be so desc stating the height in further stages of 5 ft (Acc) (D) (Enu) (F) (Loc) (SL) (W) (Wp)
1	3	(c)	(i)Any treatment of the finished face of concrete, beyond the ordinary depositing, spreading or levelling, shall be described and given in yards or feet superficial. (F) (R)	F14 6	(a)	Treating the surface of unset concrete over 12" thick (eg grading to falls; grading to cross falls; grading to cambers; grading to slopes; tamping; trowelling) shall be given in sq yds. Such treatments to the surface of unset concrete ne 12"m thick shall be given in the description (Acc) (D) (Enu) (F) (Loc) (SL) (R) (W) (Wp)
(1	4	(c)	(ii)In the case of concrete measured as a superficial or lineal item, such finish may be included with the item.			<i>See clauses F62 and 63</i>
1	5	(d)	Concrete required to be vibrated, mechanically tamped, placed in position by a particular method, or poured at stated speeds, shall be given separately (M)	F1 7	(c)	Concrete required to be consolidated by a particular method (eg mechanically tamped; vibrated) shall be so desc. (Acc) (D) (Enu) (Loc) (M) (SL) (W) (Wp)

		<i>See clause 1 (d) above</i>	F1 8	(b)	Concrete required to be placed by a particular method (eg poured at a stated speed) shall be so desc. (Acc) (D) (Enu) (Loc) (M) (SL) (W) (Wp)	
		<i>No comparable clause</i>	F1 9	(d)	Concrete required to be cured by a particular method shall be so desc. (Acc) (D) (Enu) (Loc) (M) (SL) (W) (Wp)	
		<i>No comparable clause</i>	F1 10	(e)	Curved labours on concrete shall be so desc irrespective of radius. (Rad)	
		<i>No comparable clause</i>	F1 11	(f)	Labours on old concrete shall be so desc.	
		<i>See clause 4 of 'General Principles'</i>	F1 12	(g)	Concrete shall be measured as executed (subject to the minimum stated in Clauses D10(a) and D11(a) hereof (N)	
1	6	(f)	Where conc is r/f by bars or fabric r/f each member or part of the wk tb given sep and desc, & (except in the case of walls, floors and roofs) shall be classified acc to size as follows:- Those having a sectional area not exceeding 36 inches, those of an area over 36 and not exceeding 72 inches, those over 72 inches and not exceeding 144 inches, those over 144 inches. (Acc) (CU) (D) (Enu) (Sh) (SL) (Loc) (W) (Wp)	F1 13	(h)	Where the sectional area of plain or reinforced conc members are reqd to be stated in accordance with this clause, they shall be grouped and desc as follows:- (i)Not ex 48 sq ins (ii)Over 48 but ne 144 sq ins (iii)Over 144 sq ins (Acc) (CU) (D) (Enu) (Sh)(SL) (Loc) (W) (Wp)
Editions 4 and 5						
		<i>See clause 4 below</i>	F1 14	(j)	For wk in underpinning see Section H hereof	
					Plain concrete and reinforced concrete	
			F2 15	(a)	For rules relating to Section F generally see Clause F1 hereof.	
1	7	(e)	(i)If concrete is between and around steel joists, (it shall be so stated) (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F7 16	(a)	(ii)(Suspended floors, roofs, etc) Those laid around or between steel filler joists (measured over the fillers) shall be so described. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
1	8	(e)	(ii)(If concrete is between and around) bars or fabric reinforcement	F2 17	(c)	Reinforced in-situ concrete and its reinforcement and associated formwork shall be given under an appropriate

		it shall be so stated. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			heading (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	
1	9	(e)	(iii)and the system of construction and character of the reinforcement described.		<i>No comparable clause</i>	
1	10	(g)	Concrete, formwork, and reinforcement shall be given separately unless otherwise herein provided	F2 18	(b)	Plain in-situ concrete and its associated formwork shall be given under an appropriate heading See also clause F2 (c) above
			<i>No comparable clause</i>	F2 19	(d)	Designs for reinforced concrete work shall be deemed to be provided by the employer. Work required to be designed by the contractor shall be given in accordance with clauses F56 to F61 hereof

1	11	(h)	No deductions shall be made for:- (1)Voids of 1 ft cu or under (2)The volume of the reinforcement (3)Openings in walls, floors, roof slabs, roadways and the like of 2 ft sup or under. (N)	F1 20	(g)	<i>(Conc shall be msd as exec)</i> but no deduction shall be made for the following:- (i)Vol of any steel embedded in the concrete (ii)Voids ne 1sq ft in wk given in sq yds (iii)Voids ne 1 cu ft in wk given in cu yds. (N)
2	12		Concrete in trenches shall be given in yards cube; where less than 12 inches in thickness it shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F3 21	(a)	Foundations in trenches shall be given in cu yds stating the thickness in the following stages: (i)Not ex 6” thick (ii)Over 6” but ne 12” thick (iii)Over 12” thick (Acc) (Cu) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
3	13		Conc in small bases for fencing posts etc shall be enumerated and the sizes given. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			<i>See clause Y 17 (a)</i>

4	14		Conc in u'pin tb given sep. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			See Clause F1(j) above.	
5	15	(a)	Conc beds less than 12 ins in thickness tb given in yds sup and the thickness stated, 12 ins thick & over tb given in yds cu. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F5	22	(a)	Beds over 12" thick shall be given in cu yds. Those ne 12" thick shall be given in sq yds stating the thickness (Acc) (Cu) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
5	16	(b)	(i)Concrete beds less than 12" thick formed or laid to falls, currents or cambers shall be given separately and the labour inc in the desc. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)	F5	23	(b)	Beds laid to slopes ne 15° from horizontal and those laid to slopes over 15° from horizontal shall each be so described (Acc) (Cu) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)
Editions 4 and 5							
5	17	(b)	(ii)where such beds are 12" thick and over the labour finishing to falls, etc shall be given separately in yds sup (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)				See clause F5 (b) above
5	18	(c)	If concrete beds are to be laid in bays this shall be stated, and the description shall include the necessary formwork to the joints between bays.	F5	24	(c)	Beds laid in bays shall be so described stating the average size of bays. Fmwk between the bays shall be given in the description.
	19		Expansion joints, if required, shall be given in accordance with clause 19 (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)				See Clause F15 below (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
			see clause 1(c)	F5	25	(d)	Beds intended to form a base for granolithic paving (or other similar paving) laid whilst the base is in an unset condition shall be so described (Acc) (D) (Enu) (F) (Loc) (SL) (Tpt) (W) (Wp)
			No comparable clause	F6	26		Roads, footpaths & pavings shall ea be so desc & given in accordance with the rules for beds in clause 5 hereof
6	20		Channels in concrete shall be given in feet run describing the shape, width and average depth and including the formwork in the description. Where channels formed in concrete beds require additional concrete under, it shall be so stated and the sizes given. (Acc) (D) (Enu) (Sh) (SL) (Loc) (T) (Tpt) (W) (Wp)	F14	27	(c)	Forming channels and chases in the surface of unset concrete shall be given in linear yds stating the shape, the width and the depth. Channels to falls shall be so described. Channels and chases requiring additional concrete shall be so desc stating the size of the additional conc. Fmwk shall be given in the desc. Ends, angles, intersections and outlets shall each be enumerated separately (Acc) (D) (Enu) (Sh) (SL) (Loc) (Ls) (R) (T) (Tpt) (W) (Wp)

		<i>No comparable clause</i>	F3 28	(b)	Foundations to stanchions, columns and piers which are combined with fdtns in trenches shall be classified as fdtns in trenches. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
7 21	(a)	(i)Concrete in foundations to isolated stanchions and columns shall be given separately in yards cube; where less than 12 inches in thickness it shall be given separately. Foundations less than 6 ft cu shall be given in ft cu and the number stated. (ii)Concrete packed around steel grillages shall be given separately in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F3 29	(c)	Foundations over 6 cu ft each to stanchions columns and piers which are isolated shall be grouped together and given in cu yds stating the thickness in stages as paragraph (a) of this clause. Such work not exceeding 6 cu ft shall be given in cu yds stating the number. (Acc) (Cu)(D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
	(b)	Cement grouting under steel stanchion bases or under steel grillages shall be given in feet superficial; if under small base not exceeding one yard superficial the groutings shall be enumerated stating the size. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F3 30	(e)	Casings to steel grillages tb given in cu yd (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
			F3 31	(f)	Grouting under steel stanchion bases and under steel grillages shall each be given separately in sq yds stating the mix of the grout and the number of bases or grillages (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
Editions 4 and 5					
8 23		The building in of holding down bolts and the temporary boxings or wedges to form the holes for same shall be enumerated; the lengths shall be stated and the grouting included in the description (Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F3 32	(g)	Building in and grouting anchor bolts and the like shall be enum stating the length of the bolt and the mix of the grout. Temp boxings or wedges to form holes or mortices for anchor bolts shall be enumerated or they may be given in the description of building in. (Acc) (Alt) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
9 24		Concrete in engine beds and machine bases shall be given in yards cube; beds and bases less than 6 ft cu shall be given in ft cu and the number stated (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F4 33	(a)	Large machine bases (ie over 6 cu ft ea) shall be given in cu yds. (b) Small machine bases (ie ne 6cu ft ea) shall be enum stating the size. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
10 25		Concrete curbs formed in situ shall be given in feet run including formwork; angles and fair ends shall be enumerated (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F12 34		Kerbs shall be given in lin yds stating the size (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)

11 26	(a)	i)Concrete floors and roofs shall be given in yards superficial and the thickness stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F7 35	(a)	(i)Suspended floors, roofs and the like (measured over all bearings and grouped together) shall be given in sq yds stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
11 27	(a)	(ii)If finished to falls this shall be stated, the average thickness being given. (R)			<i>See clause F14(a) above</i>
28		(iii)The measurement shall be taken across beams. (DW)	F10 36		(ii)Floor beams and roof beams shall be measured below the slab.
11 29	(a)	(iii)If the panel system of heating is adopted, wherein the pipes are embedded in the concrete, the area of heating panels shall be stated. (DW)	F14 37	(b)	Working concrete and pipes or cables of panel htg systems shall be given in sq yds. (DW)
11 30	(b)	If floors and roofs are sloping this shall be stated and they shall be given separately; if of steeper pitch than 15 degrees the angle of pitch shall be stated. (R)	F7 38	(a)	(Suspended floors, roofs etc) (III)Classification shall be as follows:- (i)Horizontal (ii) Sloping ne 15° from horiz. (iii)Sloping over 15° from horiz. (Cu) (R) <i>See clauses F9(iv) & (v) below.</i>
		<i>No comparable clause</i>	F7 39	(b)	Curved roofs, conical roofs, spherical roofs and elliptical roofs shall each be so desc. irrespective of radius. Haunchings shall be given in cu yds(Acc) (D) (Enu) (SL) (Loc) (Rad) (Tpt) (W) (Wp)
Editions 4 and 5					
11 31	(c)	Conc tops & cheeks of dormers shall each be given sep (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F7 40	(c)	Tops and cheeks of dormers (grouped together) shall be given in sq yds stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
11 32	(d)	Concrete hearths shall be given in ft sup and the number stated. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F7 41	(d)	Isolated suspended hearths shall be enumerated stating the size. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)

12 33		<p>The following casings to steel joists shall be given separately in feet cube, viz:- (1)Concrete casing to beams and lintels.</p> <p>(2)Concrete casing to stanchions. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)</p> <p><i>See clause 11(a) above</i></p> <p><i>See clause 13 (c) below</i></p> <p><i>See clause 11(b) above</i></p> <p><i>See clause 11(b) above</i></p>	F9 42		<p>(i)Casings to steel beams, lintels, stanchions & the like shall each be given sep in cu yds stating the sectional area in stages as Clause F1 (h) hereof. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)</p> <p>(ii)Floor beams & roof beams shall be msd below the slab.(Acc) (D) (DW) (Enu) (SL) (Loc) (Tpt) (W) (Wp)</p> <p>(iii)Projections shall be added to the appropriate items. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)</p> <p>(iv)Horiz members & sloping members ne 15° from horiz (grouped together) shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)</p> <p>(v)Vert members & sloping members over 15° from horiz (grouped tog) shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)</p>
13 34	(a)	(i)Concrete walls in situ less than 12” thick shall be given in yards superficial and the thickness stated, the measurements being taken between piers or projections. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			<i>See clause F8(b)(i) below</i>
13 35	(a)	(ii)Those 12 inches thick and over shall be given in yards cube. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F8 47	(b)	(i)Walls over 12” thick shall be given in cu yds. Those ne 12” thick shall be given in sq yds stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
13 36	(b)	Concrete retaining walls shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F8 48	(b)	(ii)Retaining wls shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
13 37	(c)	Projections not exceeding 18 inches in width on walls less than 12 inches thick shall be dealt with as columns as hereinafter described and shall be measured through the wall. When the projections exceed 18 inches wide the full thickness of wall and projection	F8 49	(a)	Measurements of wls shall be taken bet attached piers or pilasters. The thickness of attached piers or pilasters shall be taken as the combined thickness of the wall & the attached pier or pilaster. Attached or isolated piers, pilasters and the like (except where caused by openings) having a length

17	43	(c)	Landings to be given in feet stating thickness. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			See clause F11 (b) above
			No comparable clause	F13	57	Finishes (measured on the exposed face which are cast on to the concrete by lining formwork with the required mix (eg granolithic; cast stone; mosaic; terrazzo) shall be given in sq yds as EO the concrete stating the mix and the thickness of the finish. (Acc) (D) (Enu) (Sep) (SL) (Loc) (Tpt) (W) (Wp)
18	44		All labours and details where produced by the formwork shall be measured with the formwork. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)			See clauses F23 – F25
19	45		Expansion joints in beds, suspended floors, walls, etc., including formwork and any labours, shall be given in yds run. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F15	58	Expansion joints in conc shall be given in linear yds stating the size. Formwork shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
20	46		Work involving cutting in concrete shall be separately given; grooves, chases, and the like shall be given in feet run, and holes, mortices, and the like enumerated and described. The making good of finishings shall be given separately in the appropriate trade. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F64	59	Cutting grooves, chases, rebates, chamfers and the like shall each be given separately in linear yds stating the size. For such details produced by formwork see clause 24 hereof. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
			Reinforcement	Reinforcement		
			See clause 25 below	F17	60	(a) Particulars of the following shall be given:- (i) Kind and quality of steel
21	47	(a)	Particulars shall be given of any tests to be applied to samples.	F17	61	(a) (ii) Any tests of the bars
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21	48	(b)	Any special restrictions in regard to hot or cold bending shall be stated.	F17	62	(a) (iii) Any restrictions as to hot or cold bending

21 49	(c)	Reinforcement in floors, roofs, walls, beams, columns and the like shall each be given separately	F17 63	(b)	(ii) Classification shall be as follows:- (i)In foundations and bases (grouped together) (ii)In machine bases (iii)In beds (iv)In roads, footpaths and pavings (grouped together) (v)In floors roofs and the like (grouped together) (vi)In walls (vii) In casings to steelwork (viii)In beams, lintels, columns, steps, staircases and strings (grouped together). (CU)
22 50	(a)	Bar reinforcement shall be given by weight and shall include for cutting to lengths, hooked ends and bending (except as provided by clause 25); no allowance shall be made in the weight for rolling margin and this shall be stated (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)	F17 64	(b)	(i)Bar reinforcement (measured as executed) shall be given in cwts stating the size. Each size shall be given separately. Bends, hooks, tying wire, distance blocks and ordinary spacers shall be given in the description. No allowance in calculating the weight of reinforcement shall be made for tying wire, ordinary spacers or rolling margin. (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp) (Wt)
22 51 52	(b)	Bars shall be sub-divided as follows:- (1)General reinforcing bars (2)Links, stirrups or bindings (CU)	F17 65	(g)	Links, stirrups, binders and special spacers (eg steel chairs to support top steel in thick slabs) and the like (grouped together) shall be given in cwts stating the size. Each size shall be given separately. Bends and hooks shall be given in the desc. (CU)(D) (Sh) (Wt)
22 53	(b)	(3)Indented bars or bars of other special form (CU)	F17 66	(f)	High tensile steel bars shall be so described (CU)
22 54	(b)	(4)Bars exceeding 30 ft in length, in stages of 5 ft (CU)	F17 67	(c)	Bars over 30 ft long shall be so described stating the length in further stages of 5 ft (CU)

22 55	(b)	(5)Helical reinforcement (CU)	F17 68	(e)	Twisted bars or bars of special section shall be so desc (CU)
22 56	(b)	(6)Work requiring special bending or bending to large radius. (CU)	F17 69	(d)	Bars specially bent to curve shall be so desc irrespective of radius (CU) (Rad)
22 57	(c)	Bars of 5/8 inch to 1 inch in diameter shall be given under one description (CU)			See clause F17(b) above
22 58	(d)	Bars of less than 5/8 " and exceeding 1" in dia shall be given separately for each size (CU)			See clause F17(b) above
23 59	(a)	i)Fabric reinforcement shall be given in yards superficial and described; only the net area covered shall be measured (Acc) (D) (Enu) (SL) (Loc) (T) ((Tpt) (W) (Wp)	F18 70	(a)	(i)Fabric reinforcement shall be measured as the area covered but no allowance shall be made for laps (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		See clause 23(a) above	F18 71	(b)	Fabric reinforcement shall be given in sq yds stating the mesh, the weight per sq yd and the minimum extent of side & end laps. Classification shall be in accordance with the rules of bar reinforcement in Clause F17(b) hereof (Cu) (D) (Enu) (N) (W) (Wp) (Wt)
23 60	(a)	(ii)but no deduction shall be made for openings less than 10 ft sup (N)	F18 72	(a)	(ii) and no deduction shall be made for voids not exceeding one sq yd (N)
23 61	(a)	(iii)the description shall include the bending of fabric as necessary (Sh)	F18 73	(a)	(iii)Bends, tying wire and distance blocks shall be given in the description (Rad) (Sh)
23 62	(a)	(iv) and the extra material at laps, particulars of which shall be given (E) (N)			See clause F18(a)(i) above
23 63	(b)	Tension strips shall be given in yds run	F18 74	(c)	Strips required to be in one width (eg in foundations under walls; in tension strips to floors and roofs) shall be given in linear yards stating the width, the mesh, the weight per sq yd and the minimum extent of end laps (N) (Wt)
		No comparable clause	F18 75	(d)	Self-centering fabric reinforcement shall be so described. Temporary strutting shall be given in the desc and where over 11ft high shall be so described stating the height in further stages of 5 ft. (Acc) (Cu) (D) (Enu) (Loc) (SL) (T) (W) (Wp))

23 64	(c)	(iii) Raking and circular cutting and waste shall be given in feet run.	F19 76	(a)	Raking cutting and curved cutting on fabric reinforcement shall each be given separately in linear yds stating the mesh and the weight of the fabric. (Acc) (Cut) (D) (Enu) (R) (Rad)
		<i>No comparable clause</i>	F19 77	(b)	Notching fabric reinforcement around obstructions shall be enumerated irrespective of size. (Acc) (Cut) (D) (Enu) (Loc) (Sh) (SL) (W) (Wp)
24		Tying wire required for supporting the reinforcement shall not be separately given but shall be included with the description of the items Note:- The term tying wire is reserved for the wire tying together reinforcement in contact, and the term links or bindings for the wire forming part of the reinforcement and linking and binding together reinforcement not in contact).			See clause 18(a)(iii) above
25 65		If high carbon steel is to be used it shall be given separately and all bends in same shall be enumerated and described as forged bends.			See clause F17 above
		Formwork			Formwork
26 66	(a)	(i) Formwork shall be measured the actual surface in contact with the concrete (N)	F20 78	(a)	(I) Formwork shall be msd as the actual surfaces of fin structure which require to be supported during the deposition of the conc, including the upper surfaces of the work sloping more than 15° from the horizontal. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
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		<i>No comparable clause</i>	F20 79	(a)	(II) Where the face of the concrete is troughed or similarly shaped, the method of measuring the formwork shall be stated
26 67	(a)	ii) It shall be given in yards superficial for the larger areas, such as soffits of floors, otherwise in feet superficial.	F21 80	(a)	(i) Formwork to surfaces (other than those mentioned in Clauses F22 to F25 hereof) shall be given in sq yds
26 68	(a)	(iii) Formwork to small features shall be enumerated (Enu)			See clause 25(a)
26 69	(a)	(iv) If wrought formwork is required, it shall be so stated. (Acc) (D) (Enu) (F) (SL) (Loc) (T) (Tpt) (W) (Wp)	F20 81	(f)	Wrought fmwk shall be so desc (Acc) (D) (Enu) (F) (SL) (Loc) (T) (Tpt) (W) (Wp)

26 70	(a)	(v)Formwork left in shall be so described.(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F20 82	(e)	Formwork left in shall be so desc (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
26 71	(b)	Where formwork is required to be lined with wallboard, hardboard, plywood or paper lining or to be coated with mould oil, mould liquid or limewhite, such formwork shall be so described and given separately (F)	F21 83	(a)	(ii)Formwork required to be lined with a particular material (eg wallboard; hardboard; plywood; paper) shall be so described (F)
26 72	(c)	Where lining of wallboard, hardboard, asbestos, cork slab & the like is of a permanent character & to be left in, such lining to be given sep in yds sup, the descr to incl any necessary fixing to concrete. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 84	(a)	(iii)Lining material which is required to be left in position on the concrete shall be given separately in sq yds stating the method of securing (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
26 73	(d)	No deductions shall be made for openings less than 10 ft sup (N)	F20 85	(a)	(iv)No dds shall be made for the following (iv)(i)Voids ne 1sq yd (N)
27 74	(a)	(i) The descriptions shall include splayed edges, notchings,(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F26 86	(b)	Splayed edges and notches shall be deemed to be inc with the fmwk items(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
27 75	(a)	(ii) allowance for overlaps and passings at angles,(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F20 87	(a)	(III)No allowance shall be made for overlaps and passings at angles(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
27 76	(a)	(iii) battens, strutting, bolting, wedging, easing, striking and removal.(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F20 88	(b)	Battens, struts, reversed cut strings, bolting, wedging, easing, striking and removing shall be deemed to be included with the formwork.(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			F20 89	(c)	Formwork to curved surfaces, conical surfaces & spherical surfaces shall each be so desc stating the radius. Fmwk to elliptical surfaces and other surfaces curved to more than one radius shall be so desc stating the radii. Curved linear items of formwork shall be so described stating the radius (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (Tpt) (W) (Wp)
			F20 90	(e)	Formwork coated with a retarding agent shall be so desc. (F)
			F20 91	(g)	Making good exposed faces of concrete after removal of formwork (eg cutting off proj fins; filling in small voids; brushing to

					expose the aggregate) shall be given in the description of formwork. (F)
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27 77	(b)	Where the height of the strutting exceeds 12 feet form-work shall be given separately and the height stated in stages of 2 feet (CU) (D)	F21 92	(b)	Formwork to soffits requiring strutting over 11ft high shall be so desc stating the ht in further stages of 5 ft (CU) (D)
27 78	(c)	Filleting to form stopped chamfered edges or splayed internal angles not exceeding 2 inches wide shall be included in the description of formwork to beams, &c. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (Tpt) (W) (Wp)	F24 93	(b)	Forming chamfers ne 2" wide and forming splayed int angles ne ½" wide shall be given in the description of the formwork in which they occur (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (Tpt) (W) (Wp)
27 79	(d)	Raking or circular cutting and rounded or moulded edges shall be given in feet run. Moulded stoppings shall be enumerated. (R) (Rad) (Wp)	F26 94	(a)	Raking cutting and curved cutting shall each be given separately in linear yds (R) (Rad) (Wp)
27 80	(e)	Formwork to secondary beams shall be measured up to the sides of main beams, but no ddt shall be made from the formwork of the main beam where the secondary beam intersects it. Formwork to beams which intersect with stanchion casings or columns shall be measured up to them on all sides. No deduction shall be made from the formwork to stanchion or column casings at these intersections (Acc) (D) (Enu) (SL) (Loc) (N) (T) (Tpt) (W) (Wp)	F20 95	(a)	No ddt's shall be made for the following; (IV)(ii)Intersections of main beams with wls or columns (IV)(iii)Intersections of main beams with secondary beams (Acc) (D) (Enu) (SL) (Loc) (N) (T) (Tpt) (W) (Wp)
28 81	(a)	Formwork generally shall be classified and given separately as follows:- (i)Flat surfaces such as soffits of floors and the like; (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 96	(a)	(IV)Classification of formwork shall be as follows:- (i)To horizontal soffits of floors, roofs, landings and the like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
28 82	(a)	(ii)where flrs exceed 9 inches in thickness the formwork shall be given separately.	F21 97	(b)	Formwork to soffits of solid concrete floors or solid roofs over 9" thick shall be so desc. (Cu)
		See Clauses 28 (b) and (c) below	F21 98	(a)	(iv)To vertical or battering sides of fdns, ground beams, large machine bases & the

					like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
28 83	(b)	Vertical surfaces such as surfaces of walls and the like.(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 99	(a)	(v)To vertical or battering sides of walls, solid balustrades & the like (grouped together)(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
28 84	(c)	Sloping surfaces. (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)	F21 100	(a)	ii)To sloping soffits of floors, roofs, staircases & the like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)
28 85	(d)	Curved surfaces stating the radius (Acc) (D) (Enu) (SL) (Loc) (Rad) (T) (Tpt) (W) (Wp)			See clause F20(c) above
28 86	(e)	Tops and cheeks of dormers and the like (Acc) (D) (Enu) (SL) (Loc) ® (T) (Tpt) (W) (Wp)	F21 101	(a)	(viii)To sides and soffits of dormers, gablets & the like (grouped tog) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)
28 87	(f)	Sides & soffits of beams & lintels; that to beams & lintels 30” deep & over tb given separately (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 102	(a)	(ix)To sides and soffits of horizontal beam casings, beams, lintels and the like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		No comparable clause	F21 103	(d)	Fmwk to isolated beam casings and isolated beams (ie detached from concrete floors or roofs) shall be so described. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		See clause 28(c) above	F21 104	(a)	(x)To sides and soffits of sloping beam casings, staircase strings and the like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)
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		See clause 28(c) above.	F21 105	(a)	(xi)To sloping upper surfaces of beam casings, beams, staircase strings and the like where more than 15° from horiz. (grouped together) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)

28 88	(g)	sides of piers & stanchions (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 106	(a)	(vi)To vertical or battering sides of stanchion casings, columns, piers, pilasters & the like (grouped together) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)
28 89	(h)	Edges & breaks in floors & wls (tb given in ft run where under 9” in width (Acc) (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)	F21 107	(a)	(vii)To sides and soffits of openings in wls, recesses in wls, projecting panels on wls & the like (grouped together) (Acc) (CU) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
		<i>See clause 28 (h) above</i>	F22 108	(a)	Formwork to edges and risers shall be given in linear yds stating the width. Classification shall be as follows:- (i)To edges of beds, roads, footpaths, pavings & the like (grouped together) (ii)To edges of suspended floors, landings and roofs (grouped together) (iii)To sides of kerbs & upstands (grouped together) (iv)To risers of steps and staircases (grouped together) (Acc) (CU) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	F22 109	(b)	Formwork to edges and soffits of projecting eaves (grouped together) shall be given in linear yds stating the girth. (Acc) (CU) (D) (Enu) (Loc) (SL) (T) (Tpt) (W) (Wp)
28 90	(i)	(Formwork to) Cornices & mouldings (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (Tpt) (W) (Wp)	F23 110		Formwork to projecting or sunk bands, cornices and the like (grouped together) shall be given in linear yds as EO the formwork in which they occur stating the

					girth (Acc) (D) (Enu) (SL) (Loc) (Sh)(T) (Tpt) (W) (Wp)
		<i>See clause 28 (j) below</i>	F25 111	(a)	Fmwk to proj caps and bases of pilasters & columns (grouped together) shall be enumerated as EO the formwork in which they occur stating the size. (Acc) (CU) (D) (Enu) (EO) (Loc) (SL) (T) (Tpt) (W) (Wp)
28 91	(j)	Small surfaces such as cantilever ends, brackets, ends of steps, caps and bases to pilasters and columns and the like (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (Tpt) (W) (Wp)	F25 112	(b)	Fmwk to ends of kerbs, cantilevers, brackets and steps (grouped together) shall be enumerated stating the size ((Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (Tpt) (W) (Wp)
29 92		Formwork shall be measured to both sides of walls and the surface of work sloping more than 15 degrees from the horizontal. (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)	F21 113	(a)	(iii)To sloping upper surfaces of floors, roofs and the like where more than 15° from horizontal (grouped together) (Acc) (D) (Enu) (SL) (Loc) (R) (T) (Tpt) (W) (Wp)
30 93		All formations in concrete surfaces (other than the chamfered edges & splayed int angles before mentioned) & details where produced by formwork shall be measured.	F24 114	(a)	Formwork to throats, grooves, chases, rebates, chamfers over 2” wide, splayed int angles over ½” wide, mouldings, & the like shall each be given separately in linear yds stating the size. Plain stops shall be deemed to be inc with the formwork but stops which are splayed or moulded shall each be enumerated separately. (D) (Enu) (Loc) (Ls) (Sh) (T) (Wp)
		<i>No comparable clause</i>	F25 115	(c)	Fmwk to small machine bases and isolated suspended hearths shall each be enumerated separately stating the size (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
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		<i>No comparable clause</i>	F26 116	(c)	Cutting and fitting fmwk around projecting members which will be cast in (eg pipes; continuity bars) shall be enumerated singly or in groups (Cut)
		Pre-cast Concrete Work			Pre-cast concrete units
					Note: The section has been considerably enlarged in this edition. There is little point in writing out the clauses in full when there is nothing to compare them with, so the new clauses have merely been numbered and written short in the following.

		<i>No comparable clause</i>	F27 117	(a)	For rules relating to Section F generally see Clause F1 hereof
31 94	(a)	(i)Pre-cast work shall be given separately (ii)& measured in accordance with rules for the measurement of natural stone	F27 118	(b)	Precast units shall be given under an appropriate heading <i>No comparable clause</i>
31 95 96	(b)	Precast work shall be described as including all moulds, finished faces, (Acc) (D) (Enu) (F) (SL) (Inc) (Loc) (T) (Tpt) (Wp) and hoisting and setting; the reinforcement shall be described and included with each item.	F27 119	(d)	Fmwk or moulds for precast units shall be deemed t b included with the items (Acc) (D) (Enu) (F) (SL) (Inc) (Loc) (T) (Tpt) (Wp) <i>See clause F27(c) below</i>
		<i>No comparable clause</i>	F27 120	(c)	Particulars of the following shall be given:- (i)Kind, quality and size of reinforcement (ii)Shape of cross section of unit (iii)Nature and extent of surf finish (iv)Composition & mix of jointing and bedding mats (v)Method of fixing
		<i>No comparable clause</i>	F27 121	(e)	Precast units over 6ft long shall be so described stating the number (CU)
31 97	(c)	Slab walling shall be msd in accordance w Bricklayer clause 43			<i>No comparable clause</i>
		<i>No comparable clause</i>	F28 122		Structural units (eg stanchions; beams; purlins; trusses) shall each be enumerated separately stating the size (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F29 123	(a)	(i)Partitions (Enu) (D) (Loc) (W) (Wp) (ii)Curved partitions (Enu) (D) (Loc) (W) (Wp) (Rad)

					(iii)Concrete blocks see Section G
		<i>No comparable clause</i>	F29 124	(b)	Irregular units (Enu) (D) (Sh) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F29 125	(c)	Angles etc (Enu) (D) (Ls) (Loc) (W) (Wp)
Editions 4 and 5					
		<i>No comparable clause</i>	F29 126	(d)	Notches etc (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F30 127	(a)	(i)Posts & heads to ptns (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F30 128	(a)	(ii)Those cast on(Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F30 129	(a)	(iii)Curved members(Enu) (Rad) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F30 130	(a)	(iv)Fair ends, rounded ends, dowelled ends & the like tb enum (Enu) (Sh) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F30 131	(b)	Tapped sockets & blocks tb enum (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F32 132	(a)	(i)Shelves, divisions etc >12" wide (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F32 133	(a)	(ii)Shelves ne 12" (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F32 134	(a)	(iii)Members irreg & curved(Enu) (Sh) (D) (Loc) (Rad) (W) (Wp)
		<i>No comparable clause</i>	F32 135	(b)	(i)Fair edges etc (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F32 136	(b)	(ii)Stops etc (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F32 137	(c)	Notches etc (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F33 138		(i)Kerbs etc (Enu) (D) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F33 139		(ii)Curved members tb desc stating rad (Enu) (Sh) (D) (Loc) (Rad) (W) (Wp)

		<i>No comparable clause</i>	F33 140		(iii)Fair ends etc tb enum (Enu) (D) (Loc) (W) (Wp)
32 98		Cornices, string courses, plinths, sills, copings, lintels and other similar items shall be given in feet run and the sizes stated: those over 7 feet and not exceeding 10 feet in length and those above 10 feet in length shall be given separately, and the average length and number in each of these groups shall be stated; angle stones, kneelers, bonders, stoolings, and similar items shall be enumerated. (Acc) (CU) (D) (Enu) (SL) (Loc) (Sh)(T) (Tpt) (W) (Wp)	F34 141		Sills, lintels, copings and the like shall each be given separately in linear yds stating the size. Curved members shall be so described stating the mean radius. Fair ends, stooled ends, returned ends, angles and the like shall each be enumerated separately.(Acc) (CU) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (Tpt) (W) (Wp)
33 99		Pre-cast concrete pavement & roof lights tb enum & the method of bedding & jointing stated. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F37 142		Pavement lights, roof lights and the like shall each be enumerated separately stating the size and the shape where other than rectangular. Glass blocks shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
34 100		Steps (other than spandril steps and winders) shall be given in feet run; ends of steps shall be enumerated. Spandril steps, winders and landings shall be enumerated and the extreme sizes stated. (Acc) (D) (Enu) (Sh) (SL) (T) (Loc) (W) (Wp)	F31 143	(a)	Steps (except winders) shall be given in linear yards stating the extreme size and the number of steps. Nosings, rebates and the like shall be given in the description. Spandril steps (ie steps with sloping soffits) shall be so described. Curved steps shall be so described stating the mean radius. Fair ends, rounded ends, wall holds, stooled ends and the like shall each be enumerated separately. (Acc) (D) (Enu) (Rad) (Sh) (SL) (T) (Loc) (W) (Wp)
Editions 4 and 5					
			F31 144	(b)	Winders, landings, solid balustrade panels and the like shall each be enumerated separately stating the extreme size. Members of irregular shape shall be so described. Nosings, rebates, fair ends, returned ends, shaped ends, wall holds and the like shall be given in the description. . (Acc) (D) (Enu) (Rad) (Sh) (SL) (T) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F35 145		Templates etc (Acc) (D) (Enu) (Rad) (Sh) (SL) (T) (Loc) (W) (Wp)
		<i>No comparable clause</i>	F36 146		Pier caps etc . (Acc) (D) (Enu) (Sh) (SL) (T) (Loc) (W) (Wp)
35 101		Holes & notchings for pipes and the like shall be enumerated . (Enu) (D)	F65 147	(a)	Holes for pipes, tubes, bars, cables and the like members (grouped together) shall be enumerated stating the size of the member

					as clause A4(c) hereof and the thickness of the concrete. Fixing pipe sleeves shall be given in the desc. (Enu) (D) (DW)
		No comparable clause	F65 148	(b)	Holes for ducting, trunking, tray and the like members (grouped together) shall be enumerated stating the sectional area of the member in stages of 36 sq ins and the thickness of the concrete (Cu) (D) (Enu)
		No comparable clause	F38 149		For precast concrete tile or slab finishings to floors and walls see section U hereof.
			F39 150		For cast stone see section K hereof
		Suspended Floors, Roofs & the like of Special Construction			Hollow block suspended construction
		No comparable clause	F40 151	(a)	For rules relating to Section F generally see clause F1 hereof
36 102	(a)	Floors, roofs, &c. shall include for the concrete, hollow tiles or other units and reinforcement. (DW)			See clause 40b below
		See clause 36(a) above	F40 152	(b)	Hollow block construction, its reinforcement and formwork under appropriate heading (DW)
		No comparable clause	F40 153	(c)	(i)Design by employer
		No comparable clause	F40 154	(c)	(ii)Design by contractor
36 103	(b)	(i)Floors and roofs, &c. shall be given separately in yards superficial (Acc) (D) (DW) (Enu) (SL) (T) (Tpt) m(Loc) (W) (Wp)	F41 155	(a)	(I)Suspended floors, roofs and the like (measured over the ribs and bearings and grouped together) shall be given in square yds in acc with Clause F7 hereof. (Acc) (D) (DW) (Enu) (SL) (T) (Tpt) (Loc) (W) (Wp)
Editions 4 and 5					
104		(ii)giving desc of the floor finishings; the superimposed load tb stated in lbs/ ft sup & in case of floors of normal loads the span tb given in multiples of 2 ft comm at 6 ft. In floors subject to exceptionally heavy loads the exact span tb given. Floors subjected to moving or vibrating load			

		tb given separately, and the nature of the load fully described			
		<i>No comparable clause</i>	F41 156	(a)	(II) Solid conc wk in hollow block const & filling ends of hollow blocks deemed to be inc with the items. Particulars of the following tb given:
		<i>No comparable clause</i>	F41 157	(a)	(i) Comp & mix of conc and topping
		<i>No comparable clause</i>	F41 158	(a)	(ii) Overall thickness of slab.
		<i>No comparable clause</i>	F41 159	(a)	(iii) Size and type of blocks
		<i>No comparable clause</i>	F41 160	(a)	(iv) Distance bet centres of rows
		<i>No comparable clause</i>	F41 161	(a)	(v) Size and type of slip tiles
		<i>No comparable clause</i>	F41m 162	(a)	(vi) Finish to exposed soffits. (Acc) (D) (DW) (Enu) (SL) (T) (Tpt) (Loc) (W) (Wp)
36 105	(c)	If the load is to be taken as inclusive of provision for future partitions it shall be so stated and particulars given.			<i>No comparable clause</i>
37 106	(a)	Sloping floors and roofs, vertical work, &c., shall each be given separately in yards superficial, and if circular, the radius of the curve shall be stated. (R) (Rad)			See clause F41(a) & note ref to clause F7
37 107	(b)	Cantilever work shall be given sep (Acc) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)			<i>No comparable clause</i>
37 108	(c)	Dormer cheeks and tops, &c., shall each be given in feet superficial. (Acc) (D) (Enu) (SL) (Loc) (R) (Tpt) (W) (Wp)	F41 163	(b)	Tops and cheeks of dormers (grouped together) shall be given in sq yds stating the thickness. . (Acc) (D) (DW) (Enu) (SL) (T) (Tpt) (Loc) (W) (Wp)
37 109	(d)	Small turrets, small domes, &c., shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (W) (Wp)			<i>No comparable clause</i>
38 110	(a)	Measurement shall be taken to the extreme edge of the construction for its full bearing into chases &c., and from the extreme edge of casing to external beams			<i>No comparable clause</i>
38 111	(b)	Raking and circular cuttings shall be separately given in feet run. Forming			<i>No comparable clause</i>

		hips & valleys shall be given in ft run. (Cut) (R) (Rad)			
38 112	(c)	No deductions shall be made for openings of 2 ft sup or under (N)			No comparable clause
38 113	(d)	For all opgs where steel trimmers are not prov an item tb given of ex lab & mat in trimming flr around opening, stating the size of the opening and the span of the floor in which the opening occurs. (Acc) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)			No comparable clause
Editions 4 and 5					
39 114		If the panel system of heating is adopted, wherein the pipes are embedded in the floor the area of heating panels shall be stated. (Acc) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)			No comparable clause
40 115		Where the construction is interrupted by steel joists in the depth of the slab an item shall be given in feet run of extra labour cutting and waste against both sides of steel joists. In the case of diagonal strengthening this shall be given separately. (Acc) (Cut) (D) (SL) (Enu) (Loc) (Tpt) (W) (Wp)			No comparable clause
41 116		Channels or chases formed in the floor tb given in ft run & desc & their position in the slab stated; the description shall include the extra formwork necessary. (D) (SL) (Enu) (Loc) (Sh) (T) (Wp)			No comparable clause
42 117		Fixing slips for grounds, slating battens, &c., or metal clips for floor fillets shall be enumerated (Enu) (Loc)	F45 164		Fixing slips, metal clips and the like shall each be enumerated separately stating the method of fixing (Enu) (Loc)
43 118		Holes shall be enumerated and described and shall include the boxing (Enu) (Loc) (T)			See clause F65
44 119		Conc casing to steel joists tb msd the net vol below the floor & given in ft cu, and inc for all necessary wiring, binding or stirrups ard flanges of joists; any extra bar r/f tb given sep in wt, as desc in clauses 21-25. In measuring casing to box girders, the void tb ddt if > 48" in sectional area. Unless the thickness of the floor is known the qty of beam casing shall	F42 165	(a)	Casings to steel supporting beams (msd below the slab) shall be given in accordance w Clause F9 hereof. (Acc) (D) (SL) (Enu) (Loc) (T) (W) (Wp)

		be prov. (Acc) (D) (SL) (Enu) (Loc) (T) (W) (Wp)			
		<i>See clause 15 above</i>	F42 166	(b)	Conc beams (msd below the slab) tb given in acc w clause F10 hereof. (Acc) (Cu) (D) (Enu) (SL) (Loc) (Tpt) (W) (Wp)
45	120	Concrete curbs shall be given in feet run stating the size and shall include for reinforcement and formwork. All labours shall be included in the description. (Acc) (D) (DW) (SL) (Enu) (Loc) (T) (W) (Wp)	F42 167	(c)	Kerbs shall be given in linear yds stating the size. (Acc) (D) (DW) (SL) (Enu) (Loc) (T) (W) (Wp)
			F43 168		Forming hips and valleys shall each be given separately in linear yds stating the thickness (Acc) (D) (DW) (SL) (Enu) (Loc) (T) (W) (Wp)
		<i>See clauses 21 to 25 above</i>	F44 169		Reinforcement shall be given in accordance w Clauses F17 to F19 hereof (Acc) (Cu) (Cut) (D) (Enu) (Loc) (N) (R) (Rad) (Sh) (SL) (T) (Tpt) (W) (Wp) (Wt)
46	121	Formwork, if any, shall be measured in accordance with clauses 26-30 (Acc) (CU) (D) (SL) (Enu) (F) (Inc) (Loc) (N) (R) (Rad) (Sh) (T) (Tpt) (W) (Wp)	F46 170		Formwork shall be given in accordance w Clauses F20 to F26 hereof. (Acc) (Cu) (Cut) (D) (Enu) (EO) (F) (Inc) (Loc) (Ls) (R) (Rad) (Sh) (SL) (T) (Tpt) (W) (Wp)
Prestressed concrete					
<i>Note: This is the first edition in which prestressed concrete work has appeared, so the circumstances are similar to those of the previous section, and the same procedure is followed</i>					
Editions 4 and 5					
		<i>No comparable clause</i>	F47 171	(a)	For rules relating to Section F generally see clause F1 hereof
		<i>No comparable clause</i>	F47 172	(b)	Prestressed concrete work (ie work where reinforcement is tensioned before or as the load is applied) and its reinforcement and associated formwork shall be given under an appropriate heading.
		<i>No comparable clause</i>	F47 173	(c)	(i) Design by employer
		<i>No comparable clause</i>	F47 174	(c)	(ii) Design by contractor
		<i>No comparable clause</i>	F47 175	(d)	A general desc

	<i>No comparable clause</i>	F47 176	(e)	Particulars of the following shall be given:- (i)Steel wires
	<i>No comparable clause</i>	F47 177	(e)	(ii)Type of jack
	<i>No comparable clause</i>	F47 178	(e)	(iii)Type of cones, wedges etc.
	<i>No comparable clause</i>	F47 179	(e)	(iv)Amount of tension
	<i>No comparable clause</i>	F47 180	(e)	(v)No. & dia of wires (D)
	<i>No comparable clause</i>	F47 181	(e)	(vi)Pre-tensioned, post tensioned etc
	<i>No comparable clause</i>	F47 182	(e)	(vii)Maturity of conc bef. release
	<i>No comparable clause</i>	F47 183	(e)	(viii)Tests
	<i>No comparable clause</i>	F47 184	(e)	(ix)Cutting off and sealing (Cut)
	<i>No comparable clause</i>	F48 185	(a)	Structural in-situ members.
	<i>No comparable clause</i>	F48 186	(b)	Members cast in sections
	<i>No comparable clause</i>	F48 187	(c)	Construction joints (Acc) (D) (SL) (Loc) (T) (W) (Wp)
	<i>No comparable clause</i>	F49 188	(a)	Forming & grouting. Partics of (i)sleeves, sheathing
	<i>No comparable clause</i>	F49 189	(a)	(ii)Tempy supports. (T)
	<i>No comparable clause</i>	F49 190	(a)	(iii)Composition of grout
	<i>No comparable clause</i>	F49 191	(b)	Ducts or grooves (Acc) (D) (SL) (Loc) (Sh) (T) (W) (Wp)
	<i>No comparable clause</i>	F49 192	(c)	Curved sleeves (Rad)
	<i>No comparable clause</i>	F49 193	(d)	Forming and grouting
	<i>No comparable clause</i>	F49 194	(e)	Filling in
	<i>No comparable clause</i>	F50 195	(a)	Supplying steel wires
	<i>No comparable clause</i>	F50 196	(b)	Fixing ea length
	<i>No comparable clause</i>	F50 197	(c)	Cones, wedges
	<i>No comparable clause</i>	F50 198	(d)	Tensioning
	<i>No comparable clause</i>	F51 199		Reinforcement

Editions 4 and 5					
		<i>No comparable clause</i>	F52 200	(a)	Formwork, subject to: (i)strutting and supports (T)
		<i>No comparable clause</i>	F52 201	(a)	(ii)Fmwk to pre- and post-tensioned ea so desc
		<i>No comparable clause</i>	F52 202	(a)	(iii)Tempy restraints. (T)
		<i>No comparable clause</i>	F52 203	(b)	Fmwk to recesses (T)
		<i>No comparable clause</i>	F52 204	(c)	Fmwk to tempy const jts. (T)
					Precast prestressed units
		<i>No comparable clause</i>	F53 205	(a)	For rules relating to Section F generally see clause F1 hereof
		<i>No comparable clause</i>	F53 206	(b)	A general desc
		<i>No comparable clause</i>	F53 207	(c)	(i)Design by employer
		<i>No comparable clause</i>	F53 208	(c)	(ii)Design by contractor
		<i>No comparable clause</i>	F53 209	(d)	Particulars of the following shall be given:- (i)Steel wires
		<i>No comparable clause</i>	F53 210	(d)	(ii)Cross section shape. (Sh)
		<i>No comparable clause</i>	F53 211	(d)	(iii)Surface finish. (F)
		<i>No comparable clause</i>	F53 212	(d)	(iv)Jtg & bedding mat
		<i>No comparable clause</i>	F53 213	(e)	Formwork or moulds. (T)
		<i>No comparable clause</i>	F54 214	(a)	(I)Precast units
		<i>No comparable clause</i>	F54 215	(a)	(II)Units of identical section ne 10ft (Sh) (CU)
		<i>No comparable clause</i>	F54 216	(a)	(III)Units over 10ft (CU)
		<i>No comparable clause</i>	F54 217	(a)	(IV)Those of unusual shape. (Sh)
		<i>No comparable clause</i>	F54 218	(a)	(V)Classification shall be as follows:- (i) Pre-tensioned in mould (CU)
		<i>No comparable clause</i>	F54 219	(a)	(V)(ii)Post tensioned on ground (CU)
		<i>No comparable clause</i>	F54 220	(a)	(V)(iii)Cast in sections, assembled & post-tensioned before erection (CU)

		<i>No comparable clause</i>	F54 221	(a)	(V)(iv)Cast in sections, assembled in situ & post tensioned after erection (CU)
		<i>No comparable clause</i>	F54 222	(a)	(V)(v)Post-tensioned after hoisting but capable of self support (CU)
		<i>No comparable clause</i>	F54 223	(a)	(V)(vi)Post tensioned after hoisting but requiring support until tensioning dcomp (CU)
		<i>No comparable clause</i>	F54 224	(b)	Construction jts (CU)
		<i>No comparable clause</i>	F54 225	(c)	Temporary supports (CU) (T)
		<i>No comparable clause</i>	F55 226		Cores, ducts and recesses
		<i>No comparable clause</i>			Contractor designed construction
		<i>No comparable clause</i>	F56 227	(a)	Construction which is to be designed and executed by the contractor
		<i>No comparable clause</i>	F56 228	(b)	Where the contractor's choice of design is limited
		<i>No comparable clause</i>	F56 229	(c)	The type of soffit
Editions 4 and 5					
		<i>No comparable clause</i>	F56 230	(d)	Particulars of tests
		<i>No comparable clause</i>	F56 231	(e)	Work shall be msd as executed
		<i>No comparable clause</i>	F57 232	(a)	(I)Suspended floors
		<i>No comparable clause</i>	F57 233	(a)	(II)In the case of cross reinforced
		<i>No comparable clause</i>	F57 234	(a)	(III) The superimposed load on slabs
		<i>No comparable clause</i>	F57 235	(a)	(IV)Solid concrete in hollow block
		<i>No comparable clause</i>	F57 236	(a)	(V) slabs shall be grouped & desc as follows:- (i) Isolated slabs (CU)
		<i>No comparable clause</i>	F57 237	(a)	(V)(ii)End slabs (CU)
		<i>No comparable clause</i>	F57 238	(a)	(V)(iii)Intermediate slabs(CU)
		<i>No comparable clause</i>	F57 239	(a)	(V)(iv)Cross reinforced isolated slabs(CU)
		<i>No comparable clause</i>	F57 240	(a)	(V)(v)Cross reinforced corner slabs(CU)
		<i>No comparable clause</i>	F57 241	(a)	(V)(vi)Cross reinforced side slabs(CU)

		<i>No comparable clause</i>	F57 242	(a)	(V)(vii)Cross reinforced middle slabs (CU)
		<i>No comparable clause</i>	F57 243	(b)	The superimposed loads on slabs shall be given in the description as follows: (i)Weight of floor or roof finishings
		<i>No comparable clause</i>	F57 244	(b)	(ii)Weight of partns
		<i>No comparable clause</i>	F57 245	(b)	(iii)Working load and abnormal loads
		<i>No comparable clause</i>	F57 246	(c)	Classification of floors and roofs shall be as follows:- (i)Horizontal (CU)
		<i>No comparable clause</i>	F57 247	(c)	(ii)Sloping ne 15° (CU) (R)
		<i>No comparable clause</i>	F57 248	(c)	(iii)Sloping ex 15° (CU) (R)
		<i>No comparable clause</i>	F57 249	(c)	(iv)Vertical . ???
		<i>No comparable clause</i>	F57 250	(d)	Cantilevered work (CU)
		<i>No comparable clause</i>	F57 251	(e)	(i)Curved roofs. (Rad)
		<i>No comparable clause</i>	F57 252	(e)	(ii) Elliptical (Rad)
		<i>No comparable clause</i>	F57 253	(f)	Haunchings. (Sh)
		<i>No comparable clause</i>	F57 254	(g)	Tops and cheeks of dormers (grouped together) (DW)
		<i>No comparable clause</i>	F57 255	(h)	Small turrets (Sh)
		<i>No comparable clause</i>	F58 256		Trimming floors
		<i>No comparable clause</i>	F59 257	(a)	Raking cutting (Cut)(R)
		<i>No comparable clause</i>	F59 258	(b)	Working concrete ard pipes
		<i>No comparable clause</i>	F59 259	(c)	(i)Forming channels (Sh)
		<i>No comparable clause</i>	F59 260	(c)	(ii)Channels to falls. (Sh)(R)
		<i>No comparable clause</i>	F59 261	(c)	(iii)Ends, angles (Ls)
Editions 4 and 5					
		<i>No comparable clause</i>	F60 262	(a)	(i)Casings to steel

		<i>No comparable clause</i>	F60 263	(a)	(ii)Isolated casings
		<i>No comparable clause</i>	F60 264	(a)	(iii)Bar reinforcement
		<i>No comparable clause</i>	F60 265	(a)	(iv)Formwork (T)
		<i>No comparable clause</i>	F60 266	(a)	(v)In cases where thickness of slab is not known
		<i>No comparable clause</i>	F60 267	(b)	(i)Kerbs
		<i>No comparable clause</i>	F60 268	(b)	(ii)Formwork (T)
		<i>No comparable clause</i>	F61 269		Fixing slips
					Sundries
		<i>No comparable clause</i>	F66 270		Mortices (other than those mentioned in clause F3(g) hereof), sinkings and the like shall each be enum separately stating the size or purpose. Running mortices with lead or mortar shall be given in the description. (Enu) (DW)
		<i>No comparable clause</i>	F67 271		Making good concrete in connection with holes and mortices shall be given in the description of such labours. Making good plasterwork and other finishings shall be given in accordance with Section U hereof
		<i>No comparable clause</i>	F68 272		Protecting the work in this section shall be given as an item
		PILING			PILING
47 122	(a)	(i)A general description of the nature of the site (i.e. whether level or irregular) shall be given. (Acc)	E1 273	(a)	(i)Any information concerning the nature of the groundshall be given stating whether the surface is level or irregular. (Acc)
47 123	(a)	(ii)In work near rivers or tidal waters the level of the ground surface in relation to high and low water mark and Ordnance datum should be stated, together with records of highest flood water level. (Acc) (Ad)	E1 274	(b)	Work near rivers or tidal waters shall be so desc stating the level of the ground in relation to high water mark, low water mark and the Ordnance datum. Attention shall be drawn to any available records of the highest flood water level in the locality. (Acc) (Ad)
47 124	(a)	(iii)All available information as to the strata through which the piles are to be driven shall be given,	E1 275	(a)	(ii)Any information concerning the nature of thestrata shall be given
125		(iv)or reference made to any plans showing records of bores.	E1 276	(a)	(iii)Attention should be drawn to any available records of bores on the site

		<i>No comparable clause</i>	E1 277	(c)	Providing and assembling the piling equipment on the site and its subsequent removal shall be given as an item. Moving the piling frames about the site, raising and lowering them and providing any necessary staging or barges to support them shall be deemed to be included with the item. (PP)
Editions 4 and 5					
47 126	(b)	If piles are to be driven from any other level than Ground level this shall be stated; if the piling frame is to be lowered or raised the exact height and nature of the work shall be described. (SL) (PP)	E1 278	(d)	A general description of the piling operations shall be given as an item stating the approximate levels at which the piling frames will operate (eg ground level; reduced level; basement level. (SL) (PP)
47 127	(c)	Trial piles shall be given separately stating the position of each and the length to be driven. (Acc) (D) (Enu) (SL) (Loc) (PP) (Tpt) (W) (Wp)	E6 279		Trial piles shall be enumerated stating the location, length and cross section of the pile, the length of driving and the method of testing. Any necessary pointed ends, shoes, heads and r/f shall be given in the desc. (Acc) (D) (Enu) (Inc) (SL) (Loc) (PP) (Tpt) (W) (Wp)
47 128	(d)	Any extra excavation that may be entailed for the movement of the piling frame about the site in order to place the hammer over any pile situated in an angle or similar position, together with any necessary filling in and ramming afterwards, shall be measured or covered by provisional items (Acc) (D) (SL) (Enu) (Loc) (P) (PP) (Tpt) (W) (Wp)	E1 280	(e)	Extra excavation (where necessary in order to place the hammer over any pile situated in an angel (sic) or similar position) together with any necessary filling and ramming afterwards, shall be given in detail or as provisional items. (Acc) (D) (SL) (Enu) (Loc) (P) (PP) (Tpt) (W) (Wp)
Wood or concrete piles					
		<i>No comparable clause</i>	E2 281	(a)	For rules relating to Section E generally see clause E1 hereof
		<i>No comparable clause</i>	E2 282	(b)	Designs for piles shall be deemed to be provided by the employer. Piles reqd to be designed by the contractor shall be given in accordance with Clause E7 hereof
48 129	(a)	Wood piles shall be described and given in ft cu and the size stated. If over 20 ft long the lengths shall be given in stages of 4 feet. (Acc) (D) (SL) (Enu) (Loc)	E3 283	(a)	Supplying wood piles shall be given in cubic feet stating the size of the cross section. Those over 30 feet long shall be so described stating the length in further stages of 10 ft. (Acc) (D) (SL) (Enu) (Loc)
48 130	(b)	Shoeing and pointing piles shall be enumerated stating the weight of the shoes and the size of the pile. (Enu) (Sep) (Wt) (D) (SL) (Loc)	E3 284	(b)	Pointed ends of piles shall be enum as EO the piles on which they occur. Where shoes are fitted they shall be given in the description stating the weight. (Enu) (EO) (Sep) (Wt) (D) (SL) (Loc)

48	131	(c)	Cutting off tops of piles and ringing with steel bands shall be enumerated and, if cut off below water level, the depth shall be stated. (Acc) (Ad) (Cut) (D) (Enu) (EO) (Loc) (O) (Sep) (SL) (W) (Wp)	E3	285	(e)	Cutting off the tops of piles to required levels and ringing with steel bands shall be enumerated as EO the piles concerned stating the size of the cross section of the band. Cutting under water shall be so described stating the depth below water level. (Acc) (Ad) (Cut) (D) (Enu) (EO) (Loc) (O) (Sep) (SL) (W) (Wp)
49	132	(a)	(i)Concrete piles shall be described and given in feet run and classified according to section and length, the extra strength of the heads being stated. (Acc) (CU) (D) (DW) (Enu) (Loc) (T) (W) (Wp)	E4	286	(a)	(i)Supplying cast concrete piles shall be given in linear feet stating the size of the cross section and the number (Acc) (CU) (D) (Enu) (Loc) (PP) (SL) (Tpt) (W) (Wp) (Wt)
Editions 4 and 5							
49	133	(a)	(ii)Any requisite moulds shall be inc in the desc, as also the necessary strappings and bolts. (Acc) (D) (DW) (Enu) (Loc) (Sep) (T) (W) (Wp)	E4	287	(a)	(ii)Moulds deemed tb inc with items. (Acc) (D) (DW) (Enu) (Loc) (Sep) (T) (W) (Wp)
49	134	(a)	(iii)If piles may be cast at the site this shall be stated. (Acc) (D) (DW)(Enu) (Loc) (Sep) (T) (W) (Wp)	E4	288	(a)	(iii)Piles required to be cast away from the site and subsequently transported to the site shall be so described. (Acc) (D)(DW)(Enu) (Loc) (Sep) (T) (Tpt) (W) (Wp)
49	135	(b)	Heads and shoes shall be enumerated and the weight of each given; rock shoes shall be specially mentioned. (Enu) (Inc) (Wt)	E4	289	(c)	Heads and shoes shall each be enumerated as EO the piles to which they are fitted stating the weight. Rock shoes shall be so described. (Enu) (Inc) (Wt)
49	136	(c)	Cutting or breaking away heads of piles to required levels shall be enumerated. (Cut) (Enu) (SL)	E4	290	(f)	Cutting off the tops of piles to required levels and preparing the reinforcement shall be enumerated as EO the piles concerned. Cutting under water shall be so described stating the depth below water level. (Ad) (Cut) (Enu) (SL)
49	137	(d)	Where there is a possibility of certain of the piles being reqd to be lengthened in pos, prov quants for this wk tb given sep, & lab & mat in connections enumerated . (Acc) (D) (DW) (Enu) (Loc) (P) (Sep) (T) (W) (Wp)	E4	291	(g)	Lengthening piles in pos shall be given in detail. Connections shall be enum. Redriving lengthened piles tb given in lin ft stating the number. . (Acc) (D) (DW) (Enu) (Loc) (Sep) (T) (W) (Wp)*
49	138	(e)	Steel reinforcement shall be classified and given as clauses 21-25 ; forks or struts shall be enumerated and the weight given. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (N) (P) (PP) (R) (Rad) (Sh) (T) (Tpt) (W) (Wp)	E4	292	(b)	Bar reinforcement shall be given in accordance with the rules for reinforcement in Section F hereof. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (N) (P) (PP) (R) (Rad) (Sh) (T) (Tpt) (W) (Wp)
50	139	(a)	Handling, pitching and driving the piles shall be enumerated, stating whether singly or in clusters and	E3	293	(c)	Handling transporting and pitching piles shall be enumerated stating the size, the
				E4	294	(d)	

		giving the size and length of the piles. (D) (Enu) (PP) (Tpt)			length, and whether single or in clusters. (D) (Enu) (PP) (Tpt)
50 140	(b)	Driving of piles, other than sheet piles, tb given in ft run, msd from shoe point when pitched to shoe point when driven, & set reqd & any limitation on the method to be used shall be stated. Driving of raking piles & piles driven in water tb given sep, also driving of piles exc 30 ft in length, in stages of 10 ft (Ad) (CU) (D) (Enu) (Loc) (M) (R)	E3 295 E4 296	(d) (e)	Driving piles (measured from the shoe point in contact with the ground when pitched to the shoe point when driven) shall be given in linear ft stating the set required and any limitation on the method of driving. Driving piles on rake and driving piles in water shall each be so desc. (Ad) (CU) (D) (Enu) (Loc) (M) (R)
		<i>No comparable clause</i>	E5 297	(a)	Boring pile holes and filling bores with concrete (taken together) shall be given in lin ft stating size and number of bores & mix of conc filling. (Acc) (D) (DW) (Enu) (Loc) (PP) (SL) (Tpt) (W) (Wp)
		<i>No comparable clause</i>	E5 298	(b)	Where bored piles are required to finish below the formation level of the ground, an additional item of blind boring shall be given in linear ft stating the size of the bore
		<i>See clauses 21 to 25</i>	E5 299	(c)	Bar reinforcement shall be given in accordance with the rules for reinforced concrete in Section F hereof. (Acc) (Cu) (Cut) (D) (Enu) (Loc) (N) (R) (Rad) (Sh) (SL) (T) (Tpt) (W) (Wp) (Wt)
		<i>No comparable clause</i>	E5 300	(d)	Disposal of soil from the bores shall be given in accordance with the rules for disposal of excavated material in Section D hereof . (Acc) (D) (Loc) (Tpt) (W) (Wp)
Editions 4 and 5					
					Contractor designed concrete piles
		<i>No comparable clause</i>	E7 301	(a)	For rules relating to Section E generally see clause E1 hereof
		<i>No comparable clause</i>	E7 302	(b)	Contractor- designed concrete piles shall be enum stating actual length, superimposed load t b carried & method of disposing of any spoil. Particulars t b given of any restrictions regarding type of pile or method of driving. Any necessary r/f in piles shall be deemed to be included with the items. (Enu) (D) (Acc) (Add) (Loc) (PP) (W) (Wp) (Tpt)
		<i>No comparable clause</i>	E7 303	(c)	Where tops of piles required to fin bel formation level, piles tb so desc stating

					depth of top below such level (D) (SL) (W) (Wp)
50 141	(c)	The driving of piles in close contact to form sheeting shall be given separately from that of piles driven apart from each other, the type of interlock, if any, being described. (Acc) (D) (Enu) (SL) (Loc) (M) (R)			No comparable clause
					Steel sheet piling
		No comparable clause	E8 304	(a)	For rules relating to Section E generally see clause E1 hereof
51 142	(a)	(i)Sheet piling shall be described and given in feet superficial; the measurement shall be the net area as placed in position and shall include for laps the amount of which shall be stated. (Acc) (D) (CU) (Enu) (Loc) (N) (PP) (R) (SL) (T) (Tpt) (W) (Wp) (Wt) No comparable clause	E8 305	(b)	(i)Steel sheet piling (measured the area as placed in position taken on the centre line of the piling) shall be given in sq ft stating the size of the cross section of each unit and the thickness or substance of the metal. (Acc) (D) (CU) (Enu) (Loc) (N) (PP) (R) (SL) (T) (Tpt) (W) (Wp) (Wt) (ii)Sheet piling over 40 ft long shall be so described stating the length in further stages of 10 ft. Handling, transporting, pitching strutting and waling shall be given in the description. (Acc) (D) (CU) (Enu) (Loc) (N) (PP) (R) (SL) (T) (Tpt) (W) (Wp) (Wt)
			E8 306	(b)	
51 143	(a)	ii)The driving shall be given in feet superficial, and the item shall include for handling and transporting; if the total depth of driving exceeds 10 feet the extra depths shall be stated in stages of 5 feet. Strutting and waling to sheet piling shall be described. (inc above) See General Principles, Clause 11 See clause 51 (b) below	E8 307	(c)	Driving steel sheet piling (measured from formation level of the ground to the bottom edge of the sheet piling when driven) not exceeding 20ft dp shall be given in sq ft. Driving over 20 ft dp shall be given in sq ft stating the depth in further stages of 10 ft. (Inc above) Driving in water shall be so desc. Withdrawing steel sheet piling shall be given in the description of driving.
			308		

			309		
51 144	(b)	It shall be stated whether the sheet piling is to be left in or drawn (Sep)			See clause E8 (c) above
Editions 4 and 5					
51 145	(c)	Corner and junction piles shall be given in feet run as extra only. (EO) (Ls)	E8 310	(d)	Corner piles and junction piles shall each be given in lin ft as extra over the sheet piling in which they occur. (EO) (Ls)
51 146	(d)	Cutting or burning through sheet piling shall be given in feet run. (Cut) <i>See General Principles, Clause 11</i>	E8 311 312	(e)	Cutting or burning through steel sheet piling shall be given in lin ft as extra over the piling concerned. (Cut) (EO) Cutting under water shall be so desc stating the depth below water level. (Ad)
52 147		If any special system of piling is required the general principles given above shall apply; in the case of cylinder sinking the total quantity of excavated material brought to the surface for removal shall be given in yards cube. (Tpt)			<i>No comparable clause</i>
		BRICKLAYER			Brickwork & Blockwork THE UNIT OF BILLING SHALL BE THE YARD
		<i>No comparable clause</i>	G1 1	(a)	Brickwork and blockwork shall be measured the mean length by the average height. Fair face and facework shall be measured on the exposed face.
		<i>No comparable clause</i>	G2 2	(a)	For rules relating to Section G gen, see clause G1 hereof.
		<i>No comparable clause</i>	G2 3	(b)	Particulars of the following shall be given:- (i)Kind, type and size of bricks (ii)Type of bond (iii)Composition & mix of mortar

1 1	(a)	(i)Brickwork generally shall be given in yds sup reduced to 1 brick in thickness, (Enu) (Loc) (W)			<i>See section heading above</i>
1 2	(a)	(ii)brickwork exceeding 3 ½ bricks thick may be given in yards cube.			<i>No comparable clause</i>
		<i>No comparable clause</i>	G3 4	(a)	(vi)Battering walls (ie walls of uniform thickness built battering. (Acc) (D) (Enu) (Loc) (R) (SL) (W) (Wp) (vii)Bkk used as fmwk. Tempy strutting shall be given in the desc. (Acc) (D) (Enu) (Loc) (R) (SL) (W) (Wp) (viii)Refractory brick lining to flues. (Acc) (D) (Enu) (Loc) (R) (SL) (W) (Wp) (ix)Brick damp proof courses (Acc) (D) (Enu) (Loc) (R) (SL) (W) (Wp) (x)Vaulting (Acc) (Cut) (D) (Enu) (Sh) (SL) (Ls) (Loc) (Rad) (T) (W) (Wp)
		<i>No comparable clause</i>	G3 5	(b)	<i>(See clause G3(a) above)</i> Where the thickness of work is not a multiple of ½ brick, the rough cutting shall be given in the description of work under 2B thick but shall be given in accordance w clause G10 hereof in the case of work over 2B thick
1 3	(b)	Half brick walls shall be given separately in yards superficial,	G3 6	(a)	<i>See clause G3(a) above</i>
Editions 4 and 5					
1 4	(c)	One-brick walls if faced or finished fair on both sides, shall be given separately in yds sup	G2 7	(d)	For brickwork built fair both sides or built entirely of facing bricks see clauses G24 to G28 hereof.
		<i>No comparable clause</i>	G1 8	(b)	Labours on different kinds of work shall be given separately

1 5	(d)	Labours to existing work shall be given separately	G1 9	(c)	Labours on old work shall be so desc
2 6	(a)	(i)Deductions shall be measured the net sizes of the openings and recesses, including the extra width of rebated reveals. (D)(Enu) (Loc) (MsA) (N) (W) (Wp) (ii)No deductions shall be made for openings one ft sup and under.	G1 10	(a)	<i>See clause G2(c) below</i> (i)(No deduction shall be made for) voids not exceeding 1 sq ft
2 7	(b)	Deductions shall be made for strings, sills, lintels and the like only when exceeding 3 ins. in height. (N) <i>See above</i>	G2 11 G14 12	(c) (e)	Deductions of brickwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full brick courses displaced and as regards depth to the extent only of the full half brick beds displaced (N) Deductions of facework for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full brick courses displaced (N)
			G14 13	(f)	For half brick and 1 B wls built fair bs or built entirely of facing bricks see clauses G24 to G28 hereof
3 8		Footings shall be measured and included with the general brickwork. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			<i>See clause G3 above</i>
Editions 4 and 5					
4 9		Brickwork in backing to Masonry shall be given separately; the description shall include all cutting and waste for bonding. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (O) (W) (Wp)	G4 14		(ii)Backing to masonry. Cutting and bonding brickwork to masonry shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (O) (W) (Wp)
5 10	(a)	Brickwork in underpinning shall be given separately (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	G1 15	(e)	For work in underpinning see Section H hereof (Acc)(D)(Enu)(SL)(Loc)(W)(Wp)

5 11	(b)	Wedging up on top of underpinning shall be given in feet superficial. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	G53 16		Wedging and pinning up new work to underside of old construction in cases where the load is to be transmitted to the new work shall be given in lin yds stating the thickness of the work. The materials for wedging and pinning shall be described (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
6 12	(a)	The necessary scaffolding for building brickwork in raising or off girders shall be given in feet run stating the height above ground at which brickwork commences: this item shall only be given in cases where there is no brickwork immediately below the girders and it shall not apply to steel framed buildings. (Acc) (D) (Enu) (SL) (T) (Loc) (W) (Wp)			<i>No comparable clause</i>
6 13	(b)	The preparation of tops of existing walls for raising shall be given in feet superficial.(Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	G50 17	(a)	Preparing tops of old walls to receive new walls shall be given in linear yds stating the thickness of the old wall. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)*
6 14	(c)	The thick bed to flush up the rivet heads, where raising is off girders, shall be given in feet superficial. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	G50 18	(b)	Beds of mortar to cover rivets of girders under walls shall be deemed to be included with the walls which shall be measured from the top surface of the girders. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
7 15	(a)	Brickwork in hollow walls shall be given in yards superficial stating the thickness of the inner and outer casings and the width of the cavity; disposition of the ties shall be described or the number per yard superficial given. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G8 19	(a)	<i>See clause G3(a)(iii) above</i> Forming cavities in hollow walls shall be given in sq yds stating the width of the cavity. Wall ties shall be given in the description stating the type and dis-position or number per sq yd. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
7 16	(b)	Alternatively brickwork in hollow walls may be measured by giving the inner and outer walls as separate items in conformity with Clause 1, the brickwork being described as in hollow walls and given separately from other brickwork; the forming of the cavity shall be given in yards superficial and shall include the ties, their disposition or the number per yard superficial being stated. (Alt) (D) (O) (Inc)			<i>No comparable clause</i>

7	17	(c)	Where the cavity is closed against openings, at ends and the like, an item shall be given in feet run and the material and method described. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)	G8	20	(b)	Closing cavities at ends of hollow walls or at jambs of openings shall be given in linear yds stating the width of the cavity & method of closing (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)
8	18	(a)	Brickwork circular on plan shall be measured the mean length of the wall and the radius stated; the description shall include all cutting and templates. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	G1	21	(d)	Curved work shall be so desc stating the mean radius. Curved fair face and curved facework shall be so desc stating the radius on face. Rough cutting within the thickness (or the provision of curved bricks or curved blocks) shall be given in the description of curved work. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)*
Editions 4 and 5							
8	19	(b)	When brickwork is circular on one face only, an item of circular rough face of brickwork shall be given in yards superficial stating the radius and including all cutting. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Rad) (W) (Wp)				<i>No comparable clause</i>
9	20	(a)	Tapered walls and walls with one battering face shall be measured the mean thickness and added to the general brickwork. (R)	G6	22		Bkk in tapered walls (ie walls of dim thickness from base to top) tb given in sq yds stating the av thickness, whether one or both faces are battered and the rate of batter. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
9	21	(b)	An item of cutting shall be given in feet superficial stating the rate of taper or batter per foot in length or height as the case may be. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)		23		Rough cutting within the thickness shall be given in the description (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
10	22		Walls built battering shall be given separately. Rough cutting shall be measured at each change of direction and given in ft sup. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)				<i>See clause G6 above</i>
11	23	(a)	Thickening existing walls shall be given separately in yards superficial and the thickness stated; the description shall include for extra labour in cutting tooting and bonding to existing wall (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G5	24		Brickwork of any thickness in each of the following classes shall be given in sq yds stating the thickness. Cutting and bonding new to old and extra material for bonding shall be given in the desc stating any special method of bonding. Classification shall be as follows:- (i)Thickening old wls (msd beyond face of the old wl) (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)

			25		(ii) Projections on old wls (msd beyond face of the old wl) of attached piers, chimney breasts & the like (grouped together)
11 24	(b)	Chimney breasts and piers built against existing walls shall be measured in a similar manner and given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			See clause G4 above
11 25	(c)	If any special method of bonding is specified it shall be stated			See clause G4 above
12 26	(a)	Brickwork in filling in openings shall be given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			See clause G3(a)(ii) above
12 27	(b)	Levelling and preparing sill of opening and tothing and bonding to jambs and pinning up to soffits shall be given in feet superficial or in feet run stating the thickness of the wall. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			No comparable clause
			G15 26	(e)	Facework to vaulting shall be so desc
Editions 4 and 5					
13 28		Brickwork in vaulting shall be given separately in yards superficial. Cutting to groin points, intersections, or against ribs shall be given in feet run, stating the thickness of the vaulting. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (Sh) (T) (W) (Wp)	G16 27	(b)	See clause G3(a)(x) above Fair cutting on brick vaulting at groin points, intersections and ribs (grouped together shall be given in linear yds. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (Sh) (T) (W) (Wp)
			G14 28	(a)	For rules relating to Section G generally see clause G1 hereof
			G14 29	(b)	The rules relating to facework shall apply equally to fair face on brickwork
			G14 30	(c)	Particulars of the following shall be given:- (i) Kind and quality of facing bricks where different from those in the body of the work. Purpose made bricks shall be so described (ii) Size of facing bricks where different from those in the body of the work and the

				<p>method of bonding such facings to the backing.</p> <p>(iii) Type of bond except in the case of fair face</p> <p>(iv) Composition and mix of mortar for pointing where different from that in the body of the work</p> <p>(v) Method of pointing</p>
14 29	(a)	Fair face of bkk tb msd on all exposed faces, the pointing desc, and the quantity given in yards superficial.		<i>See clause G1(a)</i>
14 30	(b)	Arches in fair faced work shall be measured as described in clause 45. (Acc) (D) (DW) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)		<i>See clause G22</i>
15 31		Where grooved bricks are to be used for surfaces to be plastered the area shall be given in yds sup as EO brickwork (EO)	G7 31	Grooved bricks shall be given in sq yds as EO the brickwork in which they occur (EO)
16 32		Limewhiting or cement wash shall be given in yards superficial. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)		<i>See clause G49</i>
17 33		Rough cutting shall be given in feet superficial stating the thickness. The cuttings to various kinds of brickwork shall be given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)	G10 32	<p>(a) Rough cutting shall be given in sq yds and shall be deemed to comprise any or all of the following:-</p> <p>Rough cutting against soffits</p> <p>Rough cutting at squint or birdsmouth angles</p> <p>Rough cutting at rebated reveals except where both dims are a multiple of ½ B</p> <p>Rough cutting around steel sections</p> <p>Rough cutting within the thickness of walls which are over 2 B thick & not a multiple of ½ B in thickness as clause G3(b) hereof.</p> <p>Rough cutting to proj which are not a multiple of ½ B as clause G4(i) hereof</p> <p>Rough raking cutting</p> <p>Rough splay cutting</p>

					Rough curved cutting (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
Editions 4 and 5					
		<i>No comparable clause</i>	G10 33	(b)	Rough cutting at square angles and vertical abutments shall be deemed to be inc with the bkk (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
		<i>No comparable clause</i>	G10 34	(c)	Rough cutting to form chamfered angles and rounded angles shall each be given separately in linear yds stating the width radius or girth. No distinction shall be made between Horizontal raking vertical and curved angles. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (W) (Wp)
		<i>No comparable clause</i>	G10 35	(d)	Rough cutting on brick vaulting at groin points, intersections and ribs (grouped together) shall be given in lin yds stating the thickness of the vaulting. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
18 34	(a)	Projections of less than 4 ½ inches for plinths, pilasters, aprons, friezes, and the like shall be given in yds sup as extra lab and mat, stating the projection. Where 4 ½ inches or over they shall be msd the net projection & added to the general bkk; if not a multiple of half-a-brick rough cutting shall be measured. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Ls) (Loc) (O) (SW) (T) (W) (Wp)	G4 36		Brickwork of any thickness in each of the following classes shall be reduced to 1B and given separately in sq yds. Classification shall be as follows: (i)projections (measured beyond the face of the wall) of footings, attached piers, chimney breasts, plinths, bands, o'sailing courses and the like (grouped together). Rough cutting for projections which are not a multiple of ½ B in thickness shall be given in accordance with clause G10 hereof. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Ls) (Loc) (O) (SL) (T) (W) (Wp)
18 35	(b)	Oversailing or receding courses in the wall face shall be given in feet run for extra labour, stating the projection and height and any extra material shall be added to the general brickwork (for faced work see clause 50 (a). (Acc) (C) (Cut) (D) (Enu) (Inc) (SL) (Loc) (Sh) (T) (W) (Wp)	G19 37	(a)	Facework to flush, sunk or proj brick on edge bands, brick on end bands, dentilled bands, basket pattern bands, moulded or splayed plinth cappings, moulded string courses, moulded cornices & the like shall ea be given sep in lin yds stating the width of band & depth of the set back or set forward. Horizontal, raking, vertical and curved members shall ea be so desc. The type of moulded or splayed bricks (eg stock pattern; purpose made; cut & rubbed) tb stated. Moulded or splayed bands entirely of headers or stretchers tb so desc. Facework to margins, rough cutting within the thickness and extra material shall be given in the desc. (Acc) (C) (Cut) (D) (Enu) (Inc) (SL) (Loc) (Sh) (T) (W) (WP)

			G19 38	(b)	Ends, int angles, ext angles & irregular angles shall each be enum sep (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (W) (Wp)
			G20 39	(a)	Flush, sunk and proj tile creasings shall each be given sep in lin yds as EO the bkk in which they occur stating the number of courses and the depth of the set back or set forward. Horiz, raking, vertical and curved members shall ea be so desc. (Acc) (Cut) (D) (Enu) (EO) (SL) (Loc) (R) (Rad) (W) (Wp)
			G20 40	(b)	Fair ends and irregular angles shall each be enumerated separately. Stopped ends and other angles shall be deemed to be included with the items (Acc) (D) (Enu) (SL) (Loc) (Ls) (W) (Wp)
18 36	(c)	Courses set back or forward as string courses & the like tb given in ft run for extra labour, stating the number of cos & the depth of returns: where proj the desc shall inc for the extra mat. (for faced work see clause 50 (b)) (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			<i>See clauses G19(a) and (b) above</i>
18 37	(d)	If in fair face the items referred to in sub- clauses (b) & (c) shall be msd in accordance with clause 50.			<i>See clause 25(d)</i>
19 38		Trimmer arches shall be given in feet superficial stating the thickness; the skewbacks shall be given in feet run. Alternatively trimmer arches may be enumerated. (Acc) (Alt) (D) (Enu) (Rad) (T) (W) (Wp)			<i>See clause G12</i>
20 39		Raking out joints of brickwork and hacking face of wall to form key shall be given in yds sup. (Acc) (Cut) (D) (Enu) (DW) (F) (SL) (Loc) (T) (W) (Wp)			<i>See clause G48(a)</i>
		<i>No comparable clause</i>	G43 41		Particulars of the following shall be given:- (i) Kind and quality of damp proof material (ii) Gauge, thickness or substance (eg wt per sq ft) of sheet material (iii) Number of layers (iv) Composition and mix of bedding materials

		<i>No comparable clause</i>	G44 42	(a)	Slate damp proof courses and sheet damp proof courses (eg bitumen felt; sheet lead; sheet copper) over 9” wide shall each be given separately in sq yds. Such work ne 9” wide shall be given in lin yds stating the width. No allowance in measurement shall be made for laps & this shall be stated in the description. No ddt shall be made for voids ne 4 sq ft. Horizontal, raking, vertical & curved work shall each be so desc. Cutting to curve shall be given in the desc of work in curved walls (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (W) (Wp)
		<i>No comparable clause</i>	G44 43	(b)	Damp proof courses with cavity gutters in hollow walls shall be so desc
		<i>No comparable clause</i>	G44 44	(c)	Pointing exposed edges of damp proof courses shall be deemed to be included with the damp proof courses (DW) (O) (C)
		<i>No comparable clause</i>	G45 45		For brick damp proof courses see clause G3(a)(ix) hereof
		<i>No comparable clause</i>	G46 46		For asphalt damp courses see section L hereof
21 40	(a)	Horizontal damp-proof courses 9” wide or over shall be given in feet superficial; those less than 9” wide shall be given in feet run and the width stated. (D) (Enu) (Ls) (SL) (Loc) (N) (W) (Wp)			<i>See clause G44(a) above</i>
Editions 4 and 5					
21 41	(b)	Vertical damp-proof linings shall be given in yards superficial. (D) (Enu) (Ls) (SL) (Loc) (N) (T) (W) (Wp)			<i>See clause G44(a) above</i>
21 42	(c)	Damp-proof courses or linings on circular walls, both horizontal and vertical, shall include all extra cutting and waste (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (Rad) (W) (Wp)			<i>See clause G44(a) above</i>
21 43	(d)	Damp-proof courses in underpinning shall be given separately. (D) (Enu) (Ls) (SL) (Loc) (N) (T) (W) (Wp)			<i>See clause H6</i>
21 44	(e)	All vertical work done overhead shall be given separately. (Acc) (Ad) (D) (Enu) (Ls) (SL) (Loc) (N) (T) (W) (Wp)			<i>No comparable clause</i>

21	45	(f)	Damp-proof course to chimney stacks shall be given separately			<i>See clauses G3(a)(v) and (ix)</i>
22	46		Bkk in eaves filling t b inc with the general brickwork; the labour in eaves filling shall be given in ft run (msd over all) stating thickness of wall. (Acc) (Cut) (D) (DW) (Enu) (Inc) (SL) (Loc) (W) (Wp)	G9	47	Brickwork in eaves filling shall be added to the general brickwork. The labour in eaves filling shall be given in lin yds (measured over all) stating the thickness of the wall (Acc) (Cut) (D) (DW) (Enu) (Inc) (SL) (Loc) (W) (Wp)
23	47		Plumbing to angles shall be measured to all external angles in facings and fair faced brickwork and shall be given in feet run. (D) (Inc) (Loc) (W) (Wp)	G17	48	(a) Fair vertical internal angles and fair vertical external angles shall be deemed to be included with the facework except that in the case of glazed brick facework such angles shall each be given separately in linear yds (D) (Inc) (Loc) (W) (Wp)
24	48		An item of cutting in forming reb reveals tb given in ft run except where both dims of rebate are multiples of half a brick. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (Ls) (T) (W) (Wp)			<i>See clause G10(a) above</i>
25	49	(b)	Squints and birdsmouths shall be similarly given in feet run; the item shall be deemed to inc cutting 4 1/2 " in to the thickness of wl, & any cutting beyond tb measured as rough cutting in accordance with clause 17. (Acc) (Cut) (D) (Enu) (IW) (SL) (Loc) (Ls) (T) (W) (Wp)	G17	49	(c) Fair squint angles and fair birdsmouth angles shall each be given separately in linear yds stating the method of forming (eg fair cut; fair cut and rubbed; purpose made) (Acc) (Cut) (D) (Enu) (IW) (SL) (Loc) (Ls) (T) (W) (Wp)
25	50	(a)	Splays and rounded angles shall be given in feet run and described as rough or fair, and the width of splays and girth or radius of angles stated; the description of any special bricks shall be given, stating if they are purpose made. (Acc) (Cut) (D) (Enu) (IW) (SL) (Ls) (Loc) (T) (W) (Wp)	G17	50	(d) Fair chamf angles, fair rdd angles & fair mo angles shall ea be given sep in lin yds stating the width, radius or girth & method of forming (eg fair cut; fair cut & rubbed; purpose made). Horiz, raking, vert and curved angles shall ea be so desc. Ends, int mis, ext mis & irreg mis shall ea be enum sep. (Acc) (Cut) (D) (Enu) (IW) (SL) (Ls) (Loc) (T) (W) (Wp)
26	51		Where new walls are bonded to extg an item of lab & mat in ctb shall be given in ft sup, alternatively this may be given in ft run stating the thickness of the new wall. (Acc) (Cut) (D) (Enu) (IW) (SL) (Ls) (Loc) (T) (W) (Wp)	G13	51	Bond ends of new wls to old tb given in lin yds stating bond & thickness of wl. Cutting pockets in old wk & extra mat for bonding t b given in the desc. (Acc) (Cut) (D) (Enu) (IW) (SL) (Ls) (Loc) (T) (W) (Wp)
27	52	(a)	Chases in brickwork for edges of partitions shall be given in feet run stating the thickness of the partition. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)	G11	52	Horiz rough chases in new work for edges of floors, landings and roofs shall be deemed to be inc with the bkk. Other horiz rough chases & all raking vert and curved rough chases shall each be given sep in lin yds stating the size. No ddt of bkk shall be made for any rough chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)

		<i>See clauses 27b to 28 below</i>	G17 53	(e)	Fair chases tb given in lin yds stating size. Facewkw to back and sides tb given in the desc. Horiz, raking, vert and curved chases shall each be so desc. No ddt of brickwork or facework shall be made for any chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (R) (T) (W) (Wp)
27 53	(b)	Chases for pipes, wires, and the like shall be given in feet run stating the size; (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			<i>See clauses G11 and G17(e) above</i>
27 54	(c)	Chases for edges of conc, hollow tile or similar floors or landings tb given in ft run, stating thickness of floor or landing and depth of chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			<i>See clauses G11 and G17(e) above</i>
27 55	(d)	Chases for turning in edge of asphalt and the like and pointing shall be given in feet run. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			<i>See clauses G11 and G17(e) above</i>
27 56	(e)	Vertical, horizontal or raking chases shall each be given separately (R)			<i>See clauses G11 and G17(e) above</i>
27 57	(f)	No deduction of brickwork shall be made for such chases (N)			<i>See clauses G11 and G17(e) above</i>
28 58		Cutting and pinning edges of landings shall be given in feet run and the thickness stated. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)			<i>No comparable clause</i>
29 59		Cutting and fitting brickwork up to or around steel stanchions and concrete columns and around steel joists and girders shall be given in feet run stating the sizes ; alternatively this may be given in feet superficial. (Acc) (Alt) (Cut) (D) (Enu) (Inc) (SL) (Loc) (T) (W) (Wp)			<i>See clause G10(a)</i>
30		Wedging and pinning up bkk to u/s of steel jsts and girders, conc slabs and beams or other soffits t b given in ft sup.; alt this may be given in ft run stating the width.			
31 60		Raking out for and pointing flashings shall be given in feet run; that for stepped flashings shall be given separately. (Acc) (Cut) (D) (Enu) (Inc)(SL) (Loc) (T) (W) (Wp)	G55 54	(a)	Raking out joint or cutting groove for turned in edge of flashings shall be given in lin yds. Horiz, raking, stepped, vertical and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (R) (T) (W) (Wp)

Editions 4 and 5						
32	61	(a)	Bedding plates shall be given in feet run, unless brickwork is measured over the plates; if more than 4 ½ ins, on bed, the width shall be stated. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	G52 55	(a)	Bedding plates shall be given in lin yds (except where wls are msd over plates without ddt) stating the width of bed where over 4 ½ “ (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
32	62	(b)	Bedding corrugated sheeting and the like on top of walls shall be given in ft run and the width of the bed stated; if required to be pointed on one or both sides this shall be included in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (T) (W) (Wp) (Wt)	G52 56	(b)	Bedding corrugated sheeting and the like shall be given in lin yds stating the width of the bed. Pointing to one or both sides shall be given in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (T) (W) (Wp) (Wt)
33	63		The bedding and pointing of wood frames shall be given in feet run stating if pointed on one or both sides; where sills are bedded in a different material these shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp) (Wt)	G52 57	(c)	Bedding wood frames and sills shall be given in lin yds. Pointing to one or both sides shall be given in the description (Acc) (D) (Enu) (SL) (Loc) (W) (Wp) (Wt)
34	64		Hoop iron and similar metal bonds and building in shall be given in yards run. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			<i>See clauses G47 and G56(b)</i>
35	65		For brick pavings and steps see Pavior, clause 6. (Acc) (D) (Enu) (Ls) (Loc) (R) (Rad) (W) (Wp)	G28 58		For brick pavings see section U hereof
36	66		Rough arches shall be measured the mean girth and given in feet run as extra over brickwork, stating the thickness of the wall and the number of rings in height; the items shall include for all cutting except for skewbacks, which shall be measured as rough cutting. (Acc) (Cut) (D) (Enu)(EO) (SL) (Loc) (N) (Rad) (T) (W) (Wp)	G12 59		Rough arches (measured the mean length on face) shall be given in lin yds as EO the brickwork in which they occur stating the thickness and the number of rings in the arches. Rough cutting on arches and walls shall be given in the description of the arches. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (Rad) (T) (W) (Wp)
37	67		Brick fireplaces shall be measured in detail, and given under a separate heading. (Acc) (D) (Enu) (SL) (Loc) (N) (Rad) (T) (W) (Wp)			See clause G64(b)
38	68		Hearths shall be given in feet superficial stating the number; the screeded bed (if any) shall be given separately. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)			<i>See clause G64(b)</i>
39	69	(a)	Setting stoves, grates, mantels, and ranges shall be enumerated and type	G64 60	(a)	Stoves, grates, mantels, ranges and similar units shall each be enumerated separately

		fully described; the size of the opening in all cases shall be stated. The description shall include for all concrete and brick backings required for setting. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp) (Wt)			stating the type and the size. Setting in fireplace opgs & providing any concrete and brick backings shall be given in the description stating the width of the fireplace opening. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp) (Wt)
39 70	(d)	(i)The descriptions for setting tile, marble and other surrounds shall state whether slabbed or built up in position, and in either case shall include mortar for fixing also cleaning off and washing down on completion. . (Acc) (D) (Enu) (SL) (Loc) (N) ((T) (W) (Wp)	G64 61	(b)	Surrounds, hearths and similar units shall each be enumerated separately stating the size, the nature of the material (eg tile; marble) and the condition in which each unit is supplied (eg loose parts: pre-slabbed). Assembling and jointing or building up loose parts and setting shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)
71		(ii) Tiling to recesses for portable stoves and the like shall be measured in accordance with the rules for wall tiling (see Plasterer, clause 33)			<i>No comparable clause</i>
39 72	(b)	The description for setting ranges shall include for setting back boiler (if any) and for forming all short flues and fixing covings. Soffit plates, dampers, &c.; connections of hot water pipes to boiler shall be measured, described, and given separately in the hot water fitter's work. The cutting away for hot water pipes shall be given as hereinafter described. . (Acc) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp) (Wt)			<i>See clause G64(a) above</i>
39 73	(c)	The descriptions for setting portable stoves, coppers, &c., shall include placing in position and the length and diameter of flue pipe shall be stated; the connections with brick flue shall be given separately. Acc) (D) (DW) (Enu) (SL) (Loc) (N) (T) (W) (Wp)			<i>See clause G64(a) above</i>
39 74	(e)	Fixing mantels shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			<i>See clause G 64(a) above</i>
40 75	(a)	Parging and coring flues shall be given in ft run (Acc) (D) (Enu) (SL) (Loc) (N) (R) (T) (W) (Wp)	G61 62	(a)	Parging and coring flues shall be given in lin yds stating the internal size of the flue where over 3sq ft in sect area (Acc) (D) (Enu) (SL) (Loc) (N) (R) (T) (W) (Wp)
40 76	(d)	(ii)No deduction of brickwork shall be made for flues of smaller size than 1 ft. 6 ins. x 1 ft. 6 ins. (N)	G1 63	(a)	(ii)(No deduction shall be made for) Flues, lined flues and flue block where the voids and the work displaced do not together exceed 3 sq ft in sectional area. (N)

40 77	(b)	Flue linings shall be given in feet run; bends and easings formed by cutting shall be included with the item.	G61 65	(c)	For refractory brick linings to flues see clause G3(a)(viii) hereof
Editions 4 and 5					
40 78	(c)	Pre-cast concrete flue blocks built into brickwork shall be enumerated (Enu)	G62 66		Gas flue blocks shall be enum stating the type of block and the size and number of flues in each block. The method of bldg shall be desc. (eg built-in; free standing). Rough cutting on walls ard the flue blocks shall be given in the description of built in flue blocks. For deduction of brickwork see clause G1(a) hereof. (Acc)(Cut) (D) (Enu) (Loc) (M) (SL)(W) (Wp)
41 79	(a)	Building in metal window and door frames tb enum stating the sizes; the desc to inc for b i fixing lugs and for bedding & pointing, stating if pointed one or b s. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (Wt)	G56 67	(a)	(i)Building in metal windows, metal doors and the like (complete with frames) shall each be enum sep stating the over-all size. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (Wt)
41 80	(b)	Fixing runners & channels to sliding doors & shutters shall be enum stating the length and the method of fixing. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (Wt)			<i>No comparable clause</i>
41 81	(c)	Building in doors and frames of safes shall be enumerated stating the size, approximate weight, the method of fixing and if pointed on one or both sides; the different floor levels at which safe doors are to be fixed shall also be stated. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (Wt)	G56 68	(a)	B i strong room doors, safe doors & the like (complete with frames) shall each be enum sep stating the o'all size, the approx wt & floor level. B i o r c & p lugs, bedding frames & ptg to one or both sides shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (Wt)
42 82	(a)	Cutting and pinning or building in ends of timbers, lintels, steps, steel joists, brackets, &c., shall be enumerated except where no deduction has been made under Clause 2 (b); if in faced brickwork or in existing walls they shall be so described and given separately. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G56 69	(b)	(i)Building in ends of lintels, bearing bars, steps, timbers and the like as the work proceeds shall be deemed to be inc. with the brickwork and blockwork items. (i)Cutting and pinning ends of lintels, steps, timbers, tubular rails, brackets and the like (grouped together) shall be enumerated irrespective of size. No deduction shall be made for any ends mentioned in this paragraph (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
42 83	(b)	Where ends of timber floor joists and joists to flat roofs bear on a wall			<i>No comparable clause</i>

		plate, building in of ends shall not be given			
42 84	(c)	Cutting and pinning or building in ends of steel joists shall be enumerated and classified in groups as follows:- Those not exceeding 6 inches in depth, those exceeding 6 inches and not exceeding 12 inches in depth, and continuing in stages of 6 inches in depth. (CU)	G56 71	(b)	(ii)Building in ends of steel sections shall be enum stating the size as Clause A4(b) hereof. No deduction shall be made for any ends mentioned in this paragraph (CU)
42 85	(d)	Holes through walls for pipes shall be enumerated and classified in accordance with General Principles, clause 10, stating the thickness of the wall, and shall include the making good of common brickwork and fair face (if any). (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)	G57 72	(a)	Holes for pipes, tubes, bars, cables, conduits and the like members (grouped together) shall be enumerated stating the size of the member as clause A4(c) hereof and the thickness of the work. Fixing pipe sleeves shall be given in the description. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)
42	(e)	The making good of all finishings, inc bk fcgs, for holes for pipes shall be enum. And given sep in the appropriate trade			
42 86	(f)	Air bricks and the building in of ventilating gratings, soot doors &c., shall be enumerated stating the thickness of wall in which they are built; the formation of the opening behind, including the lintel, shall be desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G60 73		Forming small openings in walls and building in air-bricks, ventilating gratings, soot doors and the like shall each be enum separately stating the size of the opening, the nature of the wall & its thickness. Lintels and arches shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
42 87	(g)	Chimney pots including the setting and flaunching, shall be enumerated. (Acc) (D) (Enu) (Sh) (SL) (Loc) (T) (W) (Wp) (Wt)	G63 74		Chimney pots shall be enum stating the type and size. Setting and flaunching shall be given in the description. (Acc) (D) (Enu) (Sh (SL) (Loc) (T) (W) (Wp) (Wt)
43 88	(a)	Partitions or walls formed of slabs, concrete blocks, hollow tiles, or patent blocks shall be given in yards superficial; the description shall state the thickness and finish of the blocks. (Acc) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp) (ii)C & p at top, cutting at ends & round openings, & cutting and			See clauses G32(b), G33(a)(i)

43 89	(b)	bonding to, intersections, Ls and irreg. Ls tb given in ft run; raking and circ cutting tb given sep. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (R) (Rad)(T) (W) (Wp)			See clause G37(a)
43 90	(c)	Cutting and bonding to walls of different construction shall be given in ft run and desc as inc the extra material. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			See clauses G33(a) and G37(a)
Facings, Arches, &c.			Brick Facework		
44 91	(a)	All facings shall be measured to the whole of the faces of walls exposed to view as extra only over common brickwork and shall be given in yards superficial except as otherwise provided below. The nature of the bricks, the pointing, and the bond shall be described. (DW) (EO) (Enu) (Loc) (T) (W) (Wp)	G14 75	(d)	Facework shall be given as EO the bkk on which it occurs. Pointing shall be given in the description (DW) (EO) (Enu) (Loc) (T) (W) (Wp)
44 92	(b)	Where it is necessary for the work to be executed overhand the facings shall be given separately. (Acc) (Add) (D) (Enu) (SL) (Loc) (Ls) (N) (T) (W) (Wp)	G15 76	(c)	Facework built overhand shall be so described (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
44 93	(c)	Battering facings shall be given separately and the batter described. (Acc) (D) (R) (SL) (W) (Wp)	G15 77	(f)	Battered facework shall be so desc stating the rate of batter. (Acc) (D) (R) (SL) (W) (Wp)
Editions 4 and 5					
		See clause 23 above	G17 78	(b)	Fair battered internal angles and fair battered external angles shall each be given separately in linear yds (Acc) (D) (Enu) (Ls) (R) (SL) (W) (Wp)
44 94	(d)	In the case of circular facings the radius shall be stated. (Rad) (Wp)			See clause G1(d)
44 95	(e)	All purpose made bricks shall be so described. (Sh) (Wp)			See clauses G1(d) and G14(c)(i)
44 96	(f)	Facings to reveals and returns 9 inches wide and under shall be measured the net width and given in feet run; the description shall state the width and include the plumbing to angle. (Acc) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)	G15 79	(a)	Facework over 4 ½ “ wide to walls, piers, chimney stacks, returns and the like (grouped together) shall be given in sq yds(Acc) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)

		See clause 44(f) above	G15 80	(b)	Facework not ex 4 ½ “ wide to reveals, returns, soffits, offsets, exposed edges and sup items of sunk or projecting wk etc (grouped together) tb given in lin yds as facewk to margins irrespective of actual width. Curved margins & shaped margins shall each be so desc. Ends and angles deemed tb inc.(Acc) (D) (Rad) (Sh) (SL) (W) (Wp)
44 97	(g)	Facings to cavity and other walls where snapped headers are required shall be given separately (Acc) (Cut) (D) (Enu) (IW) (Loc) (Ls) (SL) (T) (W) (Wp)			See clause G2(b)
44 98	(h)	Facing with bricks differing in sizes from the general building brick shall be given separately and the size of the bricks and the method of bonding to general brickwork stated. (D) (M) (Wp)			See clause G14(c)(ii)
44 99	(i)	(i)Facing in panels not exceeding one yd sup shall be given separately in ft sup and the number stated: (D) (Enu) (Sh) (Wp)	G15 81	(d)	Facework to panels and aprons not exceeding one square yard each shall be so described stating the number (D) (Enu) (Sh) (Wp)
		(ii) Facings in bands differing from the general facing and not exceeding four courses in height shall be given in ft run (D) (Enu) (Sh) (Wp)	G18 82	(a)	Facework to flush plain bands ne 12” wide formed with facing bricks which differ in kind or size from the general facings shall be given in linear yds stating the width of the band. Horiz, raking, vertical and curved bands shall each be so desc. (D) (Enu) (Sh) (Wp)
44 100	(i)	See clause 44(i) above	G18 83	(b)	Facework to sunk and projecting plain bands ne 12” wide t b given in lin yds stating kind of facing bricks where they differ from those in the gen facewk, the width of band and depth of set back or set forward. Horiz, raking, vert and curved bands shall each be so desc. Facework to margins, rough cutting within the thickness & extra material shall be given in the desc of the bands.(D) (Enu) (Sh) (Wp)
			G18 85	(d)	Facework to plain bands over 12” wide shall be dealt with as facework to walls. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
45 101	(a)	Arches shall be measured the mean length on face and given in feet run, stating the height on face and the width of exposed portion of soffit (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)	G22 86		(further to clauses G18 (a) & (b)) Facework to arches (measured the mean length on face) shall be given in lin yds stating the width on face, the width of the exposed soffit and the outline of the arch. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)

45 102	(b)	Arches of varying shapes and types and arches of purpose-made bricks shall be given separately. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G22 above</i>
45 103	(c)	Arches of unusual outline shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G22 above</i>
46 104		Aprons in facings shall be given in feet superficial and the projection stated (see clause 18); the returns shall be given in feet run. Shaping edges of aprons shall be given in feet run and shall include all cutting; alternatively the shapings may be enumerated stating the girth. (Acc) (Cut) (D) (Enu) (Ls) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G15(d) above</i>
47 105	(a)	Fair cutting shall be deemed to include cutting 4 ½ “ into thickness of wall, and any cutting beyond this shall be measured as rough cutting. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp) <i>See clause 47(b) below</i>	G16 87	(a)	Fair cutting (which shall be deemed to penetrate 4 ½” into the wall) shall be given in lin yds. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp) Classification shall be given as follows:- (i)Fair cutting at vertical abutments (ii)Fair cutting against soffits (iii)Fair raking cutting & fair splayed cutting (grouped together) (iv)Fair curved cutting (CU)
			G16 88	(b)	Fair cutting on brick vaulting at groin points, intersections and ribs (grouped together) shall be given in linear yards (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)
47 106	(b)	Fair cutting shall be measured up to stone or terra cotta dressings and to skewbacks of fair arches and given in feet run. Where panels are formed of stone or bricks of a different description from that of the general facing causing a vertical straight joint, an item of fair cutting shall be similarly measured. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G16 (a) above</i>

47	107	(c)	Cuttings against mouldings shall be enumerated and the girth of moulding stated. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			See clause G16 (a) and (b)	
48	108	(a)	Squints and birdsmouths shall each be given in feet run stating whether fair cut and rubbed or purpose made (Acc) (Cut) (D) (Enu) (IW) (SL) (Loc) (Sh) (T) (W) (Wp)			See clause G17(c)	
48	109	(b)	Splays, rounded angles, and moulded angles shall be given in feet run and the width, radius, or girth stated; stops, angles &c., shall be enumerated. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)			See clause G17(d)	
49	110	(a)	Flush or projecting quoins formed with bricks of a different description from those of the general facings shall be given in feet run (each face being measured), stating the average width and whether bonded into the general facings or with a straight joint; if cut and rubbed they shall be so described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)	G21	89	(a)	Facework to flush quoins formed with facing bricks which differ in kind or size from the general facings shall be given in linear yds (measured on the vertical angle) stating the average girth and the method of jointing between quoin and general facework. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (T) (W) (Wp)
			See clause 49(a) above	G21	90	(b)	Facework to sunk and projecting quoins shall each be given separately in linear yds (msd on the vertical angle) stating the av girth, the depth of the set back or set forward and the method of jointing between quoin and general facework. Facework to margins, rough cutting within the thickness and extra material shall be given in the description (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)
49	111	(b)	Rustication shall be given in feet run. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)	G21	91	(c)	Cut and rubbed quoins shall be so desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Rad) (Sh) (T) (W) (Wp)
50	112	(a)	O'sailing or receding courses in the wl face tb given in ft run for ex lab & pointing returns: total projection & number of courses tb stated. (For unfaced brickwork see clause 18(b). (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)	G21	92	(d)	Tile insets in quoins and rustications in quoins shall be given in the description (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)
50	113	(b)	Courses set back or fwd as string courses & the like tb given in ft run for ex lab, stating no of cos & depth of returns: the descr to inc for pointing returns &, where proj, for the extra mat. The formation of dentil			See clause G21(d) above	

		or other ornamental cos tb desc. (For mouldings see clause 51 (b) and for unfaced work clause 18 (c). (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)			
					<i>See clause G19(a)</i>
			G15 93	(g)	Facework sunk or projecting less than 4 ½ “ from the general face of the wall shall be so desc stating the depth of the set back or set forward. Rough cutting within the thickness and extra material shall be given in the description (Acc) (Cut) (D) (Enu) (Loc) (SL) (T) (W) (Wp)
51	114	(a)			<i>See clause G19(a)</i>
51	115	(b)			<i>See clause G19(a)</i>
51	116	(c)			<i>See clause G19(b)</i>
51	117	(d)			<i>See clause G19(a)</i>
52	118				<i>See clause 26(a) and (b)</i>
53	119				<i>No comparable clause</i>
54	120	(a)			<i>See clause G27</i>

		(D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			
54	121	(b)	Tumblings to buttresses shall be enumerated and shall include all cuttings. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)	G23 94	Facework to tumblings of buttresses shall be enumerated stating the size. Fair and rough cuttings shall be given in the desc.. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)
			<i>No comparable clause</i>		Brickwork built fair both sides or entirely of facing bricks
			<i>No comparable clause</i>	G24 95	(a) For rules relating to Section G generally see clause G1 hereof
			<i>No comparable clause</i>	G24 96	(b) Particulars in accordance with Clauses G2(b) and G14(c) hereof shall be given
			<i>No comparable clause</i>	G24 97	(c) Deductions of brickwork shall be msd in accordance with clause G2(c) hereof (MsA)
			<i>No comparable clause</i>	G24 98	(d) Pointing shall be given in the desc of the work on which it occurs (DW)
			<i>No comparable clause</i>	G25 99	(a) Half brick walls and one brick walls built fair b s or entirely of facings shall ea be given sep in sq yds. Classification shall be as clause G3(a) hereof (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			<i>No comparable clause</i>	G25 100	(b) Fair returns (eg ends of wls; reveals of opgs) shall be given in lin yds stating the width in stages of 4 ½ (Acc) (D) (Enu) (IW) (SL) (Loc) (T) (W) (Wp)
			<i>No comparable clause</i>	G25 101	(c) Fair cutting, fair angles and fair chases shall be given in accordance w clauses G16 and G17 hereof. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			<i>No comparable clause</i>	G25 102	(d) Plain bands, ornamental bands, comices, tile creasings, quoins and arches shall be given in accordance w clauses G18 to G22 hereof.
			<i>No comparable clause</i>	G26 103	(a) Sills, thresholds, copings and steps built of fair faced brickwork or entirely of facings shall each be given separately in lin yds stating the size and the method of forming (eg all headers on edge; all stretchers on end). Horizontal, raking, vertical and curved work and work set weathering shall each be so desc. Rough cutting to bkk and fair cutting to facework shall be given in

					the desc.(Acc) (Cut) (D) (Enu) (Loc) (R) (Rad) (SL) (T) (W) (Wp)
		<i>No comparable clause</i>	G26 104	(b)	Ends, internal angles, external angles and irregular angles shall each be enumerated separately (Ls)
		<i>See clause 54(a) above</i>	G27 105		Key blocks, corbels, bases to pilasters, cappings to pilasters and cappings to isolated piers shall each be enumerated separately stating the size. Rough cutting to brickwork and fair cutting to facework shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
		Rubbed and Gauged Facings			<i>No comparable clause</i>
55 122		Clauses 44 to 54 shall apply generally to the measurement of rubbed and gauged facings. A description of the setting shall be given.(Acc) (D) (Cut) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>No comparable clause</i>
56 123	(a)	Facing to niches shall be given in feet superficial stating the radius. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)			<i>No comparable clause</i>
56 124	(b)	An item of external angle of straight and circular facing shall be measured at edges of niches and given in feet run.(Acc) (D) (Enu) (IW) (SL) (Loc) (Ls) (T) (W) (Wp)			<i>No comparable clause</i>
56 125	(c)	Niche heads and sills shall be enumerated, the shape and size stated, and the superficial area given. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>No comparable clause</i>
56 127	(d)	Arches to niche heads shall be measured the mean length on face and given in feet run including the external angle of arch and niche head. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)			<i>No comparable clause</i>
57 127		Bands shall be given in feet run stating the projection; all labours, such as weatherings, mouldings or throatings shall be described. In the case of circular bands the radius shall be stated; external and internal angles, stops and similar labours shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G19(a) and (b)</i>
58 128		Projecting strings and cornices, &c., shall be given in feet run, stating the			<i>See clause G19(a) and (b)</i>

		height and projection and the girth of moulding. In the case of circular work the radius shall be given; external and internal angles, stops, and similar labours shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)			
59	129	(a)	Square pilasters shall be given separately in feet run stating the projection, and shall include for cutting and bonding with the general facing at internal angles. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
59	130	(b)	Pilasters with entasis to be given similarly and the mean width and return stated. (Acc) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)		<i>No comparable clause</i>
60	131		Caps, bases and neckings to pilasters to be enumerated, stating extreme dims, & girth of mold; Ls, stopped ends, &c., to be included in desc. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
Editions 4 and 5					
61	132	(a)	Block for carved panels, corbels, &c., ex 3 ft. sup to be given in ft sup & the proj stated; the extra brickwork for the projection shall be included in the description of the item. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
61	133	(b)	Smaller items shall be enumerated, giving extreme sizes and projections, and shall include the extra brickwork. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
61	134	(c)	Work set in shellac to be given separately. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
62	135	(a)	Surface ornament to be given in ft sup. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>No comparable clause</i>
62	136	(b)	Running enrichments and dentil courses shall be given in ft run. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>See clause G19(a)</i>
62	137	(c)	Corbels and other similar items and small panels not exceeding 12" x 12" to be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)		<i>See clause G27</i>

63		See Preliminaries, clause 21 (for casing and protecting)			See clause G70
					Blockwork
		No comparable clause	G32 106	(a)	For rules relating to Section G generally see clause G1 hereof
		No comparable clause	G32 107	(b)	Particulars of the following shall be given:- (i) Kind, type and size of blocks. Purpose made blocks shall be so desc (ii) Surface finish of blocks (eg keyed, smooth, glazed) (iii) Type of bond in the case of glazed blocks (iv) Composition and mix of mortar for bedding, jointing and pointing (v) Method of pointing
		No comparable clause	G32 108	(c)	Msmts of wls shall be taken between attached piers. The thickness of attached piers shall be taken as the combined thickness of the wall and the pier. Attached or isolated piers(except where caused by openings) having a length on plan not exceeding four times the thickness shall be classified as piers and those having a length over four times the thickness and those caused by openings shall be classified as walls.
		No comparable clause	G32 109	(d)	Deductions of blockwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full block courses displaced. (N)
		No comparable clause	G32 110	(e)	Pointing shall be given in the desc of the work on which it occurs (DW)
			G32 111	(f)	For glass blockwk see clause G42 hereof.

Editions 4 and 5

		<i>No comparable clause</i>	G33 112	(a)	<p>Blockwork shall be given in sq yds stating the thickness. Classification shall be as follows:-</p> <p>(i) Walls and partitions (grouped together)</p> <p>(ii) Filling old openings</p> <p>(iii) Skins of hollow walls</p> <p>(iv) Dwarf supports under fittings, tanks, pipes and the like (grouped together)</p> <p>(v) Piers and chimney stacks (grouped together)</p> <p>(vi) Isolated casings (ie blockwork detached from other blockwork and not exceeding 5 ft mean girth on plan)</p> <p>(vii) Blockwork used as fmwk. Tempy strutting shall be given in the desc. (CU) (T)</p>
		<i>No comparable clause</i>	G33 113	(b)	<p>Blockwork finished with a fair face and blockwork finished with facing blocks different from those in the body of the work shall each be so desc stating whether to one or both faces (DW)</p>
		<i>No comparable clause</i>	G33 114	(c)	<p>Filling ends of hollow blocks or providing special blocks with solid ends shall each be given separately in linear yards as EO the work in which they occur. (EO) (Enu)(DW)</p>
		<i>No comparable clause</i>	G33 115	(d)	<p>Fair returns (eg ends of wls; sides of piers and chimney stacks; reveals of opgs) shall be given in lin yds stating the width. (D) (Enu) (IW) (Loc) (SL) (W) (Wp)</p>
		<i>No comparable clause</i>	G34 116		<p>Blockwork in backing to masonry shall be given in sq yds stating the av thickness. Cutting & bonding blockwk to masonry shall be given in the desc. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)</p>

		<i>No comparable clause</i>	G35 117		Forming cavities in hollow walls shall be given in accordance with clause G8 hereof.
		<i>No comparable clause</i>	G36 118		Blockwk in eaves filling shall be added to the general blockwk. The labour in eaves filling shall be given in linear yds (msd overall) stating the thickness of the wall. (Acc) (Cut) (D) (DW) (Enu) (Inc) (SL) (Loc) (W) (Wp)
		<i>No comparable clause</i>	G37 119	(a)	Rough cutting shall be given in lin yds stating the thickness of the blockwk. Classification shall be as follows:- (i)Rough cutting against soffits (ii)Rough cutting at irregular angles and irregular intersections (grouped tog) (iii)Rough raking cutting and rough splay cutting (grouped tog) (iv)Rough curved cutting (CU) (Cut) (Ls) (R) (Rad)
		<i>No comparable clause</i>	G37 120	(b)	Rough cutting at square angles, square intersections and vert abutments shall be deemed tb inc w the blockwk (Cut) (D) (Enu) (Loc) (SL) (W) (WP)
		<i>No comparable clause</i>	G37 121	(c)	Rough cutting ard steel sections shall be given in lin yds stating the girth of the cutting in stages of 6" (Acc) (Cut) (D) (Enu) (Loc) (SL) (W) (Wp)
		<i>No comparable clause</i>	G37 122	(d)	Rough cutting to form chamf angles and rounded angles shall each be given in lin yds stating the width, radius or girth. No distinction shall be made between horiz, raking, vert & curved Ls (Acc) (Cut) (D) (Enu) (Inc) (Ls) (R) (Rad) (SL) (Loc) (W) (Wp)

		<i>No comparable clause</i>	G38 123		Rough chases shall be given in accordance with clause G11 hereof (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (W) (Wp)
		<i>No comparable clause</i>	G39 124		Bonding ends of new blockwork to other types of construction shall be given in linear yds stating the thickness of the blockwork. Forming pockets in new construction, cutting pockets in old construction & extra mat for bonding shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
		<i>No comparable clause</i>	G40 125		Fair cutting shall be given in linear yds stating the thickness of the blockwk. Classification shall be as follows: (i)Fair cutting at vertical abutments. (ii)Fair cutting against soffits (iii)Fair cutting at irregular angles and irregular intersections (grouped together) (iv)Fair raking cutting and fair splay cutting (grouped together) (v)Fair curved cutting (Acc) (Cut) (D) (Eu) (SL) (Ls) (Loc) (R) (Rad) (T) (W) (Wp)
		<i>No comparable clause</i>	G41 126	(a)	Fair vert int & fair vert ext Ls shall be deemed to be inc with the blockk except that in the case of glazed blockk such Ls each tb given sep in lin yds (Acc) (Cut) (D) (Enu) (SL) (Ls) (Loc) (T) (W) (Wp)
		<i>No comparable clause</i>	G41 127	(b)	Fair chamfered angles & fair rdd Ls each tb given sep in lin yds stating width, radius or girth. Horiz, raking, vert & curved Ls each tb so desc. Stopped ends, int mis, ext mis & irreg mis shall each be enum separately. (Acc) (Cut) (D) (Enu) (SL) (Ls) (Loc) (R)

					(Rad) (T) (W) (Wp)
		<i>No comparable clause</i>	G41 128	(c)	Fair chases shall be given in accordance w clause G17(e) hereof. (Acc) (Cut) (D) (Enu) (SL) (Loc) (N) (R) (T) (W) (Wp)
		<i>See Glazier, Clause 11</i>	G42 129	(a)	Glass blockwork in walls and panels shall be given in sq yds stating the size & thickness of the blocks. For r/f see clause G47 hereof (Acc) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)
		<i>See Glazier, Clause 11</i>	G42 130	(b)	Bedding the perimeter of glass blockwk in mat different from the mortar shall be given in lin yds stating the width and the kind of bedding material
		Glazed Brick Facings.			<i>No comparable heading</i>
64 138		Glazed brick facings shall be measured and given as described in clauses 44 to 54. An item of extra for internal angles shall be given in feet run. (Acc) (D) (Enu) (EO) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)			<i>See clause G14</i> <i>See clause G17(a)</i>
Editions 4 and 5					
					Sundries
			G47 131		Reinforcement in wls shall be given in lin yds stating the width. No allowance in msmt shall be made for laps and this shall be stated in the description (Add) (Acc) (D) (Enu) (N) (SL) (W) (Wp)
			G48 132	(a)	Raking out jts or hacking faces of wls (or both) to form key shall be given in sq yds stating the nature of the work to be hacked (eg engineering bk; glazed bkk; conc blockk) and the purpose for which the key is reqd. (D) (Enu) (F) (Loc) (SL) (W) (Wp)

			G48 133	(b)	Hacking by special mechanical means shall be so described (PP)
			G48 134	(c)	For grooved bks see clause G7 hereof
		<i>See clause 16</i>	G49 135		Cement wash on steelwork shall be given in sq yds
		<i>No comparable clause</i>	G51 136		Weather fillets & L fillets ea tb given sep in lin yds stating width. Curved fillets tb so desc irrespective of radius. Ends & Ls to fillets deemed to be inc. (Acc) (D) (Enu) (SL) (Loc) (Ls) (Rad) (W) (Wp)
		<i>No comparable clause</i>	G54 137		Cutting grooves for water bars and the like shall be given in linear yds (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
		<i>See Clause 27(d)</i>	G55 138	(b)	Raking out and enlarging joint or cutting groove for nib of asphalt shall be given in lin yds. Horiz, raking, vert and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (W) (Wp)
		<i>No comparable clause</i>	G57 139	(b)	Holes for ducting, trunking, tray & the like members (grouped tog) tb enum stating sectional area of member in stages of 36 sq ins & thickness of work (Acc) (Cut) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)
		<i>No comparable clause</i>	G58 140		Mortices, sinkings and the like shall each be enumerated separately stating the size or purpose. Running mortices with lead or mortar shall be given in the description.

					(Acc) (Cut) (CU) (D) (DW) (Enu) (SL) (Loc) (W) (Wp)
		<i>No comparable clause</i>	G59 141		Making good walls and making good fair face or facings in connection with any of the labours mentioned in clauses G56, G57 and G58 hereof shall be given in the description of such labours. Making good plasterwork and other finishings shall be given in accordance with Section U hereof
					Centering
			G65 142	(a)	Particulars of the following shall be given:- (i) Nature of the surface to be supported (eg brickwork; blockwork) (ii) Shape of surface (eg flat; segmental; semicircular; groined) (Sh)
57 128		Bands shall be given in feet run stating the projection; all labours, such as weatherings, mouldings or throatings shall be described. In the case of circular bands the radius shall be stated; external and internal angles, stops and similar labours shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)			<i>See clause G19(a) and (b)</i>
58 129		Projecting strings and cornices, &c., shall be given in feet run, stating the height and projection and the girth of moulding. In the case of circular work the radius shall be given; external and internal angles, stops, and similar labours shall be enumerated. (Acc) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)			<i>See clauses G19(a) and (b)</i>
Editions 4 and 5					
		<i>See Carpenter Clause 2 (c)</i>	G65 143	(b)	Centering left in shall be so described
		<i>See Carpenter Clause 2 (a)</i>	G65 144	(c)	Centering with supports over 11 ft high shall be so desc stating the height in further stages of 5 ft (D)(Enu) (SL) (T)

		<i>See Carpenter Clause 2 (a)</i>	G65 145	(d)	Centering shall be msd as the actual surface to be supported. Strutting, shoring, bolting, wedging, easing, striking and removing shall be deemed to be included with the items
		<i>See Carpenter Clause 2 (d)(3)</i>	G66 146	(a)	Centering for flat soffits over 12" wide and ne 6ft span shall be given in sq yds. (D)(Enu)(SL)(T)
		<i>See Carpenter Clause 2 (d)(2)</i>	G66 147	(b)	Centering for flat soffits n.e. 12" wide and n.e. 6ft span shall be given in linear yds stating the width. (D)(Enu)(SL)(T)
		<i>See Carpenter Clause 2 (d)(4)</i>	G66 148	(c)	Centering for flat soffits over 6 ft span shall be enumerated stating the span of the opening and the width of the soffit. (D)(Enu)(SL)(T)
		<i>See Carpenter Clause 2 (a)</i>	G66 149	(d)	Centering for sloping soffits shall be so described. (D)(Enu)(R)(SL)(T)#
		<i>See Carpenter Clause 2 (b)</i>	G67 150		Centering for curved soffits and vaulted soffits shall each be given separately in sq yds. (D)(Enu)(Rad)(SL)(T)
		<i>See Carpenter Clause 2 (d)(5)</i>	G68 151		Centering for segmental, semicircular, invert and other curved arches shall each be enumerated separately stating the span of the opening and the width of the soffit. The rise shall also be stated except in the case of semicircular arches . (D)(Enu)(Rad)(SL)(T)
		<i>See Carpenter Clause 3</i>	G69 152	(a)	Raking cutting, curved cutting, cutting to groin points, cutting to intersections, cutting against ribs and the like labours shall each be given separately in linear yds. Scribed edges and splayed edges shall be deemed to be inc w the items (Cut) (D) (Enu) (Rad) (Sh) (SL)
		<i>See Carpenter Clause 3</i>	G69 153	(b)	Notching for key blocks, projecting voussoirs and the like shall each be enum sep stating the size or girth (Cut) (D) (Enu) (Rad) (Sh) (SL)

					Protection
		<i>See Preliminaries Clause 21(a)</i>	G70 154		Protecting the work in this section shall be given as an item
		Boiler Seatings and Flues, and Boiler Shafts or Stacks.			Brickwork in connection with boilers
		<i>No comparable clause</i>	G29 155	(a)	For rules relating to Section G generally see clause G1 hereof
		<i>No comparable clause</i>	G29 156	(b)	Particulars in accordance with clauses G2(b) and G14(c) hereof shall be given
65 140		All work in connection with boiler seatings and flues, and boiler shafts or stacks, shall be given separately			<i>See clauses G29(a) and (b)77</i>
66 141		Firebrick and fireclay work shall be given separately. Boiler seating blocks and curved flue covers shall be given in feet run and all irregular pieces enumerated. All cuttings in brickwork, firebricks, fire lumps or tiles, seating blocks, and flue covers shall be given. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)	G30 157	(a)	Boiler seatings and boiler flues together with their associated labours shall be given in detail in accordance with the relevant clauses hereof under an appropriate heading. Firebrick and fireclay work shall each be so desc.(Acc) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)
			G30 158	(b)	Boiler seating blocks and curved flue covers shall each be given separately in linear yards stating the size. Pieces of irregular shape shall be enumerated stating the size. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (Sh) (T) (W) (Wp)
67 142		The brickwork of the various stages in detached chimney shafts shall be given separately, the height and thickness stated, and the shape of shaft described; if built from an outside scaffold it shall be so stated. (Acc) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	G31 159		Chimney shafts tog with their associated labours shall be given in detail in accordance with the relevant clauses hereof under an appropriate heading stating the number, size on plan, shape & the overall height. Chimney shafts of diff shapes & hts shall each be given sep. Those requiring to be built from outside scaffolding shall be so described.(Acc) (D) (Enu) (Sh) (SL) (Loc) (Rad) (T) (W) (Wp)

68 143		<p>Firebrick linings shall be given in ft sup and the thickness stated; if bonded to the backing they shall be so described. Irregular angles in firebrick linings shall be given in ft run. (Acc) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)</p>		<i>See clause G30 (a) above</i>

Comparison of SMM 5 with SMM 5 (metric)

Despite the Preface of the Fifth Edition (Metric) insisting that it is a conversion, not a revision, it is taken in this study as being revised, principally because the classifications have altered radically. In the General Rules of SMM5, for example, Item A5 (b) dealing with classification of steel sections, 'small' is defined as 'not exceeding 6 inches in depth'. In the metric version, 'small' is defined as 'not exceeding 250 millimetres in depth'. The nearest rational conversion of 6" to metric would have been 150 mm, which is about 3/32 of an inch different. For something 'small' to increase in size by 63% and be called a conversion is a travesty. It does demonstrate, however, that there is no rationale to the classification rules of SMM – they exist as a convenient way of lumping items together so that there are many less items to deal with.

Apart from those considerations, the items of the two editions are almost identical, meaning that the codings for SMM5 can be applied equally to SMM5 (Metric), so there is no requirement to carry out the comparison exercise twice.

Comparison of SMM5 (Metric) with SMM6

5 th Edition, Metric (1968)			6 th Edition, (1979)		
Clause	Sub-clause	Text and comments <i>Comments in italics</i>	Clause	Sub-clause	Text and comments <i>Comments in italics</i>
		Introduction			
		The Standard Method of Measurement provides a uniform basis for measuring building works and embodies the essentials of good practice but more detailed information than is demanded by this document should be given where necessary in order to define the precise nature and extent of the required work. The Standard Method shall apply equally to the measurement of proposed works and of executed works.			
		General Rules			General Rules
			A1		The Standard Method of Measurement provides a uniform basis for measuring building works and embodies the essentials of good practice but more detailed information than is demanded by this document should be given where necessary in order to define the precise nature and extent of the required work. The Standard Method shall apply equally to the measurement of proposed works and of executed works.

A1	1		BQ shall fully describe xxx & accurately represent the works t b executed. Work which cannot be measured accurately shall be described as provisional or given as a bill of approximate quantities	A2	1	BQ shall fully describe & accurately represent the quantity and quality of the works t b carried out Work which cannot be measured X shall be described as provisional or given as a bill of approximate quantities
			A2	2	Rules of measurement adopted for little used forms of construction or not covered elsewhere in this document shall be stated	
			A3	1	Unless the term metre used in this document is preceded by the words square or cubic it shall be deemed to be linear	
A22	(a)		(i)Work shall be measured net as fixed in position (N)	A3	2	(i)Work shall be measured net as fixed in position (N)
A2	3	(b)	Where minimum deductions of voids are dealt with in this document they shall refer only to openings or wants which are wholly within the boundaries of measured areas. Openings or wants which are at the boundaries of measured areas shall always be the subject of deduction irrespective of size. (MsA)	A3	3	Where minimum deductions of voids are dealt with in this document they shall refer only to openings or wants which are wholly within the boundaries of measured areas. Openings or wants which are at the boundaries of measured areas shall always be the subject of deduction irrespective of size (MsA)
Editions 5m and 6						
A3	4	(b)	Unless otherwise specifically stated in the bill, or herein, the following shall be deemed to be included with all items:- (i)Labour and all costs in connection therewith. (ii)Materials, goods and all costs in connection therewith (e.g.conveyance; delivery; unloading; storing; returning packings; handling; hoisting; lowering) (iii)Fitting and fixing materials and goods in position	A4	2	Unless otherwise specifically stated in the bill, or herein, the following shall be deemed to be included with all items:- (a)Labour and all costs in connection therewith. (b)Materials, goods and all costs in connection therewith (c)Fitting and fixing materials and goods in position

		(iv)Use of plant (v)Waste of materials (vi)Square cutting (vii)Establishment charges, overhead charges and profit.			(d)Plant and all costs in connection therewith (e)Waste of materials (f)Square cutting (g)Establishment charges, overhead charges and profit.
A3 5	(c)	Junctions bet str & curved wk shall in all cases be deemed tb inc with the work in which they occur	A4	3	Junctions bet str & curved wk shall in all cases be deemed tb inc with the work in which they occur
A3	(d)	Notwithstanding the provisions in this doc for labs tb given as lin items, such labs may be given in the desc of any lin item of wk on which they occur	A4	4	Notwithstanding the provisions in this doc for labs tb given as linear items, such labs may be given in the desc of any lin item of wk on which they occur
A3	(e)	Notwithstanding the provisions in this document for labours to be enumerated, such labours may be given in the description of any enumerated item of work on which they occur	A4	5	Notwithstanding the provisions in this document for labours to be enumerated, such labours may be given in the description of any enumerated item of work on which they occur
			A5	1	Drawn information...defined as follows: (a) Location drawings (i) Block plan (ii)Site plan (iii)General locating drawing (b) Component details (c) Bill diagram
			A5	2	The requirement... for detailed descriptions is complied with if drawn information is provided...
			A6		The requirements of this document...deemed to be complied with if the item is a product whose details have been published and referred to in the desc.
			A9	1	(I)Alterations and work in existing buildings shall be so described. (II)Handling materials and getting them in and out of such buildings

					shall be deemed to be included with the items
A3 6	(f)	Labours on old work shall be so described.	A9	1	(III)Labours on old work shall be so described.
A4	(a)	The rules in this clause apply only when specific reference is made in this document to the following paragraphs of this clause			
A4 7	(b)	Where this document requires the sizes of metal sections to be stated in accordance with this paragraph, they shall be grouped and described as follows: (i) Small,(ie ne 250mm in depth) (ii) Large (ie >250mm but ne 500mm in depth) (iii) Extra large (ie >500 in depth)			
A4 8	(c)	Where this document requires the sizes of pipes and tubes (measured internally) and of bars, cables, conduits, standards and the like (measured externally) to be stated in accordance with this paragraph, they shall be grouped and described as follows:- (i) Small (ie not exceeding 55mm dia.) (ii) Large (ie over 55mm but ne 110mm dia) (iii) Extra large (ie over 110mm dia)			
A4 9	(d)	Where this document requires the sizes of panes to be stated in accordance with this paragraph, they shall be grouped and described as follows. Where panes of more than one size occur in any one sash, casement or door, the sizes shall be averaged for this purpose:- (i) Small,(ie ne 0.10 sq m each) (ii) Medium (i.e. > 0.10 sq m, n.e. 0.50 sq m) (iii) Large (i.e.> 0.50 sq m but ne 1 sq m) (iv)Extra large (i.e. > 1 sq m)			

A5 10	(a)	Extra for forming short lengths (ie lengths not exceeding 300mm) shall be deemed to be included with the work in which they occur except when specific reference is made in this document to the following paragraph of this clause.			
A5 11	(b)	Where this document requires short lengths (ie lengths not exceeding 300mm) to be given in accordance with this paragraph, they shall be enumerated as extra over the work in which they occur irrespective of the actual length.			
A6	(a)	Where the unit of billing is the m, quantities shall be billed to the nearest whole unit. Fractions of a unit less than half shall be disregarded and all other fractions shall be regarded as whole units	A7	1	Where the unit of billing is the m, quantities shall be billed to the nearest whole unit. Fractions of a unit less than half shall be disregarded and all other fractions shall be regarded as whole units
A6	(b)	Where the unit of billing is the kilogramme, quantities shall be calculated to the nearest whole unit. Fractions of a unit less than half shall be disregarded and all other fractions shall be regarded as whole units.	A7	2	Where the unit of billing is the tonne, quantities shall be billed to the nearest two places of decimals.
A6	(c)	Where the application of this clause would cause an entire item to be eliminated, such item shall be enumerated stating the size or weight as appropriate	A7	3	Where the application of clauses A.7.1 and 2 would cause an entire item to be eliminated, such item shall be enumerated stating the size or weight as appropriate
Editions 5m & 6					
A7		Where this document requires provisional or prime cost sums to be given in accordance with this clause, the choice of terms shall be made in conformity with the following definitions unless otherwise provided in the conditions of contract:- (i)The term “provisional sum” shall mean a sum provided for work or for costs which cannot be entirely foreseen, defined or detailed at the time the tendering documents are issued. (ii)The term “prime cost sum” shall mean a sum provided for work or services to be executed by a nominated sub-contractor, a	A8	1	Where this document requires provisional or prime cost sums to be given in accordance with this clause, the choice of terms shall be made in conformity with the following definitions unless otherwise provided in the conditions of contract:- (a)The term “provisional sum” is defined as a sum provided for work or for costs which cannot be entirely foreseen, defined or detailed at the time the tendering documents are issued. (b)The term “prime cost sum” is defined as a sum provided for work or services to be executed by a nominated sub-contractor, a

		statutory authority or a public undertaking or for materials or goods to be obtained from a nominated supplier. Such sum shall be deemed to be exclusive of any profit required by the general contractor and provision shall be made for the addition thereof			statutory authority or a public undertaking or for materials or goods to be obtained from a nominated supplier. Such sum shall be deemed to be exclusive of any profit required by the general contractor and provision shall be made for the addition thereof
A8 12		Work executed in or under water shall be so described stating whether canal, river or sea water, & (where applicable) the levels of high & low water. (Ad)	A9	2	Work carried out in or under water shall be so described stating whether canal, river or sea water and (where applicable) the mean spring levels of high and low water (Ad)
A9 13		Work executed in compressed air shall be so described stating the pressure and the methods of entry and exit (Ad)	A9	3	Work carried out in compressed air shall be so described stating the pressure and the methods of entry and exit (Ad)
		Preliminaries			
B1		The names and addresses of the employer, the architect and the quantity surveyor shall be stated	B1	3	The names and addresses of the Employer and consultants to be named in the contract shall be given
			B1	4	The names and addresses of any other consultants shall be given
B2 14	(a)	The pos of the site tb desc stating the mode of access. Attention shall be drawn to any limitations of wkg space or abutting bldgs. (Acc) (W)	B2	1	Information to indicate the boundaries of the site, the means of access and the position of the works shall be given (Acc) (W)
			B2	2	Attention shall be drawn to any drainage, water, gas and other mains or power services known to exist on or over the site

					Attention shall be drawn to any adjacent or abutting buildings
B2 15	(b)	Recommendations as to visiting the site and inspecting any trial holes shall be made stating where the keys may be obtained (if any required) and where the drawings and any other documents may be inspected	B2	4	Information to facilitate visiting the site shall be given.
B2 16	(c)	Where any restrictions are imposed on the use or disposal of any sand or gravel found on the site, particulars of the restrictions shall be given.			
B2 17	(d)	Where possession of site will be given in sections particulars shall be given.			
			B1	1	The name, nature and location of the project shall be stated
B3 18	(a)	A general description of the works shall be given	B1	2	A general description of the works shall be given
			B3	1	A list shall be given of drawings from which BQ have been prepared and...available for inspection...
			B3	2	Addresses where drawings may be inspected...
B3 19	(b)	Where drawings are not supplied with the bill, particulars of the following shall be given:- (i)the size of the building, the height above and below ground level and the number of storeys. (ii)The length and height of external elevations, the total height for each elevation being given separately			
B3 20	(c)	Where wks are to be executed or completed in any specific order or in sections or phases, particulars shall be given.			

B4	(a)	Particulars of the form and type of contract shall be given			
B4	(b)	Where the conditions of contract are standard (ie printed and published for general use), particulars of the edition to be used shall be given and a schedule of the clause headings shall be set out in the bill			Where the conditions of contract are standard and published for general use), particulars of the edition to be used and a schedule of the clause headings shall be given. Where the standard conditions provide for alternative or optional clauses the clauses which are to apply shall be stated. Amendments to standard conditions shall be given in full
B4	(c)	Where any other conditions of contract are used, a copy of the full conditions shall be supplied with the bill and a schedule of clause headings shall be set out in the bill			Where the conditions of contract are not standard and published for general use, the conditions shall be set out in full in the bill of quantities or a schedule of clause headings shall be given where a full set of conditions is supplied with the bill of quantities. In either case where the conditions provide for alternative or optional clauses the clauses which are to apply shall be stated
B4	(d)	Where there is an appendix to the conditions of contract requiring insertions to be made, a schedule of the insertions shall be set out in the bill	B4	3	Where there is an appendix to the conditions of contract requiring insertions to be made, a schedule of the insertions shall be set out in the bill of quantities.
Editions 5m and 6					
B5	(a)	For convenience in pricing, items for the following shall be given unless they are covered by the schedules given in accordance with Clause B4 hereof :-	B13	1	For convenience in pricing, items for the following shall be given. Maintaining temporary works, adapting, clearing away and making good shall be deemed to be included with the items. Notices and fees to local authorities and public undertakings related to the following items shall be deemed to be included with the items
B5 21	(a)	(i) Plant tools and vehicles	B13	1	(a) Plant tools and vehicles
			B13	1	(b) Scaffolding
B5 22	(a)	(ii) Safety, health and welfare of workpeople	B13	1	(m) Safety, health and welfare of workpeople

B5 23	(a)	(iii) Notices and fees to local authorities and public undertakings	B13	1	<i>See preamble to this clause</i>
B5 24	(a)	(iv) Setting out the works			
B5 25	(a)	(v) General foreman	B13	1	(c) Site administration and security
B5 26	(a)	(vi) National insurance and pensions for workpeople	B13	1	(n) Disbursements arising from the employment of workpeople
B5 27	(a)	(vii) Holidays for workpeople	B13	1	<i>See (n) above</i>
B5 28	(a)	(viii) Transport for workpeople	B13	1	(d) Transport for workpeople
B5 29	(a)	(ix) Safeguarding the works, materials and plant against damage and theft	B5	1	(a) Contractor's liability for risk or injury to persons or property and of damage to the works (b) Where the Employer requires the Contractor to effect insurance in respect of ... liability for such risk... particulars shall be given. (c) Where the Employer intends to relieve the Contractor... for such risk... particulars shall be given
B5 30	(a)(x)	Maintenance of private and public roads	B13	1	(p) Maintenance of private and public roads
B5 31	(a)(xi)	Police regulations.	B13	1	(l) Traffic regulations
B5	(b)	Fees payable to a District Surveyor in London shall be given as a provisional or prime cost sum as Clause A7 hereof			
			B6		Where the cost of insuring any liability of the Employer is... to be inc in the contract sum,... shall be... a Provisional sum
		See B14 (c) below	B7		Unless conditions of contract provide otherwise, the following shall be given as provisional sums: All fees & charges ... required by local authorities. Rates on tempy buildings

			B8	1	Particulars to be given of obligations and restrictions imposed by Employer in respect of...: (a) Access & possession of site (b) Limitations of working space (c) Limitations of working hours. (d) Use or disposal of mats found on site (e) Hoardings, fences screens etc (f) Maintaining existing services (g) Work in specific order, sections etc (h) maintaining specific temperature, humidity etc
B6 32		Any obligation or restriction that may be imposed on the contractor by the employer in respect of any matter not covered by any clause in the conditions of contract shall be given as an item stating the relevant particulars	B8	1	(l) Any other obligation or restriction
			B12		Desc to be given of works by Employers own tradespeople.
B7 33		Water for the works and temporary arrangements for storing and distributing about the site shall be given as an item. Where water will be supplied free of cost to the contractor, particulars shall be given as to the available capacity, the source (eg public main; borehole) and the location of the point of free supply.	B13	(f)	Water for the works. Particulars shall be given if water will be supplied by the Employer.
B8 34		Lighting and power for the works and temporary arrangements for distribution about the site and for lighting to hoardings and the like shall be given as an item. Where electric current will be supplied free of cost to the contractor, particulars shall be given as to the available capacity, the voltage, the type of supply (eg alternating; direct) and	B13	(g)	Lighting and power for the works. Particulars shall be given if current will be supplied by the Employer

		the location of the point of free supply			
B12 35		Clearing away temporary works and making good after shall be deemed to be included with the items.			
B13 36		Temporary roads, tracks, hardstandings, crossings and the like shall be given as an item stating all relevant particulars (Acc)	B13	(h)	Temporary roads, tracks, hardstandings, crossings and the like shall be given as an item stating all relevant particulars (Acc)
B14 37	(a)	Tempy sheds, offices, messrooms, san accomm & other tempy bldgs for use of the contractor tb given as an item. Htg, lghtg, furn, eqt and att deemed to be included with the item	B13	(j)	Temporary accommodation for the use of the Contractor
B14 38	(b)	Temporary offices for the use of the architect, the quantity surveyor, the clerk of works and any other person acting on behalf of the employer shall be given as an item stating the floor area required. Heating, lighting, furniture, equipment and attendance shall be given in the description (T)	B8	(j)	Temporary accommodation and facilities for the use of the Employer including heating, lighting, furnishing and attendance.(T)
B15 39		Temporary telephone facilities on the site shall be given as an item. The cost of calls made on behalf of the employer shall be the subject of a provisional or prime cost sum as Clause A7 hereof. The cost of all other calls shall be deemed to be included with the item (T)	B13 B8	(k) (k)	Temporary telephones for the use of the contractor (T) The installation of telephones for the use of the Employer and the cost of his telephone calls shall be given as a provisional sum
B16 40		Temporary screens and the like shall be given as an item stating the area in sq m and any requirements regarding construction. Doors and windows in screens shall be given in the description. (T)			
Editions 5m and 6					
B17 41	(a)	Temporary fencing, hoardings, fans, planked footways, guard rails, gantries and the like as may be necessary for protecting the public, for the proper execution of the work and for meeting the requirements of any local or other authority shall be given as an item stating any conditions imposed by the employer regarding such matters as	B13	(s)	Temporary fencing, hoardings, fans, planked footways, guard rails, gantries and similar items (Acc)(T)

		construction, access, decoration and advertising. (Acc)(T)			
			B13	(t)	Control of noise, pollution & all other statutory obligations
B17 42	(b)	Such temporary works specifically required by the employer shall be given as items stating all relevant particulars. (T)			
B18 43		General scaffolding for the works shall be given as an item, The approximate gross area of floors which have finished ceilings over 3.50m but ne 6m above the floor shall be given in sq m Where finished ceilings are over 6m above the floor, such floor areas shall be given separately in sq m stating the actual height of the ceiling. For special scaffolding see clause B20(c) hereof. (T)			
B19 44		Works which may only be carried out by a local authority or public undertaking (eg taking up and relaying public roads and footpaths; forming permanent crossings) shall each be given separately as a provisional or prime cost sum as clause A7 hereof	B11	1	Works which are to be carried out by a local authority or public undertaking shall each be given separately as a provisional sum
			B11	2	Works which are to be carried out by a local authority or public undertaking in accordance with statutory obligations shall be described
B20 45	(a)	Works which are required to be carried out by a nominated sub-contractor shall be given as a provisional or prime cost sum as Clause A7 hereof	B9	1	Works which are required to be carried out by a nominated sub-contractor shall be given as a provisional or prime cost sum. The name of the firm to be nominated shall be given (if known) together with a description of the sub-contract work.
B20 46	(b)	General attendance on nominated sub-contractors shall be given as an item in each case and shall be deemed to include only allowing use of standing scaffolding, messrooms, sanitary accommodation and welfare facilities; provide space for office accommodation and for storage of plant and materials; providing light and water for their work; clearing away rubbish (Acc) (T)	B9	2	Gen attendance on NSC includes use of contractors standing facilities (Acc) (T)

B20 47	(c)	Special attendance on nominated sub contractors to be given as an item in each case giving particulars (eg unloading, storing; hoisting; placing in position; providing power; providing special scaffolding)	B9	3	Other attendance items: (a)Special scaffold (b)Temporary access roads (c)Unload, move, hoist & place (d) Covered storage etc (e)Power supplies (f)Maintain temp or humidity (g)Any other att.
B20 48	(d)	Builders work i/c wks by nominated sub-contractors shall be given in accordance with the appropriate rules in this document. It is desirable for such work to be grouped together under a heading in each appropriate section of the bill.	B9	4	B/wk i/c NSC
B21 49	(a)	Goods and materials which are required to be obtained from a nominated supplier shall be given as a provisional or prime cost sum as clause A7 hereof	B10	1	Goods & mats from Nom Supp to be by PC sum
Editions 5m and 6					
B21 50	(b)	Fixing goods and materials shall be given in accordance with the appropriate rules in this document. Unloading, storing, hoisting the goods and materials and returning packing materials to the supplier carriage paid and obtaining credits therefor shall be deemed to be included with the items of fixing. Where the costs of conveying goods and materials to the site, any special packing or the like, are required to be paid by the contractor, particulars shall be given.	B10	2	Fixing goods from NSC as other clauses. Unload, store hoist etc deemed included with fixing
B22 51		Protecting the works from inclement weather shall be given as an item	B13	1	(e) Protecting the works from inclement weather
B23 52		Prov tempy eqt, fuel & att for drying & controlling humidity of the wks to be given as a prov or p c sum as clause A7 hereof. For temporarily operating the permanent heating			

		system see Clauses S105 and T28 hereof (T)			
B24 53		Removing rubbish and debris and cleaning the works internally and externally shall be given as an item	B13	1	(q)Remove rubbish, etc and clean works
B25		Provision for contingencies shall be given as a provisional or prime cost sum as clause A7 hereof	B14		Provision for contingencies shall be given as a provisional sum
		DEMOLITION and ALTERATIONS			
			C1		A gen desc of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document. Work required to be carried out by specific methods shall be described stating any limitations
			C2	1	An item shall be given for bringing to site and removing from site all plant required for this section of the work
			C2	2	An item shall be given for maintaining on site all plant required for this section of the work
C1 1	(a)	The location of demolitions and alterations shall be given in the description of the items (Loc) (Acc) (Enu) (T) (W) (Wp)	C3	1	The location of demolitions and alterations shall be given in the description of the items (Loc) (Acc) (Enu) (T) (W) (Wp)
C1 2	(b)	Shoring and scaffolding incidental to demolitions and alterations shall be given in the description of the items. Other shoring (eg to old buildings left standing) shall be given in accordance with Clause C10 hereof (Loc) (Acc) (T) (W) (Wp)	C5	1	Shoring & scaffolding incidental to demolitions of individual structures (or parts thereof), individual opgs &/or recesses in individual structures and m g all work disturbed deemed to be included with the items. (Loc) (Acc) (T) (W) (Wp)
C1 3	(c)	Old materials arising from demolitions and alterations shall become the property of the contractor unless otherwise stated. Clearing away such old materials shall be deemed to be included with the items. Provision should be made in the bill for credits. (Acc) (Loc) (D) (Enu) (T) (W) (Wp)	C3	2	Old materials arising from demolitions and alterations shall become the property of the contractor unless otherwise stated.. Clearing away such old materials shall be deemed to be included with the items. Provision should be made in the bill for credits. (Acc) (Loc) (D) (Enu) (T) (W) (Wp)

C1 4	(d)	Old materials required to remain the property of the employer shall be so described. Setting aside and storing such materials on site shall be given in the description of the items.	C3	3	Old materials required to remain the property of the employer shall be so described. Setting aside and storing such materials on site shall be given in the description of the items.
C1 5	(e)	Old materials permitted to be re-used in work measured as new shall be so described. No adjustment shall be made to the measured quantities of new work in which such old materials are reused.	C3	4	Old materials permitted to be re-used in work measured as new shall be so described. No adjustment shall be made to the measured quantities of new work in which such old materials are reused.
			C3	5	Any restriction imposed by the Employer on the method of disposal of old materials arising from demolitions shall be given in the description of the items.
			C3	6	Handling and disposal of toxic or other dangerous materials shall be described stating each type of material
C2	(a)	For rules relating to Section C generally see clause C1 hereof			
Editions 5m and 6					
C2 6	(b)	Demolishing individual structures or parts thereof) shall be given as items, except that clearing the site of all structures may be given as an item. The lowest level of demolition shall be stated (eg down to the top of surface concrete at the lowest floor level). (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	C4	1	Demolishing individual structures or parts thereof) shall be given as items stating the dimensions, except that clearing site of all structures may be given as a single item. The level or levels to which structures (or parts thereof) are to be demolished shall be stated. Any remaining structures and finishings required to be made good shall be so desc (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
C2 7	(c)	Leaving parts of old walls temporarily in position to act as buttresses shall be given in the description of demolition items	C4	1	(ii) . Leaving parts of old walls temp in position to act as buttresses shall be given in the description of the items

C3	(a)	For rules relating to Section C generally see clause C1 hereof.			
Editions 5m and 6					
C3	8 (b)	Alteration work which would be most conveniently priced on the site shall be grouped together and given under an appropriate heading.			
C4	9 (a)	Cutting openings in old structures shall be given as items stating the nominal finished size of the opening, the type and thickness of the old structure and the treatment around the opening (eg inserting trimmers, lintels arches, sills and the like; quoining up jambs). Extending finishings and making good all work disturbed shall be given in the description. New doors, windows and the like shall be measured in detail in accordance with the appropriate rules. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)	C4	2	Cutting openings or recesses in existing structures shall be given as items stating the size of the opening or recess, the type and thickness of the existing structure and the treatment around the opening or recess. Making good all parts of the structure disturbed shall be deemed to be inc with the items. Extending finishings and making good finishings disturbed shall be included in the description (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)
			C4	3	Cutting back projections of existing structures and cutting to reduce thickness of existing structures shall each be given as items stating the dimensions and the nature of the existing structure. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)
C5	10	Blocking up openings in old structures shall be given as items stating the size of the opening and the nature and thickness of the new work. Taking out thresholds, lintels, arches sills and the like, bonding or otherwise securing the new work to the old structure, extending finishings on the new work and making good all work disturbed shall be given in the description. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)			
C6	11	Pulling down walls, partitions, floors, roofs, staircases and other parts of old structures shall be given as items. Where practicable quantities and dimensions shall be given in the description. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)			

C7 12		Taking down fittings and fixtures (eg doors; windows; sanitary appliances; counters; cupboards) shall be given as items stating size. Those required to be set aside for refixing to be so desc. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)	C4	4	Fittings and fixtures required to be removed prior to demo shall be given as items, stating the size. Those required to be set aside for re-fixing shall be so desc. Existing structure or finishings required to be made good shall be so desc. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)
			C4	5	Removing engineering and plumbing installations shall be given as items stating the nature of the installation. Existing structure or finishings required to be made good shall be so described
			C4	6	Removing finishings or coverings to existing structures shall be given as items stating the nature of the finishings or coverings and indicating the quantity
C8 13		Repairing, adapting and refixing old fittings and fixtures shall be given as items stating the size (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)			
C9 14		Temporary screens and temporary roofs shall each be given separately in sq m or enum as may be appropriate. Weatherproof screens and dustproof screens shall be so described. Temporary arrangements for dealing with rainwater, temporary doors, temporary windows and the like in screens shall be given in the description. Clearing away temporary work shall be deemed to be included with the items. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)	C4	7	Tempy screens & tempy roofs shall each be given separately in sq m or enum as may be appropriate. Weatherproof screens and dustproof screens shall be so described. Tempy arrangements for dealing with rainwater, tempy doors, tempy windows and the like in screens shall be given in the description. Clearing away tempy work shall be deemed to be included with the items. (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)
C10 15		Timber shoring (other than that incidental to demo and alterations) shall be given in lin m stating nominal size, position and type of shoring and nature of structure to be shored. Erecting, maintaining, clearing away, cutting holes in structure, mg all work disturbed, obtaining licences and paying fees shall be given in the desc. Providing all necess nails, wedges and bolts shall be deemed to be included with	C5	2	Shoring (other than that incidental to demolitions) shall be described and given as an item stating the position and type of shoring and the nature of the structure to be shored. Cutting holes in the structure & making good all work disturbed, shall be given in the description. Providing all necessary nails, wedges and bolts shall be deemed to be included with the

		items (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)			items (Acc) (Cut) (D) (Enu) (Loc) (T) (W) (Wp)
			C5	3	Separate items shall be given for the following: (a) Providing & erecting the shoring (b) Maintaining the shoring (c) Clearing away the shoring
Editions 5m and 6					
C11 16		Protecting the work in this section shall be given as an item.	C6		Protecting the work in this section shall be given as an item.
		Excavation & Earthwork			Excavation & Earthwork
		See clause D1.c below	D1		Excavation in underpinning and drainage shall be given in accordance with Sections H and W
			D2		A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document
D1 1	(a)	(i) Any information available concerning the nature of the ground and strata shall be given.	D3	2	<i>(if the above information is not available)</i> a description of the ground and strata which is assumed shall be stated
2		Particulars of any trial holes or trial bores on site shall be given stating their location. (Ad) (Acc) (D)			(b) Trial pits or bore holes stating their location
3		(ii) The water level in the ground & date when it was msd to be stated but, where this info not available, it shall be ascertained before pumping operations are started on site. The water level so established (by either method) deemed to be normal water level in the ground throughout the contract notwithstanding any subsequent changes.	D3	1	(Ad) (Acc) (D) (Loc) Particulars of the following shall be given:
			D3	1	(a) Ground water level and the date when it was established, hereinafter described as the pre-contract water level. The ground water level shall be re-established at the time the various excavations are carried out and is described hereinafter as the post contract water level.

					Where ground water levels are subject to periodic changes due to tidal or similar effects they shall be so desc and the average of the mean high and low levels given
			D3	1	(c)Over or underground services.
			D4	1	An item shall be given for bringing to site and removing from site all plant required for this section of the work.
			D4	2	An item shall be given for maintaining on site all plant required for this section of the work.
D1 4	(b)	Work in extg bldgs tb so desc. Handling mats & getting them in or out of such bldgs deemed to be inc (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			
D1	(c)	For work in underpinning see section H hereof.			See clause D1 above
D2		For rules relating to Section D generally see Clause D1 hereof			
D3 5		Lifting turf which is to be preserved shall be given in sq m stating the method of preservation and disposal (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D8		Lifting turf which is to be preserved shall be given in sq m stating the method of preservation and disposal (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
D4 6		(i)Excavating vegetable soil which is to be preserved shall be given in sq m stating the av dpth (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D9		(a)Excavating vegetable soil which is to be preserved shall be given in sq m stating the av dpth (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
D4 7		(ii)Soil deposited on site in permanent spoil heaps or spread on site shall each be so described stating the location of such deposits or the average distance from the excavation in linear m or km (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D9		(b)Handling and disposal of topsoil shall be given in accordance with clauses D27-32

D5 8	(a)	Cutting down trees and grubbing up their roots shall be enumerated; trees ne 600mm gth (msd at ht of 1m ab grd) shall be grouped together and described as small trees, those > 600mm gth shall be classified and given in further stages of 300mm. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D5		Cutting down trees and grubbing up their roots shall be enumerated; trees ne 600mm gth (msd at ht of 1m ab grd) shall be grouped together and described as small trees, those > 600mm gth shall be classified and given in further stages of 300mm. (Acc) (D) (Enu) (Loc) (T) (W) (Wp) Filling in voids, if required, after removal of tree roots shall be given in the desc.
D5 9	(b)	Cutting down hedges and grubbing up their roots shall be given in lin m stating the nature and height of each hedge or its location (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)	D6		Cutting down hedges and grubbing up their roots, which shall be deemed to include their disposal, shall be given in lin m stating the nature and height of each hedge or its location (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)
D5 10 11	(c)	(i)Clearing site of bushes, scrub, undergrowth and the like and grubbing up their roots shall be given in sq m.(Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp) (ii) Cutting down trees ne 600mm girth within such areas and grubbing up their roots may be given in the description, but cutting down larger trees shall be dealt with in accordance with paragraph (a) of this clause. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)	D7		(i)Clearing site of bushes, scrub, undergrowth and the like and grubbing up their roots, which shall be deemed to include their disposal, shall be given in sq m.(Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp) (ii) Cutting down trees ne 600mm girth within such areas and grubbing up their roots, may be given in the description, but cutting down larger trees shall be dealt with in accordance with clause D5. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)
D6 12	(b)	(i)The quants given for excav and subsequent disposal deemed tb the bulk bef exc	D10		(i)The quants given for excav and subsequent disposal deemed tb the bulk bef exc
D6 13	(b)	(ii)& no allowance tb made for any subsequent variations in bulk or for any extra space required to accommodate planking and strutting, (Acc) (D) (Loc) (W) (Wp)	D10		(ii)& no allowance tb made for any subsequent variations in bulk or for any extra space required to accommodate earthwork support. (Acc) (D) (Loc) (W) (Wp)
D6 14	(c)	(i)Getting out excavated materials by any means necessary shall be deemed to be included with the items of excavation. (Acc) (Loc)			
D6 15	(c)	(ii)Subsequent disposal of excavated material shall be given in accordance with Clause D16 hereof (Tpt)			

D6 21	(g)	<p>(i) 0.60m from the face of any work which requires formwork over 1m deep below the starting level of excn, or from the ext face of any work which will be covered externally with a damp proof covering at any depth below the starting level of excn, or from the external face of any work which requires workmen to operate from the outside at any depth below the starting level of excn (Acc) (D) (Enu) (Ht) (Loc) (T) (W) (Wp)</p>		
22		<p>(ii) 0.25 from the face of any work which requires formwork not exceeding 1m deep below the starting level of excn. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>		<p>0.25 from the face of any work which requires formwork where the bottom of the formwork does not exceed 1m deep below the starting level of excn. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p> <p>(ii) 0.25 from the face of any work which requires formwork where the height of the formwork does not exceed 1 m and the bottom of the formwork exceeds 1m below the starting level of the excavation. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p> <p>(iii) 0.60m from the face of any work which requires formwork where the height of the formwork exceeds 1m and where the bottom of the fmwk exceeds 1m below the starting level of excn (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)</p> <p>(b) Work which requires workmen to operate from the outside:</p> <p>0.60m from the face of any work which requires workmen to operate from the outside at any depth below the starting level of the excavation (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)</p>
23		<p>(iii) 1.50m extra length at each end of trenches which are to receive post tensioned concrete ground</p>		<p>(c) Post-tensioned concrete</p>

		beams.(Acc) (D) (Enu) (Loc) (T) (W) (Wp)			1.5m from the face which requires post tensioning (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
			D12	2	Exc and filling of working space shall be classified by depth in accordance w clause D11 and given in cu m as a single item, for each of the types of exc given in clause D13. Additional earthwork support and disposal or surface treatment arising from the measurement of wkg space shall be deemed to be inc.(Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
			D12	3	Disposal of exc mat from wkg space shall be desc in accordance w clauses D27-29
			D12	4	Filling of wkg space shall be desc in accordance w clauses D33 and 37
			D12	5	The number of pits shall be stated when measuring wkg space and pits
D7 24		(i)Excavating surfaces over 300mm deep to reduce levels shall be given in cu. m. (Acc) (D) (Enu) (Loc) (W) (Wp)	D13	3	Excavating to reduce levels shall be given in cubic m. (Acc) (D) (Enu) (Loc) (W) (Wp)
25		(ii)Such work not exceeding 300mm deep shall be given in sq m stating the average depth (Acc) (D) (Enu) (Loc) (W) (Wp)			
D8 26		Exc cuttings to be given in cu m (Acc) (D) (Enu) (Ht) (Loc) (T) (W) (Wp)			
D9 27		Excavating basements and the like (msd to outside of the fdns subject to clause D6 (g) hereof) to be given in cu m stating starting level and the depth as clause D6 (f) hereof. Extg voids to be ddt. (Acc) (D) (Enu) (Loc) (W) (Wp)	D13	4	Excavating basements and the like (measured to the outside of the foundations) shall be given in cu m stating the starting level. Existing voids shall be deducted. (Acc) (D) (Enu) (Loc) (W) (Wp)
D10 28	(a)	(i)Excavating trenches to receive foundations (measured the width of the foundations therein subject to Clause D6 (g) hereof) shall be given in cu m stating the starting level and the depth as clause D6 (f) hereof. (Acc) (D) (Enu) (Ht) (Loc) (W) (Wp)	D13	6	Excavating trenches to receive foundations shall be classified as follows, stating the starting level (measured the width of the foundations therein or the width inc any wkg space msd in acc with clause D12):

29		(ii)In the case of trenches over 1m deep, the minimum width measured shall be 0.75m for the full depth and this minimum shall apply also to the concrete foundations therein. (Acc) (D) (Enu) (Ht) (Loc) (W) (Wp)			Trenches ne 0.30 in width in m stating the av depth to the nearest 0.25m. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp) Trenches ex 0.30 in width, in cu m. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
Editions 5m and 6					
D10 30	(a)	(iii)Preliminary trenches for basement retaining walls which are constructed before the basements are excavated shall be so described. (Acc) (D) (Enu) (Ht) (Loc) (Tpt) (W) (Wp)			
31		(iv)No distinction shall be made between surface trenches and basement trenches. (v)For pipe trenches and the like see clause D12 hereof.			
D10 32	(b)	Excavating curved trenches shall be so described (foundations) (Acc) (D) (Enu) (Ht) (Loc) (Rad) (Tpt) (W) (Wp)	D13	2	Curved excavation shall be so desc irrespective of radius (Acc) (D) (Enu) (SL) (Loc) (Rad) (Tpt) (W) (Wp)
D11 33	(a)	(i)Excavating pits to receive bases of stanchions, isolated piers and the like (measured the size of the base therein subject to clause D6(g) hereof and grouped together) shall be given in cu m stating the starting level and depth as clause D6(f) hereof. (Acc) (D) (Enu) (Loc) (Ht) (Tpt) (W) (Wp)	D13	5	(i)Excavating pits to receive bases of stanchions, isolated piers and the like (grouped together) shall be given in cubic m stating the number and the starting level. (Acc) (D) (Enu) (Loc) (SL) (Tpt) (W) (Wp)
D11 34	(a)	(ii)In the case of pits over 1.50m dp, the minimum size measured on plan shall be 1.25m in each direction and this minimum shall apply also to planking and strutting in connection therewith. (Acc) (D) (Enu) (Loc) (Ht) (Tpt) (W) (Wp)	D13	5	(ii)Excavating pits having both plan dimensions less than 1.25 m, inc any working space msd in accordance with clause D12 shall be given separately.
35		(iii)and to the concrete foundations therein (Acc) (D) (Enu) (Loc) (Ht) (Tpt) (W) (Wp)			

D11	(a)	(iv)No distinction shall be made between surface pits and basement pits.			
D11 36	(b)	Excavating pits not exceeding 1 cu m each shall be so desc stating the number (Enu)			
D12 37	(a)	(i)Excavating trenches to receive service pipes, cables, kerbs and the like shall each be given separately in linear m stating the starting level and the average depth to the nearest 250mm. (Acc) (D) (Enu) (Loc) (Ht) (W) (Wp)	D13	8	(i)Excavating trenches to receive service pipes, cables, kerbs and the like shall each be given separately in m stating the starting level and the average depth to the nearest 0.25m. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
38		(ii)Grading bottoms, planking and strutting, filling in, compacting and disposing of surplus soil shall be given in the description of such trenches. (Acc) (D) (F) (Enu) (Loc) (Ht) (Rad) (Tpt) (W) (Wp)			(ii)Details of type and size of service, earthwork support, grading bottoms if reqd, filling in, compaction & disposal of surplus soil tb given in the desc of such trenches. . (Acc) (D) (F) (Enu) (Loc) (SL) (Rad) (Tpt) (W) (Wp)
D12 39	(b)	Excavating curved trenches shall be so described (pipe trenches) (Acc) (D) (Enu) (Loc) (Ht) (Rad) (Tpt) (W) (Wp)			See D13.2 above
Editions 5m and 6					
D13 40		Breaking up concrete, reinforced concrete, brickwork and the like met with in excavation shall each be given separately in cubic m as extra over the various descriptions of excavation. (Acc) (D) (Enu) (EO) (Loc) (Ht) (Tpt) (W) (Wp)	D13	12	Breaking up concrete, reinforced concrete, and the like met with in excavation shall each be given separately in cubic m irrespective of depth as extra over the various descriptions of excavation. (Acc) (D) (Enu) (EO) (Loc) (SL) (Tpt) (W) (Wp)
					Why irrespective of depth?
D14 41		(i)Breaking up surface conc, reinforced surface conc, brick paving, tarmacadam and the like on the surface of the ground shall each be given separately in sq m stating the thickness and method of disposal.	D13	11	Breaking up surface conc, reinforced conc, brick paving, tarmacadam and the like on the surface of the ground shall each be given separately in sq m as extra over the various

42		(Acc) (Alt) (Cut) (D) (Enu) (EO) (Loc) (Ht) (Tpt) (W) (Wp) (ii) Alternatively, breaking up such hard materials on the surface may each be given separately in sq m as EO the various descriptions of excavation. (Acc) (Alt) (Cut) (D) (Enu) (EO) (Loc) (Ht) (Tpt) (W) (Wp)	D13	11 & 12	descriptions of excavation and working space stating the thickness . (Acc) (Alt) (Cut) (D) (Enu) (EO) (Loc) (SL) (Tpt) (W) (Wp) In the case of surface trenches measured in accordance with clause D13.8 this work shall be given in metres stating the thickness
D15 43		Clearing out and removing contents of cesspits shall be enumerated stating the method of disposal.(Acc) (D) (Enu) (Loc) (Ht) (Tpt) (W) (Wp)			
D16 44	(a)	Multiple handling of excavated mats & transporting about the site as necessary shall be deemed to be included with the items of final disposal. Multiple handling which is specifically required shall be given in the description of disposal items (Tpt)	D27		Multiple handling of excavated mats & transporting about the site shall be deemed to be included with the items of final disposal. Multiple handling which is specifically required shall be given in the description of disposal items (Tpt)
D16 45	(b)	Earth filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting.(Acc) (D) (Enu) (Loc) (Ht) (W) (Wp)	D34		Earth filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting.(Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
D16 46	(c)	Earth backfilling shall be given in cu m except as otherwise provided in Clause D12 hereof (Acc) (D) (Enu) (Loc) (Ht) (W) (Wp)			
D16 47	(d)	Earth filling in making up levels over 300mm thick shall be given in cu m. Such work not ex 300mm thick shall be given in sq m stating the average thickness (Acc) (D) (Enu) (Loc) (Ht) (W) (Wp)	D36		Filling in making up levels over 250mm thick shall be given in cu m. Such work not ex 250mm thick shall be given in sq m stating the average thickness (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)
D16 48	(e)	Earth filling required to be deposited and compacted in layers shall be so desc stating the max thickness of the layers. (Acc) (D) (Enu) (Loc) (Ht) (W) (Wp)	D37		Filling required to be deposited and compacted in layers shall be so desc stating the max thickness of the layers. (Acc) (D) (Enu) (Loc) (SL) (W) (Wp)

D16 49	(f)	(i)Surplus spoil shall be given in cubic m (Acc) (D) (Enu) (Loc) (Ht) (Tpt) (W) (Wp)			
Editions 5m and 6					
D16 50	(f)	(ii)Spoil deposited on site in permanent spoil heaps or spread on site shall be so described stating the location of such deposits or the average distance from the excavation in linear m or km (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)	D28		Exc material deposited on site in permanent spoil heaps or spread on site shall each be given in cu m stating any requirements for the location of such deposits or av dist from the excn in m or km. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)
D16 51	(f)	(iii)Spoil removed from the site to be so described & the provision of a shoot, dump or tip shall be deemed to be included with the items unless otherwise stated. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)	D29		Excavated materials to be removed from the site shall be given in cu m and so described and the provision of a shoot, dump or tip shall be deemed to be included with the items unless otherwise stated. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)
D17 52	(a)	(i)Treating the surface of the ground, or the surface of filling, or the bottom of excavation (eg levelling; grading to falls; grading to cambers; (Acc) (D) (Enu) (F) (Loc) (W) (Wp)	D40		(a)(i)Treating the surface of the ground, or filling, or the bottom of excavation (Acc) (D) (Enu) (F) (Loc) (W) (Wp)
54		(ii)blinding; compacting) (Acc) (D) (Enu) (F) (Loc) (W) (Wp)	D43		Blinding with sand, ashes or similar fine material shall be described and given in sq m. Conc blinding shall be given in accordance with section F. (Acc) (D) (Enu) (F) (Loc) (W) (Wp)
55		(iii)shall each be given separately in sq m. Alternatively, such treatments may be given in the description of any superficial item of excavation, earth filling, hardcore filling, concrete or paving. (Acc) (Alt) (D) (Enu) (F)(Loc) (W) (Wp)	D40		(a)(ii)shall each be described and given separately in sq m. Alternatively, such treatments may be given in the description of any superficial item. (Acc) (Alt) (D) (Enu) (F)(Loc) (W) (Wp)

D17 56	(b)	Compacting which is required to be carried out by specific means (eg mechanical punner, roller of specified weight) shall be appropriately desc. (Acc) (D) (Enu) (F) (Loc) (W) (Wp)	D41		Compacting which is required to be carried out by specific means shall be desc. (Acc) (D) (Enu) (F) (Loc) (W) (Wp)
D17 57	(c)	Treating bottoms of excavations in rock shall be so desc. (Acc) (D) (Enu) (F) (Loc) (W) (Wp)	D40		(b) Treating bottoms of excavations in rock shall be so desc. (Acc) (D) (Enu) (F) (Loc) (W) (Wp)
D17 58	(d)	Trimming sides of cuttings and sides of embankments to slope shall each be given separately in sq m. Curved work shall be so desc. (Acc) (D) (Enu) (F) (Loc) (R) (Rad) (W) (Wp)	D42	1	Trimming sides of cuttings and sides of embankments to slope shall each be given separately in sq m. Curved work shall be so desc. (Acc) (D) (Enu) (F) (Loc) (R) (Rad) (W) (Wp)
D17 59	(e)	Trimming sides of excn in rock to produce fair exposed faces tb given in sq m. Curved wk shall be so described (Acc) (D) (Enu) (F) (Loc) (Rad) (W) (Wp)	D42	2	Trimming sides of excn in rock to produce fair exposed faces tb given in sq m. Curved wk shall be so described. (Acc) (D) (Enu) (F) (Loc) (Rad)(W)(Wp)
D18 60		Soiling, seeding, fertilizing & turfing to surfaces shall each be given in sq m stating the thickness of soil & quantity per sq m of seed or fertilizer. (Acc) (D) (Enu) (Loc) ((W) (Wp)			Soiling, seeding, treating top surface fertilizing & turfing to surfaces shall each be given separately in sq m stating the thickness of soil & quantity per sq m of seed or fertilizer. (Acc) (D) (Enu) (Loc) (W) (Wp)
D19	(a)	For rules relating to Section D generally see Clause D1 hereof			
Editions 5m and 6					
D 19 61	(b)	Keeping excns free from general water (ie all water except spring or running water or water below the water level in the ground) shall be given as an item. (Acc) (D) (Enu) (Loc) (W) (Wp)	D25		An item shall be given for keeping the surface of the site and the excavations free of surface water. . (Acc) (D) (Enu) (Loc) (W) (Wp)
D19 62	(c)	Keeping excavations free from water below the water level in the ground, where the water level has been stated in accordance with Clause D1(a) hereof, shall be given as an item. Where the water level remains to be ascertained in accordance with the provisions of Clause D1(a) hereof, the work shall be given as a provisional or prime cost sum as Clause A7 hereof or as a provisional number of actual pumping hours for the different classes of pumps likely	D26		Where excavation is measured below the water level in accordance with clause D.13.13 an item shall be given for keeping the excavations free of ground water. (Acc) (D) (Enu) (Loc) (W) (Wp)

		to be required. (Acc) (D) (Enu) (Loc) (W) (Wp)			
D19 63	(d)	Keeping excavations free of spring or running water shall be given as a provisional or prime cost sum as clause A7 hereof or as a provisional number of actual pumping hours for the different classes of pumps likely to be required (Acc) (D) (Enu) (Loc) (W) (Wp)			
D19 64	(e)	Providing pumps and other equipment, power and attendance for pumping and standing time shall be deemed to be included with the items (Acc) (D) (Enu) (Loc) (W) (Wp)			
D20 65 66 67	(b)	(I)Planking and strutting shall be deemed to mean providing everything requisite to uphold the sides of excavation (Acc) (D) (Enu) (Loc) (T) (W) (Wp) (II)by whatever means are necessary (other than special shoring or steel sheet piling) (Acc) (D) (Enu) (Loc) (T) (W) (Wp) (III)and shall be measured whether or not any is in fact required (subject to para (c) of this clause) as follows:-	D15	1	Earthwork support shall be deemed to mean providing everything requisite to uphold the sides of excavation (Acc) (D) (Enu) (Loc) (T) (W) (Wp) (II)by whatever means are necessary (other than special shoring or steel sheet piling) (Acc) (D) (Enu) (Loc)(T)(W) (Wp) (III)and shall be measured whether or not any is in fact required except to: (a)Faces n e 0.25 in height (b)Sloping face of any excn where angle of inclination does not exceed 45° from the horizontal; (c)Face of any excn which abuts an extg wall, pier, or other structure; (d) face of any additional excn which results from the measurement of working space. (U)
D20 (67)	(b)	(i)To the full depth of any excavation which is over 300mm dp (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			

Editions 5m and 6					
D20 68	(b)	(ii)To b s of trenches over 12" dp, ex to pipe trenches and the like referred to in clause D12 hereof. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			
D20 69	(b)	(iii)To all sides of pits which are over 300mm dp subject to the minimum stated in clause D11(a) hereof. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			
D20 70	(c)	Planking and strutting shall not be measured to any excavation which does not exceed 300mm in depth, nor to the sloping side of any excavation where the angle of inclination does not exceed 45 degrees from the horizontal, nor not the side of any excavation which abuts an existing wall, pier or other structure.			See clause 15.1.(c) above
D20 71	(d)	Curved planking and strutting shall be so described (Acc) (D) (Enu) (Loc) (Rad) (T) (W) (Wp)	D14	2	Curved earthwork support shall be so desc irrespective of radius. (Acc) (D) (Enu) (Loc) (Rad) (T) (W) (Wp)
D21 72	(a)	(i)Planking and strutting shall be given in sq m stating the starting level. Except in the case of p & s to basement excn, the total depth of the p&s shall be stated in multiples of 1.5m (eg not ex 1.5 total depth; not ex 3m total depth). (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D16		Earthwork support shall be given in sq m and classified by max depth as clause D11 irrespective of starting level (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
D21 73	(a)	(ii) In the case of p & s to sides of bst excn, total depth of excn t b stated & depth of any trench immediately below the side of a bsmt shall be inc in the total depth of such side. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D18		Earthwork support to trenches pits and the like occurring below the face of an excavation should be so desc.where the horiz distance from the face of the excn above, inc any msmt for wkg space in acc with clause D12 is less than the depth of the trench, pit etc. The ht of the excn face above the top of the trench, pit etc shall be given. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
D21 74	(a)	(iii)Classification of p & s shall be as follows:- (iii)(i)To sides of excn to reduce levels over site. (iii)(ii)To sides of excn to form cuttings	D17		Earthwork support shall be classified by distance between opposing faces, excluding measurement for working space, as follows: Not ex 2.00m 2.00– 4.00 m

		<p>(iii)(iii)To sides of bst excn</p> <p>(iii)(iv)To sides of trenches (Sides which are immediately below sides of bsmts shall be deemed to be sides of bst excn)</p> <p>(iii)(v)To sides of pits (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>			<p>Ex 4.00 m</p> <p>(Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>
D21 75	(b)	<p>Planking and strutting next roadways shall be so described (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>	D19		<p>Earthwork support next to roadways shall be so described if the horiz dist from the face to be supported to the edge of the roadway or footpath, inc any msmt for working space in accordance w clause G12, is less than the depth of the excavated face below the edge of roadway or footpath (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>
D21 76	(c)	<p>Planking and strutting to trenches over 2m wide shall be so described stating the width of the trench (Acc) (D) (Enu) (Loc) (T) (W) (Wp)</p>			
D21 77	(d)	<p>Planking and strutting which extends wholly or partly below the normal water level (as established in accordance with clause D1(a) hereof) shall be so described and measured from the starting level of the excavation to the full depth. . (Acc) (Ad) (D) (Enu) (Loc) (SL) (T) (W) (Wp)</p>	D21		<p>Earthwork support to excns below ground water level as defined in clause D3.1a shall be so described and measured from the starting level of the excavation to the full depth. If the post contract water level differs from the pre contract water level the measurements shall be revised in accordance with the post contract water level. (Acc) (Ad) (D) (Enu) (Loc) (T) (W) (Wp)</p>
78		<p>Planking and strutting which extends wholly or partly into running silt or running sand (grouped together) shall be so described and similarly measured: where such work also extends below the normal water level it shall be so described. (Acc) (Ad) (D) (Enu) (Loc) (T) (W) (Wp)</p>	D22		<p>Earthwork support to excns in running silt, running sand and mthe like shall be so described and measured from the starting level of the excavation to the full depth. (Acc) (Ad) (D) (Enu) (Loc) (T) (W) (Wp)</p>
			D20		<p>Earthwork support next to extg bldgs. shall be so described if the horiz dist from the face to be supported to the nearest part of the fdtns of the bldg., inc any msmnt for wkg space in</p>

					accordance with clause D12 is less than the depth of the excavated face below the bottom of foundation. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
D21 79	(e)	No distinction shall be made in respect of planking and strutting to excn in rock	D23		No distinction shall be made in respect of earthwork support to excn in rock
D21 80	(f)	Planking and strutting left in shall be so described (Acc) (D) (Enu) (Loc) (T) (W) (Wp)	D24		Earthwork support left in shall be so described (Acc) (D) (Enu) (Loc) (T) (W) (Wp)
EDITIONS 5M & 6					
D21 81	(g)	(i)Special shoring to support p & s shall be given in the desc of p & s items. (Acc) (D) (Enu) (Loc) (T) (W) (Wp) Alt, (ii)such shoring may be given in detail as Clause C10 hereof (Acc) (Alt) (D) (Enu) (Loc) (T) (W) (Wp)			
D21 82	(h)	Shortening struts or shores and restrutting or reshoring shall be given in the desc of p & s to trenches which are to receive in-situ conc wls or which are to rec ret wls const in two thicknesses (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			
D21 83	(j)	For steel sheet piling see section E hereof.	D14	1	Interlocking driven sheet steel piling shall be given in accordance w Section E.
D22 84	(b)	Hardcore filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting (Acc) (D) (Enu) (Loc) (W) (Wp)	D34		Filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be measured after compacting (Acc) (D) (Enu) (Loc) (W) (Wp)
			D35		Filling to excns other than working space (D12.2) and service trenches (D13.8) shall be given in cu. m.
			D35		Filling to excavations other than to working space(D.12.2) and service trenches (D13.8) shall be given in cubic metres/.

D22 85	(c)	Hardcore filling in making up levels over 300mm thick shall be given in cubic m Such work not ex 300mm thick tb given in sq m stating the av thickness (Acc) (D) (Enu) (Loc) (W) (Wp)	D36		Filling to make up levels over 250 mm thick tb given in cu m Such filling not ex 250mm thick shall be given in sq m stating av thickness (Acc) (D) (Enu) (Loc) (W) (Wp)
D22 86	(d)	Hardcore filling required tb deposited and compacted in layers shall be so desc stating the max thickness of the layers. (Acc) (D) (Enu) (Loc) (W) (Wp)	D37		Filling required tb deposited and compacted in layers shall be so desc stating max thickness of the layers. (Acc) (D) (Enu) (Loc) (W) (Wp)
D22 87	(e)	Treating the surface of the hardcore shall be given in accordance with clauses D17 (a) and (b) hereof (F)	D40		Treating the surface of the ground or filling or the bottom of excavation shall each be described and given separately in sq m. Alternatively such treatments may be given in the description of any superficial item. Treating bottoms of excavation in rock shall be so described. (Alt) (F)
D22 88	(f)	Hand packing hardcore to form vertical or battering face over 300mm wide shall be given in sq m. Such work not exceeding 300mm wide shall be given in linear m stating the width. (Acc) (D) (Enu) (Loc) (W) (Wp)	D38		Hand packing hardcore to form vertical or battering face over 0.25m high shall be given in sq m. Such work not exceeding 0.25m high shall be given in m stating the ht. (Acc) (D) (Enu) (Loc) (W) (Wp)
D22 89	(g)	Hand packing hardcore to form sinking shall be given in linear m stating the size. No deduction of hardcore shall be made. (Acc) (D) (Enu) (Loc) (W) (Wp)	D39		Hand packing hardcore to form sinkings shall be given in m or enu as appropriate stating the size. No deduction of hardcore shall be made. (Acc) (D) (Enu) (Loc) (W) (Wp)
		PILING			PILING & DIAPHRAGM WALLING
			E1	1	Location drawings shall be supplied with the BQ which show: The general piling layout The positioning of any different types of pile The positions of the work within the site and of existing services. (Acc) (Ad) (Loc) (W)

E1 90	(a)	(i)Any information concerning the nature of the groundshall be given stating whether the surface is level or irregular (Acc) (Ad) (Loc)	E2	1	The nature of the ground shall be given in accordance w clause D.3 (Acc) (Ad) (Loc)
E1 91	(a)	(ii)Attention should be drawn to any available records of bores on the site			
E1 92	(b)	Work near rivers or tidal waters shall be so desc stating the level of the ground in relation to high water mark, low water mark and the Ordnance datum. Attention shall be drawn to any available records of the highest flood water level in the locality (Ad)	E2	2	Where work is to be carried out near canals, rivers etc or tidal waters the level of the ground in relation to the normal levels of the canal or river etc or to the mean spring ;levels of high and low tidal waters shall be stated. Flood levels shall be stated where applicable (Ad)

E1 93	(c)	(i)Providing and assembling the piling equipment on the site and its subsequent removal shall be given as an item. (Acc) (Loc) (PP) (W)	E3	1	The following items shall be given separately for each type of pile identified in accordance with clause E4.1: (a)An item shall be given for bringing to site and removing from site all plant required for this section of the work. (b)An item shall be given for maintaining on site all plant required for this section of the work (Acc) (Loc) (PP) (W)
E1 94	(c)	(ii)Moving the piling frames about the site, raising and lowering them and providing any necessary staging or barges to support them shall be deemed to be inc with the item. (Acc) (Loc) (PP) (W)			<i>No comparable clause</i>
E1 95		(i)A general description of the piling operations shall be given as an item (Acc) (Loc) (W)	E1	1	Location drawings shall be supplied with the BQ which show: (a)The general piling layout (b)The positioning of any different types of pile

E1		(ii)stating the approximate levels at which the piling frames will operate (eg ground level; reduced level; basement level. (SL) (PP)	E2	3	The positions of the work within the site and of existing services.(Acc) (Loc) (W) The levels from which the work is expected to begin and from which msmts have been taken shall be stated. Irregular grd shall be so desc. (SL) (PP)
E1 96	(e)	Extra excavation (where necessary in order to place the hammer over any pile situated in an angel (sic) or similar position) together with any necessary filling and ramming afterwards, shall be given in detail or as provisional items. (Enu) (P)			
		Wood or concrete piles			
E2	(a)	For rules relating to Section E generally see clause E1 hereof			
E2 97	(b)	Designs for piles shall be deemed to be provided by the employer. Piles reqd to be designed by the contractor shall be given in accordance with Clause E7 hereof			
E3 98	(a)	Supplying wood pile given in lin m stating size of the cross-section. Those over 9m long tb so desc stating the length in further stages of 3m. (Acc)(CU)(D) (Enu)(SL)(Loc)(PP)(T)(W)(Wp)	E4	1	The following types of piling operation each t b given under a sep heading, inc all ancillary work
			E4	1 (a)	Bored cast in place concrete piles
			E4	1 (b)	Driven cast in place concrete piles
			E4	1 (c)	Pre-formed concrete piles
			E4	1 (d)	Pre-formed pre-stressed piles
			E4	1 (e)	Pre-formed conc sheet piles
			E4	1 (f)	Timber piles
			E4	1 (g)	Isolated steel piles

			E4	1 (h)	Interlocking steel piles
			E4	1 (j)	Other piles
					<p>Within the above classification, prelim and test piles, contiguous bored piles and raking piles classified according to angle of rake in increments of 10° shall each be given separately. Piles to be extracted shall be identified and given separately. (Acc) (CU) (D) (Enu) (SL) (Loc) (PP) (R) (T) (W) (Wp)</p>
			E4	2	<p>Within the classification...of E4.1 items shall be given as E4.3 – 8, stating cross -section and materials of which the pile is composed and, in the case of steel piles, the nominal weight per metre</p>
			E4	3	<p>For piles other than cast in place concrete and interlocking steel piles items shall be given for:</p> <p>(a)The total no of piles</p> <p>(b)The total driven length in m.</p> <p>The total completed length or lengths of piles given in m and classified... as:</p> <p>ne 5.00m</p> <p>5.00 – 10,00m</p> <p>10.00 – 15.00m</p> <p>15.00 - 20.00m</p> <p>20.00 - 25.00m</p> <p>ex 25.00m stating the length. (Acc) (CU) (D) (Enu) (SL) (Loc) (PP) (T) (W) (Wp)</p>
			E4	4	<p>In the case of cast in place conc piles items shall be given for:</p> <p>(a)The total number of piles</p> <p>(b)The total completed length of piles in metres</p>

					<p>The total driven or bored depth in metres, in the following range of hole depth:</p> <p>ne 5.00m</p> <p>5.00 – 10.00m</p> <p>10.00 – 15.00m</p> <p>15.00 - 20.00m</p> <p>20.00 - 25.00m</p> <p>ex 20.00m stating the depth</p> <p>(Acc) (CU) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p>
			E4	6	<p>The following shall be given in metres as EO the piling:</p> <p>(a)Boring through rock stating the anticipated strata</p> <p>(Acc) (Cut) (D) (Enu) (EO) (SL) (Loc) (PP) (W) (Wp)</p> <p>(b)Permanent casing, stating thickness and type. (Acc) (D) (Enu) (EO) (SL) (Loc) (PP) (W) (Wp)</p> <p>(c)Placing concrete by tremie pipe which is deemed to inc for any adjustments to conc mix.</p> <p>(Acc) (D) (Enu) (EO) (SL) (Loc) (M) (PP) (W) (Wp)</p>
			E4	7	<p>The following shall be given in metres:</p> <p>(a)Pre-boring where specifically required (Acc) (Cut) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p> <p>(b)Backfilling empty bores stating backfill material (Acc) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p>

					<p>(c)Jetting where specifically required (Acc) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p> <p>(d)Filling hollow pipes with concrete, stating specification & if reinforced. (Acc) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p> <p>(e)Total length of tile extensions stating the no. (Acc) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p> <p>(f)Horizontal length of cutting tops of interlocking piles. (Acc) (Cut) (D) (Enu) (SL) (Loc) (PP) (W) (Wp)</p>
E3 99	(b)	Pointed ends of piles shall be enum as EO the piles on which they occur. Where shoes are fitted they shall be given in the description stating the weight (Acc) (D) (Enu) (EO) (Ht) (Loc) (PP) (T) (Wp) (Wt)	E4	8	<p>Heads and shoes to timber.... piles shall be enumerated stating the size and weight</p> <p>(Acc) (D) (Enu) (EO) (SL) (Loc) (PP) (T) (Wp) (Wt)</p>
E3 100		Handling transporting and pitching piles shall be enumerated stating the size, the length, and whether single or in clusters. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
E3 101		Driving piles (measured from the shoe point in contact with the ground when pitched to the shoe point when driven) shall be given in lin m stating the set required and any limitation on the method of driving. Driving piles on rake and driving piles in water shall each be so desc. (Acc) (Ad) (D) (Enu) (SL) (Loc) (PP) (R) (W) (Wp)			
E3 102	()	Cutting off the tops of piles to required levels and ringing with steel bands shall be enumerated as EO the piles concerned stating the size of the cross section of the band. Cutting under water shall be so described stating the depth below water level. (Acc) (Ad) (Cut) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)	E4	8	<p>(a)Cutting off tops of isolated piles to required levels which shall be deemed to include provision and backfilling of any working space required. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)</p>

E4 103	(a)	(i)Supplying cast concrete piles shall be given in lin m stating the size of the cross section and the number			
E4 104 105	(a)	(ii)Moulds deemed tb inc with items. (Enu) (Loc) (iii)Piles required to be cast away from the site and subsequently transported to the site shall be so described. (Tpt)			
E4 106	(b)	Bar reinforcement shall be given in accordance with the rules for reinforcement in Section F hereof.	E5		Steel reinforcement in piles shall be given in accordance with Section F
E4 107		Heads and shoes shall each be enumerated as EO the piles to which they are fitted stating the weight. Rock shoes shall be so described (Acc) (D) (Enu) (EO) (SL) (Loc) (PP) (Wp) (Wt)	E4	8	The following shall be enumerated: (b)Preparing conc pile heads and r/f for capping (Acc) (Cut) (D) (Enu) (SL) (Loc) (Wp) (d)Heads and shoes to cast concrete piles stating the size and weight. (Acc) (D) (Enu) (SL) (Loc) (PP) (Wp) (Wt)
			E4	8	The following shall be enumerated: (c)Forming enlarged bases stating max dia. (Acc) (D) (Enu) (SL) (Loc) (Wp) (e)Removal of piles stating type size and length (Acc) (D) (Enu) (SL) (Loc) (Wp) (F)Cutting holes in interlocking steel piles (Acc) (Cut) (D) (Enu) (SL) (Loc) (Wp)
E4 108		Handling transporting and pitching piles shall be enumerated stating the size, the length, and whether single or in clusters. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)			

E4 109	(o)	Driving piles shall be given in accordance with Clause E3 hereof			
E4 110	(c)	Cutting off the tops of piles to required levels and preparing the reinforcement shall be enumerated as EO the piles concerned. Cutting under water shall be so described stating the depth below water level. (Ad) (Cut)			
E4 111	(g)	Lengthening piles in pos shall be given in detail. Connections shall be enum. Redriving lengthened piles tb given in lin m stating the number.			
E5 112	(a)	Boring pile holes and filling bores with concrete (taken together) shall be given in lin m stating size and number of bores & mix of conc filling. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)			See E4.1.a
E5 113	(b)	Where bored piles are required to finish below the formation level of the ground, an additional item of blind boring shall be given in lin m stating the size of the bore.			
E5 114		Bar reinforcement shall be given in accordance with the rules for reinforced concrete in Section F hereof.			
E5 115		Disposal of soil from the bores shall be given in accordance with the rules for disposal of excavated material in Section D hereof. (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)	E6		Disposal of surplus excavated material arising from piling operations shall be given in cubic metres (Acc) (D) (Enu) (Loc) (Tpt) (W) (Wp)
E6 116		Trial piles shall be enumerated stating the location, length and cross section of the pile, the length of driving and the method of testing. Any necessary pointed ends, shoes, heads and r/f shall be given in the desc. (Enu)			

			E7	1	Standing time for driving and boring rigs and associated labour where authorized shall be given as a provisional number of hours
			E7	2	Boring through artificial obstructions shall be given as a provisional number of hours for the different types of obstruction.
		Contractor designed concrete piles			
E7	(a)	For rules relating to Section E generally see clause E1 hereof			
E7 117	(b)	Contractor- designed concrete piles shall be enumerated stating actual length, superimposed load to be carried & method of disposing of any spoil. Particulars to be given of any restrictions regarding type of pile or method of driving. Any necessary r/f in piles shall be deemed to be included with the items.			
E7 118		Where tops of piles required to finish below formation level, piles to be so described stating depth of top below such level. (Loc)			
		Steel sheet piling			
E8	(a)	For rules relating to Section E generally see clause E1 hereof			
E8 119	(b)	(i) Steel sheet piling (measured the area as placed in position taken on the centre line of the piling) to be given in sq m stating the size of the cross section of each unit and the thickness or substance of the metal. (ii) Sheet piling over 12m long shall be so described stating the length in further stages of 3m. Handling, transporting, pitching strutting and waling shall be given in the description. (Acc) (D) (Enu) (EO) (Loc) (Ls) (PP)(R) (W) (Wp)	E4	5	In the case of interlocking sheet piles, items shall be given for: (a) The total driven area of the piles in m ² (b) The total completed area of the piles in m ² classified in the ranges of pile length of E.4.3.c. Corner, junction, closure and taper piles, in m as EO. (Acc) (D) (Enu) (EO) (Loc) (Ls) (PP)(R) (W) (Wp)

E8 120		(i)Driving steel sheet piling (measured from formation level of the ground to the bottom edge of the sheet piling when driven) not exceeding 6m dp shall be given in sq m. Driving over 16m dp shall be given in sq m stating the depth in further stages of 3m. (CU)			
121		(ii)Driving in water shall be so desc. (Ad) (iii)Withdrawing steel sheet piling shall be given in the description of driving.			
E8 122		Corner piles and junction piles shall each be given in lin m as extra over the sheet piling in which they occur. (EO)			See E.4.5 above
E8 123		(i)Cutting or burning through steel sheet piling shall be given in lin m as extra over the piling concerned. (Cut)			
124		(ii)Cutting under water shall be so desc stating the depth below water level. (Cut)			
			E8		Separate items shall be given for tests of piles by kentledge or by anchors, and for tests of preliminary test or working piles by vertical, horizontal or raking loads, each test being kept separate stating the load and any requirements for rate of loading.
			E9	1	Quantities for piling shall be calculated as follows: (a)Driven or bored length of each pile tb msd from the level stated in accordance w clause E2.3, to bottom of toe, bottom of casing or bottom of shaft (b)Lengths msd for cast in place piles inc enlarged bases & lengths tb cut off.

					<p>For pre-formed conc, timber and steel piles, lengths msd are those which the contractor is instructed to provide</p> <p>Areas for steel sheet piling are the mean length over all corner, junction, taper & closure piles</p> <p>() Msmt of pile extensions excludes lengths formed of off cuts from others, but includes length of scarfed or other jts in timber piles.</p> <p>() Vol of surplus exc. mat is X-sect area by bored length. Inc vol of enlarged bases. Any part of surplus which is backfilled tb dtd. No disposal msd in the case of displacement piles.</p>
			E10		<p>Loc drwgs supplied w BQ show</p> <p>(a) Arrangement of diaphragm walls and relationship to surrounding buildings.</p> <p>(b) Depths, lengths and thickness of diaphragm wls</p>
			E11		Nature of the ground given as clause D3
			E12	1	An item tb given for bringing to sit and removing all plant reqd for this section of the work
				2	An item tb given for maintaining on site all plant reqd.
			E13	1	Items for diaphragm wls to be grouped under an appropriate heading
			E13	2	Excn for diaphragm walls in cu m stating thickness. Vol tb calculated from lengths and depths of walls. Depths taken from level at which exc is expected to begin. Additional excn for guide walls or wkg space & disposal of surplus deemed tb inc.

					(Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	3	Excn for diaphragm wls classified as: Ne 5.00 m 5.00 – 10.00m 10.00 – 15.00m 15.00 – 20.00m 20.00 – 25.00m 25.00 – 30.00m Exceeding 30.00m stating the depth
			E13	4	Excn in rock & artificial hard material tb each given sep in cu m stating anticipated strata and material. Alt may be given as EO excn. Standing time& assoc labour with such items deemed to be inc (Acc) (Alt) (Cut) (D) (Enu) (EO) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	5	Disposal of exc mat in cu m (Acc) (D) (Enu) (EO) (SL) (Loc) (Tpt) (W) (Wp)
			E13	6	Standing time & assoc labour for plant (authorized) tb given as a prov no of hrs.
			E13	7	Conc in diaphragm wls given in cu m stating thickness & mix. Vol shall inc conc cut off other than working tolerances .Conc vol msd to inc r/f, metal sections, cast in components each less than 0.10 cu m in vol, rebates, fillets and internal splays of less than 0.005m ² cross sect area & pockets and holes ne 0.50m ² in cross sect area (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	8	Trimming and cleaning faces of diaphragm wls in sq m stating required finish. (Acc) (D) (Enu) (EO) (F) (SL) (Loc) (T) (W) (Wp)

			E13	9	R/f as section F. Wt shall inc any stiffening lifting & supporting steel cast in. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	10	Fmwk as sect F. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	11	Waterproof jts in diaphragm wls shall be fully desc& given as an item. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E13	12	Guide wls for diaphragm walls tb given in m msd the length of diaphragm wl constructed & stating any limitations of design and const. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
			E13	13	Preparing tops of wls and r/f to receive cappings tb in m stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)
			E14		Protecting the work in this section to be given as an item
		F. CONCRETE WORK			
		The unit of billing shall be the metre except where the unit is required to be the kilogramme.			
		Generally to Section F			
			F1	2	<p>The following information for concrete framed structures and concrete to steel framed structures shall be shown on the location drawings required under clause B3.1 or shall be shown on further drawings which shall accompany the bill of quantities:</p> <p>(a)The relative positions of differing types of construction. (Acc) (D) (Enu) (SL) (Loc) (T) (W)</p> <p>(b)The size of principal structural members including thickness of floor slabs (D)</p> <p>The permissible loads on slabs and beams which may carry temporary supports of formwork relative to the time elapsed since the slab was cast.</p>

					Alternatively such information may be given in schedule form in the BQ.
			F2	1	An item shall be given for bringing to site and removing from site all plant required for this section of the work
				2	An item shall be given for maintaining on site all plant required for this section of the work
			F3	1	Work shall be classified as follows and given together with its associated formwork, reinforcement and labours under the appropriate heading: (a) In concrete framed structures (b) To steel framed structures (c) Other concrete work (CU)
			F3	2	The approximate total volume of in-situ concrete comprised in each classification shall be given in the heading.
F1 1	(a)	<i>Particulars shall be given of:</i> (i) Kind and quality of materials for concrete.	F4	1	(a) Particulars shall be given of: Kind and quality of materials for concrete.
			F1	1	A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F1 2	(a)	<i>Particulars shall be given of:</i> (ii) Any tests of the materials (iii) Any tests of the finished work	F4	1	Particulars shall be given of: (b) tests required of the materials tests required of the finished work
F1 3	(a)	<i>Particulars shall be given of:</i> (iv) Composition and mix (or strength requirements) of the concrete	F4	1	Particulars shall be given of: Mix or strength requirements of the concrete

			F4	3	Concrete designed to be waterproof shall be described stating the measures to be adopted.
			F4	4	Any requirements or restrictions as to the nature of the pour shall be given in the desc of the work concerned.
F1 4	(b)	Concrete required to be placed by a particular method (eg poured at a stated speed) shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F4	5	Concrete required to be placed by a particular method, poured at a stated speed, compacted or cured in a particular way shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F4	6	Concrete, other than beds, poured against faces of excavation and beds laid on earth or hardcore shall each be so described. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
Editions 5 and 6					
F1 5	(c)	Concrete required to be consolidated by a particular method (eg mechanically tamped; vibrated) shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			See F4.5 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F4	9	Work required to be designed by the contractor shall be given in accordance with clauses F40-44.
F1 6	(d)	Concrete required to be cured by a particular method shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			See F4.5 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F1 7	(e)	Curved labours on concrete shall be so desc irrespective of radius. (Acc) (D) (Enu) (SL) (Loc) (Rad) (W) (Wp)	F9	2	Curved labours on concrete irrespective of radius shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (Rad) (W) (Wp)
F1 8	(f)	Labours on old concrete shall be so desc.. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F9	1	Labours on concrete shall be grouped with the work concerned, stating, where specifically required whether on set or unset conc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)

F1 9	(g) (i)	Concrete shall be measured as executed (subject to the minimum stated in Clauses D10(a) and D11(a) hereof.	F4	8	Concrete shall be measured as carried out
F1 10 11 12	(g)(ii)	but no deduction shall be made for the following:- (i)Vol of any steel embedded in the Conc (N) (ii)Voids ne 0.10 sq m in wk given in sq m (N) (iii)Voids ne 0,05 cu m in wk given in cu m. (N)	F4	8	but no deduction shall be made for the following:- (a)Vol of any steel embedded in the Conc (N) (ii)Voids due to boxed or tubular steelwork not ex 0.05 m ² sect area (N) (iii)Voids ne 0,05 cu m other than voids in soffits of troughed or coffered slabs. (N)
			F4	10	Work of composite in-situ and precast construction shall be given in accordance with clause F25.
			F4	11	Prestressed in-situ concrete shall be given in accordance with clauses F33-39
F1 13	(h)	Where the sectional area of plain or r/f conc members are reqd to be stated in accordance with this clause, they shall be grouped and desc as follows:- (i)Not ex 0.05 sq m (ii)Over 0.05 but ne 0.10 sq ins (iii)Over 0.10 sq m	F5	1	Where the sectional area is reqd to be stated...the classification shall be in one of the following categories: Not exceeding 0.03 m ² 0.03 – 0.10 m ² 0.10 – 0.25 m ² Exceeding 0.25 (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)
			F5	3	The stated thickness of walls, beds and slabs shall exclude projections or recesses of any kind. For coffered or troughed slabs see clause F6.10.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F1	(j)	For wk in underpinning see Section H hereof			

		Plain concrete and reinforced concrete			
F2	(a)	For rules relating to Section F generally see Clause F1 hereof.			
F2 14	(b)	Plain in-situ concrete and its associated formwork shall be given under an appropriate heading See also clause F2 below			
F2 15		Reinforced in-situ concrete and its reinforcement and associated formwork shall be given under an appropriate heading	F4	2	Reinforced work shall be so described. Members having a reinforcement content in excess of 5% by volume shall be so described
F2 16		Designs for reinforced concrete work shall be deemed to be provided by the employer. Work required to be designed by the contractor shall be given in accordance with clauses F56 to F61 hereof			
		See clause F3(a) below	F5	2	Where the thickness is required to be stated in accordance with this clause, the classification shall be in one of the following categories: Not exceeding 100mm 100 – 150mm 150 – 300 mm Exceeding 300mm (CU)
			F6	1	All members , unless otherwise stated shall be given in cubic metres and described in the categories set out in clauses F6.2-21.
F3 17	(a)	Foundations in trenches shall be given in cu m stating the thickness in the following stages: (i)Not ex 150mm thick (ii)Over 150 but ne 300mm thick (iii)Over 300mm thick . (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	2	Foundations in trenches, which shall be deemed to include column or pier bases which are not isolated, stating the thickness as clause F5.2 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)

Editions 5m and 6					
F3 18	(b)	Foundations to stanchions, columns and piers which are combined with fdtns in trenches shall be classified as fdtns in trenches. (CU)	F6	2	
F3 19	(c)	Foundations over 0.15 cu m each to stanchions columns and piers which are isolated shall be grouped together and given in cu m stating the thickness in stages as paragraph (a) of this clause. Such work not exceeding 0,15 cu ft shall be given in cu m stating the number. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	3	Isolated foundations to columns and piers, stating the number. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F3 20	(d)	Ground beams and casings to steel ground beams shall each be given sep in cu m stating the sectional area in stages as Clause F1(h) hereof (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	5	Ground beams stating the cross sectional area as clause F5.1 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F6	6	Casings to steel ground beams, stating the cross sectional area as clause F5.1 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F6	7	Pile caps, stating the number (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F3 21	(e)	Casings to steel grillages to be given in cu m (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	4	Casings to steel grillages stating the number (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F3 22	(f)	Grouting under steel stanchion bases and under steel grillages shall each be given separately in sq m stating the mix of the grout and the number of bases or grillages (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F10	1	Grouting under steel stanchion bases and under steel grillages shall be given separately in sq m stating the mix of the grout and the number of bases or grillages (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F3 23	(g)	Building in and grouting anchor bolts and the like shall be enum stating the length of the bolt and the mix of the grout. Temp boxings or wedges to form holes or mortices for anchor bolts shall be enumerated or they may be given in the description of building in. (Acc) (Cut)(D) (Enu) (SL) (Loc) (W) (Wp)	F10	2	Anchor bolts and other fixing devices shall be enum and described stating where cast into concrete. Temp boxings or wedges to form holes or mortices shall be enumerated. Any cutting of concrete and making good for the devices shall be given in accordance with clause F9.9-10. The separate parts of any two part connecting devices shall be given with the structural works to

					which they relate (Acc) (Cut)(D) (Enu) (SL) (Loc) (W) (Wp)
F4 24	(a)	Large machine bases (ie over 0.15 cu m ea) shall be given in cu m. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	19	Concrete categories: Machine bases and similar small units, stating the number. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
25	(b)	Small machine bases (ie ne 0.15cu m ea) shall be enum stating the size. (Acc) (D) (Enu) (SL) (L)			
F5 26	(a)	Beds over 300mm thick shall be given in cu m. Those ne 300 thick shall be given in sq m stating the thickness (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	8	Concrete categories: Beds, which shall be deemed to include thickenings but to exclude upstands, stating the thickness as clause F5.2. Beds forming roads footpaths and pavings shall each be so described. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F5 27	(b)	Beds laid to slopes ne 15° from horiz and those laid to slopes over 15° from horizontal shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)			
F5 28		Beds laid in bays shall be so described stating the average size of bays. Fmwk between the bays shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
F5 29		Beds intended to form a base for granolithic paving (or other similar paving) laid whilst the base is in an unset condition shall be so described . (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F4	7	Beds, slabs or other members to receive a further finish applied while the base is in an unset condition, laid to slopes ne 15° from horiz or ... over 15... shall each be so desc.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F6 30		Roads, footpaths & pavings shall ea be so desc & given in accordance with the rules for beds in clause 5 hereof (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
Editions 5m and 6					
F7 31	(a)	(I)Suspended floors, roofs and the like (measured over all bearings and grouped together) shall be given in sq m stating the thickness. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	9	Suspended slabs which shall be deemed to inc beams, casings to steel beams and thickenings but to exclude upstands etc, stating the thickness as

					clause F5.2 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F6	10	Coffered or trough slabs shall be given sep & so desc stating the overall thickness as clause F5.2. The vol of troughs or coffer shall be dtd. Solid conc ne 500mm wide to ribs or margins of troughed or coffered slabs deemed to be inc with the items but similar work over 500mm wide tb given sep in accordance with clause F6.9 (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)
			F6	12	Walls, which are deemed to include kickers, attached columns and pilasters, stating the thickness as clause F5.2 and sub-divided into: (a)Walls (b)Walls ne 1.50m high Manhole walls Walls of horizontal or sloping ducts occurring in beds or slabs. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F7 32	(a)	(II)(Suspended floors, roofs, etc) Those laid around or between steel filler joists (measured over the fillers) shall be so described. (Acc) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)	F9	4	Working conc ard pipes or cables of panel heating systems tb msd the area of the system and given in sq m as EO the conc work concerned. (Acc) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)
F7 33	(a)	(Suspended floors, roofs etc) (III)Classification shall be as follows:- (i)Horizontal (ii) Sloping ne 15° from horiz. (iii)Sloping over 15° from horiz. (iv)Vertical (R)			
F7 34	(b)	Curved roofs, conical roofs, spherical roofs & elliptical roofs shall each be so desc. irrespective of radius. Haunchings tb given in cu m (Acc)			

		(D) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)			
F7 35		Tops and cheeks of dormers (grouped together) shall be given in sq m stating the thickness. (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)	F6	17	Tops and cheeks of dormers stating the thickness as clause F5.2 (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)
F7 36		Isolated suspended hearths shall be enumerated stating the size. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)			
F8 37	(a)	Measurements of wls shall be taken bet attached piers or pilasters. The thickness of attached piers or pilasters shall be taken as the combined thickness of the wall & the attached pier or pilaster. Attached or isolated piers, pilasters and the like (except where caused by openings) having a length on plan ne 4 times the thickness shall be classified as columns. Those having a length over 4 times the thickness and those caused by opgs in walls shall be classified as wls.			
F8 38	(b)	(i)Walls over 300mm thick shall be given in cu m. Those ne 300mm thick shall be given in sq m stating the thickness. (Acc) (CU)(D) (Enu) (SL) (Loc) (R) (W) (Wp)			
F8 39	(b)	(ii)Retaining wls shall be so desc.			
Editions 5m and 6					
F8 40		Projections on wls (msd beyond the face of the wl) to form cornices bands and the like (grouped together) shall be given in linear m stating the size. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
F8 41		Conc filling to hollow walls shall be given in sq m stating the thickness. Splying the top edge shall be deemed to be inc with the item (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)	F6	18	Filling to hollow walls stating the thickness as clause F5.2 (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)
F9 42		(i)Casings to steel beams, lintels, stanchions & the like shall each be given sep in cu m stating the sectional area in stages as Clause F1 (h) hereof. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	14	Deep beams and deep casings to steel beams, whether isolated or not shall each be given separately stating the cross sect area as clause F5.1. Deep beams and deep casings shall be so described when depth/width ratio exceeds 3:1, the depth of projection

43	(ii)Floor beams & roof beams shall be measured below the slab.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)				being measured below the slab.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
44	(iii) voids in boxed or tubular steelwork shall not be deducted unless the sectional area of the void is over 0.05 sq m. (N)				
45	(iii)Projections shall be added to the appropriate items. (Inc)				
46	(iv)Horiz members & sloping members not 15° from horiz (grouped together) shall be so desc. (R)				
47	(v)Vert members & sloping members over 15° from horiz (grouped tog) shall be so desc. (R)				
F10 48	(i)Beams, lintels, columns and the like shall each be given separately in cu m stating the sectional area in stages as Clause F1(h) hereof. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	13		Isolated beams and casings to isolated beams, which shall be deemed to include projections, shall each be given separately, stating the number and cross sectional area as clause F5.1 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
		F6	15		Isolated columns and isolated casings to steel columns which shall be deemed to include kickers, shall be each given separately, stating the cross sectional area as clause F5.1 and the number of columns. In the case of continuous columns, each storey height shall be regarded as a separate column. Isolated columns shall be so defined when their length on plan does not exceed four times their thickness (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F10 49	(ii)Floor beams and roof beams shall be measured below the slab. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)				See F6.9 above (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)

50		(iii) Projections shall be added to the appropriate items. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			See F6.13 above. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
51		(iv) Horizontal members and sloping members ne 15° from horizontal (grouped together) shall be so desc.			
52		(v) Vertical members & sloping members over 15° from horiz (grouped together) tb so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)			
F11 53	(a)	Steps staircases and strings (grouped together) shall be given in cu m (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F6	16	Concrete categories: Steps and staircases which shall be deemed to include strings and associated landings. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
F11 54	(b)	Solid balustrades and landings shall each be given separately in sq m stating the thickness (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			See F6.16 above. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F12 55		Kerbs shall be given in lin m stating the size. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F6	11	Concrete categories: Upstands and kerbs (excluding wall and column kickers) stating the cross-sectional area as clause F5.1 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F6	20	Concrete categories: Filling to pockets of a volume ex 0.10 m³ stating the number. (Acc) (D) (Enu) (Loc) (W) (Wp)
			F6	21	Concrete categories: Filling to pockets of a volume ne 0.10m³ shall be enumerated irrespective of size. (Acc) (D) (Enu) (Loc) (W) (Wp)
			F7	1	Day joints shall be deemed to be inc in the work.
			F7	2	Designed jts inc those required to be of special profile, or which incorporate water stops, expansion or compression jointing material or

					<p>which are required in the formation of bays shall be giving (sic) in metres or where of complex shape may be enumerated. Designed joints occurring at the boundaries of the work shall be so described. Except in the case of joints which can be adequately described a bill diagram showing the profile of the joint shall be given. Particulars of the following shall be given in the description:</p> <p>(a)Formwork</p> <p>(b)Treatment of r/f crossing the joint</p> <p>(c)Water stop, expansion or compression jointing and pointing material.</p> <p>(Acc) (D) (Enu) (Loc) (Ls) (Sh) (W) (Wp)</p>
			F7	3	<p>Welded or purpose made angles or intersections of water stops or expansion or compression jointing material shall be described and enum. All other angles intersections and ends shall be deemed to be included</p> <p>(Acc) (D) (Enu) (Loc) (Ls) (Sh) (W) (Wp)</p>
F13 56		<p>Finishes (measured on the exposed face which are cast on to the concrete by lining formwork with the required mix (eg granolithic; cast stone; mosaic; terrazzo) shall be given in sq m as EO the concrete stating the mix and the thickness of the finish. (Acc) (D) (Enu) (EO) (SL) (Loc) (O) (W) (Wp)</p>	F8		<p>Finishes (measured on the exposed face which are cast on to the concrete by lining formwork with the required mix shall be so described, distinguishing between sides, soffits and upper surface and given in sq m as EO the concrete stating the mix and the thickness of the finish. (Acc) (D) (Enu) (EO) (SL) (Loc) (O) (W) (Wp)</p>
F14 57	(a)	<p>Treating the surface of unset concrete over 300mm thick (eg grading to falls; grading to cross falls; grading to cambers; grading to slopes; tamping; trowelling) shall be given in sq m. Such treatments to the surface of unset concrete ne 300mm thick shall be given in the description . (Acc) (D) (Enu) (F) (SL) (Loc) (R) (W) (Wp)</p>	F9	3	<p>Treating the surface of unset concrete shall be described and given separately in sq m for each type of treatment.(Acc) (D) (Enu) (F) (SL) (Loc) (R) (W) (Wp)</p>

F14 59	(b)	Working concrete and pipes or cables of panel htg systems to be given in sq m. (Acc) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)	F9	4	Working conc and pipes or cables of panel htg systems to be the area of the system and given in sq m as EO the concrete work concerned. (Acc) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)
F14 60		Forming channels and chases in the surface of unset concrete shall be given in lin m stating the shape, the width and the depth. Channels and chases shall be so described. Channels and chases requiring additional concrete shall be so desc stating the size of the additional conc. Fmwk shall be given in the desc. Ends, angles, intersections and outlets shall each be enu separately. (Acc) (D) (Enu) (SL) (Loc) (Inc) (Ls) (Sh) (T) (W) (Wp)	F9	7	For the formation of channels, chases, pockets and holes in unset concrete, see Formwork section
F15 61		Expansion joints in conc shall be given in lin m stating the size. Formwork shall be given in the desc (D) (Enu) (SL) (Loc) (W) (Wp)			
F16 62		Fixing slips, metal clips and the like shall each be enu separately stating the method of fixing. (Enu)			
		Reinforcement			
F17 63	(a)	Particulars of the following shall be given:- (i) Kind and quality of steel	F11	1	Particulars of the following shall be given (a) Kind and quality of steel
					(b) Section of bars if other than plain circular
F17 64	(a)	(ii) Any tests of the bars		1	Tests of the bars
F17 65	(a)	(iii) Any restrictions as to hot or cold bending		1	restrictions on bending
F17 66	(b)	(i) Bar reinforcement (measured as executed) shall be given in kg stating the size. Each size shall be given separately. Bends, hooks, tying wire, distance blocks and ordinary spacers shall be given in the description. No allowance in calculating the weight of reinforcement shall be made for tying wire, ordinary spacers or rolling margin. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F11	2	Bar reinforcement shall be given in tonnes stating the diameters. Each diameter shall be given separately.
				3	Bends, hooks, tying wire, distance blocks and ordinary spacers shall be deemed to be inc No allowance in calculating the weight of reinforcement shall be made for tying wire, ordinary spacers or rolling margin. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)

F17 67	(b)	(ii) Classification shall be as follows:- (i)In foundations and bases (grouped together) (ii)In machine bases (iii)In beds (iv)In roads, footpaths and pavings (grouped together) (v)In floors roofs and the like (grouped together) (vi)In walls (vii) In casings to steelwork (viii) In beams, lintels, columns, steps, staircases and strings (grouped together). (Acc) (D) (Enu) (SL) (Inc) (Loc) (O) (W) (Wp)	F11	4	Classification of bar reinforcement shall be as follows: (a)in foundations which shall be deemed to include column and pier bases, ground beams etc. (b)Ground slabs, deemed to inc beds, roads, etc Suspended slabs, deemed to inc beams kerbs etc. Walls, deemed to inc attached columns (c)Casings to steel cols & beams (d)Steps staircases strings and landings (e)Tops and cheeks of dormers (f)Machine bases (g)Isolated columns beams and lintels. (Acc) (D)
			F11	5	Within the above categories, the following shall be shown separately: Straight and bent bars, which shall be deemed to include hooked bars (grouped together)
F17 68	(c)	Bars over 10 m long shall be so described stating the length in further stages of 2m (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F11	6	Horizontal bars and bars sloping not more than 30° from the horizontal (grouped together) over 12m long shall be so described stating the length in further stages of 3m. (Acc) (D) (Enu) (SL) (Loc) (O) (R) (W) (Wp)
			F11	7	Vertical bars and bars sloping more than 30° from the horizontal (grouped together) over 5m long shall be so described stating the length in further stages of 3m. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)

F17 69	(d)	Bars specially bent to curve shall be so desc irrespective of radius. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)	F11	5	Curved bars irrespective of radius (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)
F17 70	(e)	Twisted bars or bars of special section shall be so desc			
F17 71	(f)	High tensile steel bars shall be so described			
F17 72	(g)	Links, stirrups, binders and special spacers (eg steel chairs to support top steel in thick slabs) and the like (grouped together) shall be given in kg stating the size. Each size shall be given separately. Bends and hooks shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F11	5	Links stirrups binders and special spacers, defined as designed spacers not at the contractor's choice, and the like, grouped together. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
			F12	1	Fabric reinforcement. Particulars of the following shall be given: (a)Kind and quality of steel (b)Section of bars making up the fabric if other than plain circular Tests of fabric Restrictions on bending
F18 73	(a)	(i)Fabric reinforcement shall be measured as the area covered but no allowance shall be made for laps . (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F12	2	Fabric reinforcement shall be measured as the area covered. No allowance shall be made for laps and no deduction shall be made for voids not ex 1.00m. Tying wire and distance blocks shall be deemed to be included (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
74	(a)	(ii) and no deduction shall be made for voids not exceeding one sq m			See F12.2

75	(a)	(iii)Bends, tying wire and distance blocks shall be given in the description .			See F12.2
76	(b)	Fabric reinforcement shall be given in sq m stating the mesh, the weight per sq m and the minimum extent of side & end laps. Classification shall be in accordance with the rules of bar reinforcement in Clause F17(b) hereof. .	F12	3	Fabric reinforcement shall be given in sq m stating the mesh, the weight per sq m and the minimum extent of side & end laps. Classification shall be in accordance with the rules of bar r/f in Clause F11.4. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
77		Strips reqd tb in one width (eg in fdns under walls; in tension strips to flrs & roofs) tb given in lin m stating width, mesh, wt/sq m & min extent of end laps (Acc)(D)(Enu) (SL) (Loc) (O) (W) (Wp)	F12	4	Strips reqd tb in one width tb given in m stating width, mesh, wt per sq m, direction of main bars & min extent of end laps(Acc) (D) (Enu) (SL)) (Loc) (O) (W) (Wp)
78		Self-centering fabric reinforcement shall be so described. Temporary strutting shall be given in the desc and where over 3.50m high shall be so described stating the height in further stages of 1.5 m . (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (O) (R) (Rad) (W) (Wp)	F12	5	Self-centering fabric reinforcement shall be so described. Temporary strutting shall be given in the desc and where exceeding 3.50m high shall be so described stating the height in further stages of 1.50 m (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
F19 79	(a)	Raking cutting and curved cutting on fabric reinforcement shall each be given separately in lin m stating the mesh and the weight of the fabric. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (O) (R) (Rad) (W) (Wp)	F12	6	Raking cutting and curved cutting on fabric reinforcement shall each be given separately in m stating the mesh and the weight of the fabric. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (O) (R) (Rad) (W) (Wp)
			F12	7	Where the size of the bars exceeds 4mm dia bending fabric r/f shall be given in m stating the mesh and the size of the bars to be bent. Notching fabric r/f and obstructions shall be deemed tb inc. (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (O) (R) (Rad) (W) (Wp)
80	(b)	Notching fabric reinforcement around obstructions shall be enumerated irrespective of size (Cut)			See F12.7 above

Formwork					
			F13	1	Formwork shall be grouped in the following categories: (a) Foundations and beds (b) Slabs staircases and associated features Walls and associated features Isolated features (CU)
F20 81	(a)	(I) Formwork shall be measured as the actual surfaces of form structure which require to be temporarily supported during the deposition of the concrete, including the upper surfaces of the work sloping more than 15° from the horizontal. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)	F13	2	Formwork shall be measured to the structure which requires to be temporarily supported during the deposition of the concrete. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
82	(a)	(II) Where the face of the concrete is troughed or similarly shaped, the method of measuring the formwork shall be stated (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)	F15	4	(i) Formwork to soffits of coffered, troughed or similar shaped slabs shall be described & given in m ² stating the number of separate surfaces in each item. Such work shall be measured as to a plain surface, the profiles or pan type and size being stated. (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp) (ii) Formwork to ribs or margins of coffered or troughed slabs not more than 500 wide shall be included with the item. Where such work exceeds 500mm wide formwork shall be given separately as clause F15.1 or 2. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
83	(a)	(III) No allowance shall be made for overlaps and passings at angles			

84	(a)	(IV)No ddts shall be made for the following (IV)(i)Voids ne 1sq m (N)	F13	3	No deductions shall be made for voids n.e 5 m ² (N)
85	(a)	No ddts shall be made for the following; (IV)(ii)Intersections of main beams with wls or columns (IV)(iii)Intersections of secondary beams with main beams	F15	5	(vi)Where beams or beam casings pass subsidiary beams or column heads no deductions shall be made and a separate item shall not be measured, but such intersections shall be deemed to constitute the beginning of an additional member
86			F15	5	(vii)Formwork to ends of members shall be deemed to be inc with the items.
			F15	6	Formwork to kickers for walls shall be given in metres stating the number. Where one or both sides of formwork to kickers are required to be suspended this shall be stated. Where the height of a kicker is at the discretion of the contractor this shall be stated., (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F20 87	(b)	Battens, struts, reversed cut strings, bolting, wedging, easing, striking and removing shall be deemed to be included with the formwork.			
88	(c)	Formwork to curved surfaces, conical surfaces & spherical surfaces shall each be so desc stating the radius. Fmwk to elliptical surfaces and other surfaces curved to more than one radius shall be so desc stating the radii. Curved linear items of formwork shall be so described stating the radius.(Acc) (D) (Enu) (SL) (Loc) (Rad) (W) (Wp)	F13	6	Formwork to curved surfaces shall be described stating the geometrical nature and the radius or radii (Acc) (D) (Enu) (SL) (Loc) (Rad) (W) (Wp)
89	(d)	Formwork coated with a retarding agent shall be so desc. (F) (Inc)	F13	4	Formwork coated with a retarding agent shall be so desc. (F) (Inc)

90	(e)	Formwork left in shall be so desc (Inc)	F13	5	Formwork left in shall be so desc (Inc)
91	(f)	Wrought fmwk shall be so desc (F)			
			F13	7	Fmwk to soffits less than 1.00m high shall be do desc.(Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
92	(g)	Making good exposed faces of concrete after removal of formwork (eg cutting off proj fins; filling in small voids; brushing to expose the aggregate) shall be given in the description of formwork. (F)			
F21	(a)	(I)Formwork to surfaces (other than those mentioned in Clauses F22 to F25 hereof) shall be given in sq m .			
F21 93	(a)	(II)Formwork required to be lined with a particular material (eg wallboard; hardboard; plywood; paper) shall be so described. (DW)	F13	9	Any requirements as to special surface features of the concrete face shall be given and where such requirements apply to part only of the work the finish shall be described. (DW)
94		(III)Lining material which is required to be left in position on the concrete shall be given separately in sq m stating the method of securing. (DW)			Lining material which is required to be left in position as a finish to the concrete shall be so described stating the method of securing to the concrete. (DW)
			F13	11	No distinction shall be made between recesses which may be achieved by the insertion of fillet or battens and those which may be achieved by boxing to shape.
95	(a)	(IV)Classification of formwork shall be as follows:- (i)To horizontal soffits of floors, roofs, landings and the like (grouped together) (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F15	1	Fmwk to soffits of slabs, staircases and landings tb given in m ² stating the number of separate surfaces in each item. Classification tb as: (a)Horizontal (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
96	(a)	ii)To sloping soffits of floors, roofs, staircases & the like (grouped together)			(b)Sloping ne 15° from horizontal

		(Acc) (CU) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp)			(Acc) (CU) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp) (c)Sloping over 15° from horizontal (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp)
97	(a)	(iii)To sloping upper surfaces of floors, roofs and the like where more than 15° from horizontal (grouped together). (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp)	F15	3	Fmwk to sloping upper surfaces of slabs where more than 15° from horizontal to be given in m ² stating the number of separate areas in each item (Acc) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp)
98	(a)	(iv)To vertical or battering sides of fdns, ground beams, large machine bases & the like (grouped together) (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (T) (W) (Wp)	F14	1	To edges and faces of fdns (which shall be deemed to include bases pile caps and beds) and formwork to ground beams where ex 1.00 m high shall each be given sep in sq m Where not ex 1.00m high they shall be given in m stating the height in the following categories: Ne 250mm high 250-500mm high 500mm-1m high (Acc) (CU) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)
			F14	2	Except where the item can be adequately described a bill diagram showing the profile of the concrete shall be given.
99	(a)	(v)To vertical or battering sides of walls, solid balustrades & the like (grouped together) (Acc) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)	F16	1	(i)Formwork to faces of walls shall be given in m ² stating the number of separate surfaces in each item, distinguishing those interrupted by projections and stating whether vertical or battered (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp) (ii)Formwork inside stair wells and lift wells shall each be given

					separately, (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)
			F16	2	Vertical surfaces requiring formwork ex 3.50 m high shall be given as EO the formwork in which they occur, (Acc) (D) (Enu) (EO) (SL) (Loc) (W) (Wp)
			F16	3	Where formwork is required to one side of a wall only this shall be stated and the method of upholding the other face shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (M) (W) (Wp)
100	(a)	(vi)To vertical or battering sides of stanchion casings, columns, piers, pilasters & the like (grouped together) (Acc) (D) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)	F17	2	Formwork to isolated columns and column casings defined as columns and column casings not contiguous with a wall and where their length on plan does not exceed four times their thickness, shall be given separately in accordance with clause F16.6 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F16	4	No deduction of formwork shall be made for kickers. (DW)
101	(a)	(vii)To sides and soffits of openings in wls, recesses in wls, projecting panels on wls & the like (grouped together) (Acc) (DW) (Enu) (SL) (Loc) (W) (Wp)			
			F16	5	Formwork to projections (which shall be deemed to include cornices, attached beams and attached beam casings grouped together) and recesses shall be given separately in m stating the number of members or recesses in each item. Where part of the length of a beam or beam casing has a different profile to the

					<p>remainder an item shall be given in metres as extra over.</p> <p>Such members or recesses shall be classified as:</p> <p>(a)Horizontal</p> <p>(b)Sloping ne 15° from horizontal</p> <p>Sloping over 15° from horizontal.</p> <p>Except in the case of members which can be adequately described each cross section shall be accompanied by a bill diagram showing the required profile of the concrete member or recess and its relationship to the wall. The size of plain rectangular sections and the size at each end in the case of tapering members shall be given</p> <p>Where projections pass subsidiary beams or column heads no deduction shall be made and a separate item shall not be measured, but such intersections shall be deemed to constitute the commencement of an additional member.</p> <p>Formwork to ends of members shall be deemed to be included with the items. (Acc) (CU) (DW) (Enu) (SL) (Loc) (R) (T) (W) (Wp)</p>
102	(a)	(viii)To sides and soffits of dormers, gables & the like (grouped tog) (Acc) (DW) (Enu) (SL) (Loc) (R) (W) (Wp)			
103	(a)	(ix)To sides and soffits of horizontal beam casings, beams, lintels and the like (grouped together) (Acc) (DW) (Enu) (SL) (Loc) (W) (Wp)	F15	5	Formwork to attached beams, attached beam casings, strings, upstand beams recesses and projecting eaves shall each be given separately in metres stating the number of members or recesses in each item. (Acc) (DW) (Enu) (SL) (Loc) (W) (Wp)
104	(a)	(x)To sides and soffits of sloping beam casings, staircase strings and the like (grouped together) (Acc) (DW) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			

			F16	6	<p>Formwork to pilasters (which shall be deemed to include attached columns and attached column casings grouped together) and recesses shall each be given separately in m stating the number of members or recesses in each item. Formwork to edges of openings in association with columns shall be given with the column formwork. Where part of the height of any member or recess has a different profile to the remainder an item shall be given in m as EO.</p> <p>Except in the case of members which can be adequately desc each cross section shall be accompanied by a bill diagram showing the required profile of the conc member or recess and its relationship to the wall. The size of plain rect sections and the size at each end in the case of tapering members shall be given. No ddt shall be made for beam intersections. Fmwk to ends of members shall be deemed to be included in the items</p> <p>(Acc) (D) (Enu) (EO) (SL) (Loc) (R) (Sh) (W) (Wp)</p>
			F16	7	<p>Formwork to complex or shaped members, isolated corbels, pilaster heads and to form mortices or holes shall each be enumerated and except in the case of items which can be adequately described shall be accompanied by bill diagrams showing the size and shape of the concrete member, mortice or hole concerned and its relationship to the wall. The size of holes shall be given in accordance with clause F15.7. Formwork to holes exceeding 4.00m in girth shall be measured in accordance with clause F16.8 ,</p> <p>(Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)</p>
			F16	8	<p>Formwork to ends, sloping tops or soffits of walls and also to the perimeters of openings exceeding 4.00m girth (where not associated with columns) shall each be given in metres stating the width and except in the case of edges which can be adequately described shall be</p>

					accompanied by a bill diagram showing the profile of the concrete. The profile or width at each end in the case of tapering surfaces shall be given. , (Acc) (D) (Enu) (SL) (Loc) (R) (Sh) (T) (W) (Wp)
105	(a)	(xi)To sloping upper surfaces of beam casings, beams, staircase strings and the like where more than 15° from horiz. (grouped together) (Acc) (D) (Enu) (SL) (Loc) (O) (R) (T) (W) (Wp)			
F21 106	(b)	Formwork to soffits requiring strutting over 3.5 m high shall be so desc stating the ht in further stages of 1.5m . (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F13	8	Formwork to soffits or soffits of beams over 3.5 m high shall be so desc stating the ht in further stages of 1.5m . (Acc) (D) (Enu) (SL) (Loc) (O) (W)
107		Formwork to soffits of solid concrete floors or solid roofs over 225mm thick shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
108		Fmwk to isolated beam casings and isolated beams (ie detached from concrete floors or roofs) shall be so described (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F17	1	Formwork to isolated beams and beam casings, defined as beams or beam casings not contiguous with a slab, staircase or wall, shall be given separately in accordance with clause F15.5. (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F22 109	(a)	Formwork to edges and risers shall be given in lin m stating the width. Classification shall be as follows:- (i)To edges of beds, roads, footpaths, pavings & the like (grouped together) (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)#			
110		(ii)To edges of suspended floors, landings and roofs (grouped together)(Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)	F15	5	(ii)Formwork to edges of slabs in association with downstand beams or projecting eaves shall be given with the beam or projecting eaves formwork. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp) (iii)Where part of a beam or beam casing has a different profile to the

					<p>remainder, an item shall be given in metres as EO. Such members or recesses shall be classified as (a) Horizontal, (b)Sloping ne 15° from horizontal, Sloping over 15° from horizontal</p> <p>(Acc) (D) (Enu) (EO) (SL) (Loc) (O) (W) (Wp)</p>
			F15	8	<p>(iv)Except in the case of members which can be adequately described each cross section shall be accompanied by a bill diagram showing the required profile of the concrete member or recess and its relationship to the slab, wall or staircase. (v)The size of plain rectangular sections and the size at each end in the case of a tapering member shall be given</p> <p>(i)Formwork to edges of slabs (where not associated with downstand beams or projecting eaves), steps in tops of slabs, steps in soffits of slabs and to risers of staircases shall each be given in m stating the depth in the following categories:</p> <p>Ne 250 mm deep</p> <p>250-500mm deep</p> <p>Where exceeding 500mm deep, the depth tb stated</p> <p>(ii)Except in the case of edges which can be adequately described, the description shall be accompanied by a bill diagram showing the profile of the concrete. The profile or height at each end in the case of tapering surfaces shall be given. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)</p>
111		(iii)To sides of kerbs & upstands (grouped together) (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)			
112		(iv)To risers of steps and staircases (grouped together) (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)			(iii)Formwork to edges of staircase flights shall be given in metres stating max width .(Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)

					<p>(iv) Ends of risers abutting walls shall be enu</p> <p>(Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)</p>
			F15	7	<p>Formwork to complex or shaped members, and to form mortices or holes shall each be enumerated and except in the case of items which can be adequately described shall be accompanied by bill diagrams showing the size and shape of the concrete member, mortice or hole concerned and its relationship to the slab or staircase. The size of holes shall be given classifying the girth as follows:</p> <p>Not ex 1.00m</p> <p>1.00m – 2.00m</p> <p>2.00m – 4.00m</p> <p>Where ex 4.00m the size shall be stated</p> <p>(Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)</p>
F22 113	(b)	Formwork to edges and soffits of projecting eaves (grouped together) shall be given in lin m stating the girth. (Acc) (D) (Enu) (SL) (Loc) (Sh) (W) (Wp)			
F23 114		Formwork to projecting or sunk bands, cornices and the like (grouped together) shall be given in lin m as EO the formwork in which they occur stating the girth (Acc) (CU) (D) (Enu) (EO) (SL) (Loc) (O) (T) (W) (Wp)			
F24 115	(a)	Fmwk to throats, grooves, chases, rebates, chamfers over 50mm wide, splayed int angles over 15mm wide, mouldings, etc shall ea be given sep in lin m stating size. Plain stops deemed to be inc with formwork but stops which are splayed or moulded shall each be			

		enum sep. (Acc) (CU) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)			
116	(b)	Forming chamfers ne 50mm wide and forming splayed int angles ne 15mm wide shall be given in the description of the formwork in which they occur. (Acc) (CU) (D) (Enu) (EO) (SL) (Loc) (O) (T) (W) (Wp)			
F25 117	(a)	Fmwk to proj caps and bases of pilasters & columns (grouped together) shall be enumerated as EO the formwork in which they occur stating the size (Acc) (CU)(D) (Enu) (EO) (SL) (Loc) (O) (T) (W) (Wp)			
118	(b)	Fmwk to ends of kerbs, cantilevers, brackets and steps (grouped together) shall be enumerated stating the size (Acc) (CU)(D) (Enu) (EO) (SL) (Loc) (O) (T) (W) (Wp)			
119		Fmwk to small machine bases and isolated suspended hearths shall each be enumerated separately stating the size. (Acc) (D) (Enu) (EO) (SL) (Loc) (O) (T) (W) (Wp)			
F26 120	(a)	Raking cutting and curved cutting shall each be given separately in linear m. (Acc) (D) (Enu) (SL) (Loc) (O) (R) (Rad) (W) (Wp)	F13	10	Raking cutting and curved cutting shall each be given separately in linear m where items are measured superficial (Acc) (D) (Enu) (SL) (Loc) (O) (R) (Rad) (W) (Wp)
121	(b)	Splayed edges and notches shall be deemed to be inc with the fmwk items.			
122		Cutting and fitting fmwk around projecting members which will be cast in (eg pipes; continuity bars) shall be enumerated singly or in groups. (Cut) (D) (Enu) (O)	F13	12	Cutting and fitting around projecting pipes, continuity bars and the like shall be grouped together and enumerated irrespective of size (Cut) (D) (Enu) (O)
		Pre-cast concrete units			
F27	(a)	For rules relating to Section F generally see Clause F1 hereof			
	(b)	Precast units shall be given under an appropriate heading	F18	1	Precast units including floors shall be given under an appropriate heading and shall unless otherwise required be enumerated (Enu)

123	(c)	Particulars of the following shall be given:- (i)Kind, quality and size of reinforcement (ii)Shape of cross section of unit (iii)Nature and extent of surf finish (iv)Composition & mix of jointing and bedding mats (v)Method of fixing (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F18	2	Particulars of the following shall be given:- (i)Kind, quality and size of reinforcement (ii)Shape of cross section of unit (iii)Nature and extent of surf finish (iv)Composition & mix of jointing and bedding mats (v)Method of fixing (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
124	(d)	Formwork or moulds for precast units shall be deemed to be inc with the items (T)	F18	3	Formwork or moulds for precast units shall be deemed to be inc with the items (T)
			F18	4	Work required to be designed by the contractor shall be given in accordance with clauses F40 - 44
			F18	5	Prestressed precast units shall be given in accordance with clauses F33-39
125	(e)	Precast units over 2m long shall be so described stating the number. (CU) (D) (Enu)			
F28 126		Structural units (eg stanchions; beams; purlins; trusses) shall each be enumerated separately stating the size (CU) (D) (Enu)			
F29 127	(a)	(i)Partitions given in sq m stating thickness & no of units (CU) (D) (Enu) (ii)Curved partitions so desc stating mean radius (CU) (D) (Enu) (Rad) (iii)Concrete blocks , see section G			
128	(b)	Irregular units (CU) (D) (Enu) (Sh)			

129		Angles etc (CU) (D) (Enu) (Ls)			
		Notches etc (CU) (D) (Enu) (Sh)			
F30	(a)	(i) Posts & heads to ptns given sep in lin m stating extreme size & no of units. (CU) (D) (Enu)			
	(a)	(ii) Those cast on tb so desc. (CU) (D) (Enu) (Sh)			
	(a)	(iii) Curved members so desc. (CU) (D) (Enu) (Rad)			
	(a)	(iv) Fair ends, rounded ends, dowelled ends & the like tb enum (CU) (D) (Enu) (Sh)			
	(b)	Tapped sockets & blocks tb enum (CU) (D) (Enu) (Sh)			
F31	(a)	Steps (except winders) shall be given in lin m stating the extreme size and the number of steps. Nosings, rebates and the like shall be given in the description. Spandril steps (ie steps with sloping soffits) shall be so described. Curved steps shall be so described stating the mean radius. Fair ends, rounded ends, wall holds, stooled ends and the like shall each be enumerated separately. (Acc) (D) (Enu) (SL) (Inc) (Sh) (T) (W) (Wp)			
	(b)	Winders, landings, solid balustrade panels and the like shall each be enumerated separately stating the extreme size. Members of irregular shape shall be so described. Nosings, rebates, fair ends, returned ends, shaped ends, wall holds and the like shall be given in the description. (Acc) (D) (Enu) (SL) (Inc) (Sh) (T) (W) (Wp)			
F32	(a)	(i) Shelves, divisions etc >300mm wide in sq m (Enu)			
	(a)	(ii) Shelves ne 300mm wide in lin m (Enu)			
	(a)	(iii) Members irreg & curved enum (Enu)			
	(b)	(i) Fair edges etc in lin m (Enu)			
	(b)	(ii) Stops etc deemed inc (Enu)			

	(c)	Notches etc enum (Enu)			
F33		(i)Kerbs etc in lin m (Enu)			
		(ii)Curved members tb desc stating rad (Rad)			
		(iii)Fair ends etc tb enum (Enu)			
F34		Sills, lintels, copings and the like shall each be given separately in lin m stating the size. Curved members shall be so described stating the mean radius. Fair ends, stooled ends, returned ends, angles and the like shall each be enumerated separately. (Acc) (D) (Enu) (SL) (Loc) (O) (Rad) (W) (Wp)	F19	1	Standard or stock pattern copings, kerbs, channels and other similar units end jointed to form continuous runs shall each be given separately in metres stating the size and catalogue or other reference number. Curved members shall be so desc stating mean radius. Fair ends, rdd ends, Ls, intersections and the like shall each be enu se. (Acc) (D) (Enu) (SL) (Loc) (O) (Rad) (W) (Wp)
			F19	2	Purpose-made copings, kerbs, channels and other similar units of length to be determined by the Contractor end-jointed to form continuous runs shall be measured in accordance with clause F19.1 except that each item unless it can be adequately described shall be accompanied by a bill diagram showing the required profile. Where the individual units are required to be of specific length they shall be given in accordance with clause F21.
F35		Templates etc enum (D) (Enu)			
F36		Pier caps etc enum (D) (Enu)			
F37		Pavement lights, roof lights and the like shall each be enumerated separately stating the size and the shape where other than rectangular. Glass blocks shall be given in the description. (Enu) (W) (Wp) (Wt)			
F38		For precast conc tile or slab finishings to floors and walls see section U hereof	F20		Precast concrete tile or slab finishings to floors and walls shall be given in accordance w section T
			F21	1	The catalogue or other reference number of standard or stock pattern units shall be given
			F21	2	Except in the case of items which can be adequately described the description of each purpose made unit shall be accompanied by a bill

					diagram showing the size and shape of the unit
			F22		Where the design of precast units requires temporary support after placing in position details of the requirements shall be given in the description and the conditions for removal of the supports stated. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
			F23		Cast stone shall be given in accordance w Section K
			F24	1	Dowels, cramps and other fixing devices shall be enumerated and described stating where cast into concrete. (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
			F24	2	Cutting of concrete and making good shall be measured in accordance with clause F9.9-10. The separate parts of two part connecting devices shall be given with the structural work to which they relate (Acc) (Cut) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
			F25	1	Members of composite in-situ and precast construction shall be given separately under a heading in which the construction shall be described indicating the inter-relation of the different parts of the work. The total volume of in-situ concrete comprised in the work shall be given in the heading.
			F25	2	The in-situ and precast work shall each be measured in accordance with clauses F4-10 and clauses F18-24 respectively. Ribs or margins shall be given in accordance with clause F6.10
			F25	3	Prestressed work shall be given in accordance with clauses F33-39
			F25	4	Slabs required to be designed by the Contractor shall be given in accordance with clauses F40-44
F39		For cast stone see section K hereof			
		Hollow block suspended construction			

F40	(a)	For rules relating to Section F generally see clause F1 hereof			
	(b)	Hollow block construction, its reinforcement and formwork under appropriate heading	F26	1	Hollow block construction, its reinforcement and formwork under appropriate heading
		(i)Design by employer			
		(ii)Design by contractor	F26	2	Design by contractor
F41	(a)	(I) Suspended floors, roofs and the like (measured over the ribs and bearings and grouped together) shall be given in sq m in acc with clause F7 hereof (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	1	(i) Suspended slabs shall be given in sq m stating the thickness (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(II) Solid conc wk in hollow block const & filling ends of hollow blocks deemed to be inc with the items. Particulars of the following tb given:	F27	1	(ii) Solid conc wk in hollow block const & filling ends of hollow blocks deemed to be inc with the items. Particulars of the following tb given:
	(a)	(III)(i)Comp & mix of conc (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(a) Mix or strength...of conc (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(III)(ii)Thickness of slab (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(b)Overall thickness of slab (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(III)(iii)Size & type of blocks (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(c)Size & type of blocks (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(III)(iv)Distance bet centres of block rows (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(d)Dist bet centres of rows of blocks (Acc)(D)(Enu)(SL) (Loc) (W) (Wp)
	(a)	(III)(v)Size & type of slip tiles (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(e) Size & type of slip tiles (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(III)(vi)Finish to exposed soff (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F27	2	(f) Finish to top of slab and exposed soff (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
			F27	3	Classification shall be as follows: (a)Horizontal (b)Sloping ne 15° from horizontal Sloping over 15° from horizontal (CU) (R)

	(b)	Tops and cheeks of dormers (grouped together) shall be given in sq m stating the thickness (Acc) (D)(Enu) (SL) (W) (Wp)			
F42	(a)	Casings to steel supporting beams (msd below the slab) shall be given in accordance w Clause F9 hereof (Acc) (D) (Enu) (SL) (W) (Wp)			See F28.1 below (Acc) (D) (Enu) (SL) (W) (Wp)
	(b)	Concrete beams (msd below the slab) shall be given in accordance w clause F10 hereof. (Acc) (D) (Enu) (SL) (R) (W) (Wp)	F28	1	Concrete beams and casings to steel supporting beams (msd below the slab) to be given in acc w F6.13-14 (Acc) (D) (Enu) (SL) (R) (W) (Wp)
		Kerbs shall be given in lin m stating the size. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)	F28	2	Kerbs shall be given in m stating the size. (Acc) (D) (Enu) (SL) (Loc) (R) (W) (Wp)
			F29		Labours shall be in accordance with clause F9
F43		Forming hips and valleys shall each be given separately in lin m stating the thickness (Acc) (D) (Enu) (Ht) (Inc) (Loc) (R) (W) (Wp)			
F44		Reinforcement shall be given in accordance w Clauses F17 to F19 hereof (Acc) (D) (Enu) (Ht) (Inc) (Loc) (R) (W) (Wp)	F30		Reinforcement shall be given in accordance w Clauses F11 to F12 (Acc) (D) (Enu) (SL) (Inc) (Loc) (R) (W) (Wp)
F45		Fixing slips, metal clips and the like shall each be enumerated separately stating the method of fixing			See F 31 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
F46		Formwork shall be given in accordance w Clauses F20 to F26 hereof (Acc) (D) (Enu) (EO) (SL) (Loc) (O) (R) (T) (W) (Wp)	F32		Formwork shall be given in accordance w Clauses F13-17 (Acc) (D) (Enu) (EO) (SL) (Loc) (O) (R) (T) (W) (Wp)
		Prestressed concrete			
F47	(a)	For rules relating to Section F generally see clause F1 hereof			
	(b)	Prestressed concrete work (ie work where reinforcement is tensioned before or as the load is applied) and its reinforcement and associated formwork shall be given under an	F33	1	Conc members classed as prestressed where stress is artificially induced in the conc by means of tendons tensioned before working loads are

		appropriate heading. (Acc) (D) (Enu) (SL) (Loc) (N) (PP) (T) (W) (Wp)			applied. (Acc) (D) (Enu) (SL) (Loc) (N) (PP) (T) (W) (Wp)
		(i)Design by employer			
		(ii)Design by contractor	F33	3	Work tb designed by contractor in accordance w clauses F40-44
		A general desc	F33 F33	2 5	Shall be given under an appropriate heading Brief desc stating method of tensioning. Location drwgs tb provided....
			F33	4	Work of composite construction shall be given as clause F25
47	(e)	Particulars of the following shall be given:- (i)Steel wires (D) (Enu)	F33	6	(a).....particulars of the following shall be given:- (i)Steel wires (D) (Enu)
47	(e)	(ii)Type of jack			
47	(e)	(iii)Type of cones, wedges etc. (D) (Enu)			
47	(e)	(iv)Amount of tension	F33	6	(c)Amount of tension
47	(e)	(v)No. & dia of wires (D) (Enu)	F33	6	(b)No of wires tb tensioned simultaneously (D) (Enu)
47	(e)	(vi)Pre-tensioned, post tensioned etc			
47	(e)	(vii)Maturity of conc bef. release	F33	6	(d)Strength of conc at transfer of stress
47	(e)	(viii)Tests	F33	6	(e)Tests
47	(e)	(ix)Cutting off and sealing (C) (D) (Enu) XXXXXXXXXXXXXXXXXXXX	F33	6	(f)Cutting off and treating ends of wires (Cut) (D) (Enu)
			F33	7	Where tendons are tensioned after concrete is cast particulars of the following shall be given: (a)Type of jack (b)Details of anchorages & anchge fittings Tensioning from one or both ends

F48	(a)	Structural in-situ members as F10 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F34	1	In-situ concrete members as F4-10 (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
	(b)	Members cast in sections (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)	F34	2	Members cast in sections (Acc) (D) (Enu) (SL) (Loc) (W) (Wp)
		Construction joints enum (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	F34	3	Construction joints enum (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
F49	(a)	Forming & grouting. Partics of (i)sleeves, sheathing (D) (Enu) (SL) (Loc)			
	(a)	(ii)Tempy supports (T)			
	(a)	(iii)Composition of grout			
	(b)	Ducts or grooves over 6m long so desc & further stages of 3m (CU)			
	(c)	Curved sleeves (Rad)			
	(d)	Forming and grouting air holes enum (Enu)			
	(e)	Filling in jacking recesses enum (Enu)			
F50	(a)	Supplying steel wires in kg (Enu)			
	(b)	Fixing ea length enum (Enu)			
		Cones, wedges enum (Enu)			
		Tensioning enum, cutting off deemed enum			
F51		Reinforcement as F17 to 19 (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F35		Reinforcement as F11 to 12 (Acc) (D) (Enu) (SL) (Loc) (O) (R) (Rad) (W) (Wp)

F52	(a)	Formwork as F20 to 26, subject to: (i)strutting and supports, special requirements. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F36		Formwork as F13 to 17, subject to the following: (a)Additional requirements for supporting fmwk tb desc. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
	(a)	(ii)Fmwk to pre- and post-tensioned ea so desc (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F36	1	(b) Fmwk to pre- and post-tensioned ea so desc (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
	(a)	(iii)Tempy restraints given in description (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F36	1	Tempy restraints given in description (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
	(b)	Fmwk to recesses enum (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)	F36	2	Fmwk for anchorage pockets tb enu. (Acc) (D) (Enu) (SL) (Loc) (O) (T) (W) (Wp)
		Fmwk to tempy const jts enum (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)	F36	3	Fmwk to tempy const jts enum (Acc) (D) (Enu) (SL) (Loc) (O) (W) (Wp)
		Precast prestressed units			
F53	(a)	For rules relating to Section F generally see clause F1 hereof	F37	1	Precast conc generally shall be given in accordance with clause F18.
			F37		Precast conc units shall be given in accordance with clauses F21-22
	(b)	A general desc			
		(i)Design by employer			
		(ii)Design by contractor as F56 to 61			
		Particulars of the following shall be given:- (i)Steel wires as F47e (Enu)	F39	(1)	Prestressed tendons tb enu. (Enu)
			F39	2	Anchorage tb enu stating components (Enu)
		(ii)Cross section			
		(iii)Surface finish			
		(iv)Jtg & bedding mat			
	(e)	Formwork or moulds deemed inc. (T)			

F54	(a)	(I)Precast units of identical section but varying lengths (Enu)			
	(a)	(II)Units of identical section ne 3 m grouped & lengths averaged (Enu)			
	(a)	(III)Units over 10ft grouped in stages of 1.5 m (Enu)			
	(a)	(IV)Those of unusual shape so desc (Sh)			
	(a)	(V)Classification shall be as follows:- (i) Pre-tensioned in mould (Enu) (CU)	F37	3	Precast units shall be classified as follows: Pre-tensioned (Enu) (CU)
	(a)	(V)(ii)Post tensioned on ground (Enu) (CU)			Post tensioned before erection (Enu) (CU)
	(a)	(V)(iii)Cast in sections, assembled & post-tensioned before erection (Enu) (CU)			As (b) above (Enu) (CU)
	(a)	(V)(iv)Cast in sections, assembled in situ & post tensioned after erection (Enu) (CU)			Post tensioned after erection. Self supporting before and after tensioning (Enu) (CU)
	(a)	(V)(v)Post-tensioned after hoisting but capable of self support (Enu) (CU)			As above (Enu) (CU)
	(a)	(V)(vi)Post tensioned after hoisting but requiring support until tensioning comp (Enu) (CU)			Post tensioned after erection. Self supporting only after tensioning (Enu) (CU)
	(b)	Construction jts enum (Enu)	F37	5	Construction jts enum (Enu)
		Temporary supports classified as (iv) & (vi) of para a and enu (Enu) (CU) (T)	F37	6	Tempy suppts enum (Enu) (CU) (T)
F55		Cores, ducts and recesses as F49, Wires & cables as F50, r/f as F 17 to 19 (Acc) (D) (Enu) (F) (SL) (Loc) (M) (PP) (R) (Rad) (Sh) (T) (O) (W) (Wp) (Wt)	F38	1	Ducts and grooves for tendons given in m. Particulars of sleeve, tempy supports and mix of grout to be given. Ducts & grooves over 6m long tb so desc stating length in stages of 3m. Curved ducts desc sep.
				2	Vents tb enum

				3	Filling anchorage pockets to enum, stating finish
				4	(Acc) (D) (Enu) (F) (SL) (Loc) (M) (PP) (R) (Rad) (Sh) (T) (O) (W) (Wp) (Wt)
		Contractor designed construction			
F56	(a)	Construction which is to be designed and executed by the contractor. R/f and fmwk deemed inc. except as prov in F60	F40	1	Construction which is to be designed and executed by the contractor. R/f and fmwk deemed inc.
	(b)	Where the contractor's choice of design is limited, particulars given	F40	2	Where the contractor's choice of design is limited such limitations shall be stated
		The type of soffit deemed at contractor's option			
		Particulars of tests	F40	3	Particulars of tests
	(c)	Work shall be msd as executed, no dtds for voids ne 0.10 sq m (N)	F40	4	Work shall be msd as executed, no dtds for voids ne 0.10 sq m. (N)
F57	(a)	(I)Suspended floors in sq m in stages of 300mm, except that spans n.e.2m grouped tog. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)	F41	1	(I)Suspended floors in sq m in stages of 300mm, except that spans n.e.2m grouped tog. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(II)In the case of cross reinforced const., length & width of slab stated in 300mm stages. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)	F41	1	(II)In the case of cross reinforced const., length & width of slab stated in 300mm stages. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(III) The superimposed load on slabs given as 57b	F41	1	(III) The superimposed load on slabs shall be given in the desc
	(a)	(IV)Solid concrete in hollow block & filling ends deemed inc. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)	F41	1	(IV) Solid concrete in hollow block & filling ends deemed inc. (Acc) (CU) (D) (Enu) (SL) (Loc) (W) (Wp)
	(a)	(V) slabs shall be grouped & desc as follows:- (i) Isolated slabs (CU)	F41	1	(V) slabs shall be grouped & desc as follows:- (a) Slabs not connected to other slabs (CU)
	(a)	(V)(ii)End slabs (CU)	F41	1	(V)(b)Slabs connected at one end to other slabs (CU)

	(a)	(V)(iii)Intermediate slabs (CU)	F41	1	(V) Slabs conn at both ends to others (CU)
	(a)	(V)(iv)Cross reinforced isolated slabs (CU)			
	(a)	(V)(v)Cross reinforced corner slabs (CU)	F41	1	(V) Slabs conn on two adjacent edges to others (CU)
	(a)	(V)(vi)Cross reinforced side slabs (CU)	F41	1	(V)()Slabs conn on 3 edges to others (CU)
	(a)	(V)(vii)Cross reinforced middle slabs (CU)	F41	1	(V)()Cross r/f slabs conn on 4 edges to others (CU)
F57	(b)	The superimposed loads on slabs shall be given in the description as follows: (CU) (i)Weight of floor or roof finishings in kg/sq m	F41	1	See F41.1(III) above
	(b)	(ii)Weight of partns in kg/sq m of floor area (CU)	F41	1	See F41.1(III) above
	(b)	(iii)Working load and abnormal loads in kg/sq m (CU)	F41	1	See F41.1(III) above
F57		Classification of floors and roofs shall be as follows:- (CU) (i)Horizontal	F41	2	(a)Classification of slabs shall be as follows:- (CU) (i)Horizontal
		(ii)Sloping ne 15°. (R)	F41	2	(b)(ii)Sloping ne 15°. (R)
		(iii)Sloping ex 15° (R)	F41	2	(iii)Sloping ex 15° (R)
		(iv)Vertical What is a vertical roof or floor? A wall.			???
F57		Cantilevered work (T)	F41	3	Cantilevered work tb so desc (T)
F57	()	(i)Curved roofs (Rad)	F41	4	Slabs curved to any shape shall ea be desc stating radius or radii (Rad)
	()	(ii) Elliptical (Rad)			
F57	()	Haunchings, in cu m	F41	5	Haunchings, in cu m
F57	(g)	Tops and cheeks of dormers (grouped together) in sq m (DW)			
F57	(h)	Small turrets enum			

F58		Trimming floors enum as EO (Enu) (EO)	F42		Trimming ard opgs tb nenum as EO slabs stating size of opg & position relative to span (Enu) (EO)
F59	(a)	Raking cutting, lin m (R)	F43	1	Raking & curved boundaries & forming exposed edges tb given sep in m (R)*
	(b)	Working concrete ard pipes in sq m (WP)	F43	2	Working conc ard pipes or cables of panel htg systems tb msd the area of the system & given in sq m (W)
		(i)Forming channels in lin m (D)(Sh)	F43	3	(i)Forming channels and chases in m stating shape width & depth. (D)(Sh)*
		(ii)Channels to falls so desc (R)	F43	3	(ii)Channels to falls so desc (R)
		(iii)Ends, angles tb enum (Enu)	F43	3	(iii)Ends, angles tb enum (Enu)
F60	(a)	(i)Casings to steel as F9 (Loc)			
	(a)	(ii)Isolated casings so desc (Loc)			
	(a)	(iii)Bar reinforcement as F17			
	(a)	(iv)Formwork as F20 to 26			
	(a)	(v)In cases where thickness of slab is not known, a reasonable thickness tb assumed (P) (D)			
	(b)	(i)Kerbs in lin m			
	(b)	(ii)Formwork to kerbs as F22			
F61		Fixing slips etc enum (Enu)	F31		Fixing slips etc enum (Enu)
		Sundries			
F62		Hacking faces of concrete shall be given in sq m stating the purpose for which the key is required. Hacking by special means shall be so described . (Acc) (D) (Enu) (F) (SL) (Loc) (PP) (W) (Wp)	F9	5	Hacking faces of concrete shall be given in sq m stating the purpose for which the key is required..(Acc) (D) (Enu) (F) (SL) (Loc) (PP) (W) (Wp)
F63		Grinding, sand-blasting and the like treatments to the face of concrete shall each be given separately in sq m Such work to soffits shall be so desc. Such work to soffits over 3.5 m above floor shall be so desc stating the height in further stages of 1.5 m (Acc) (D) (Enu) (F) (SL) (Loc) (W) (Wp)	F9	6	Grinding, sand-blasting and similar treatments to the face of concrete shall each be given separately in sq m. Such work required with margins of a different finish shall be so desc giving in addition the total length of such areas abutting margins soffits shall be so desc. Such work to soffits shall be so desc and where over 3.5

					m high shall be kept separate stating the height in further stages of 1.5 m (Acc) (D) (Enu) (F) (SL) (Loc) (W) (Wp)
F64		Cutting grooves, chases, rebates, chamfers and the like shall each be given separately in lin m stating the size. For such details produced by formwork see clause 24 hereof. (Acc) (Cut) (D) (Enu) (Ht) (Loc) (W) (Wp)	F9	8	Channels and chases in concrete which are required to be cut shall be given in metres and except where of plain rectangular section shall be accompanied by a dimensioned bill diagram showing the required profile. (Acc) (Cut) (D) (Enu) (SL) (Loc) (W) (Wp)
F65	(a)	Holes for pipes, tubes, bars, cables and the like members (grouped together) shall be enumerated stating the size of the member as clause A4 hereof and the thickness of the concrete. Fixing pipe sleeves shall be given in the desc. (Acc) (D) (Enu) (Inc) (Loc) (T) (W) (Wp)			
	(b)	Holes for ducting, trunking, tray and the like members (grouped together) shall be enumerated stating the sectional area of the member in stages of 0.025 sq m and the thickness of the concrete. (Acc) (D) (Enu) (Loc) (T) (W) (Wp)			
F66		Mortices (other than those mentioned in clause F3(g) hereof), sinkings and the like shall each be enum separately stating the size or purpose. Running mortices with lead or mortar shall be given in the description. (Acc) (D) (Enu) (Inc) (Loc) (T) (W) (Wp)	F9	9	Mortices pockets and holes in concrete which are required to be cut shall be enum and desc, and except where the item can be adequately desc shall be accompanied by a bill diagram showing the size and shape. Any subsequent grouting tb inc in the desc stating the mix of the grout unless msd elsewhere (Acc) (D) (Enu) (Inc) (Loc) (T) (W) (Wp)
F67		Making good concrete in connection with holes and mortices shall be given in the description of such labours. Making good plasterwork and other finishings shall be given in accordance with Section U hereof. (Acc) (D) (Enu) (Loc) (W) (Wp)	F9	10	Making good in connection with channels chases mortices pockets and holes where required shall be given in the respective descriptions (Acc) (D) (Enu) (Loc) (W) (Wp)
F68		Protecting the work in this section shall be given as an item	F45		Protecting the work in this section shall be given as an item
		Brickwork & Blockwork			

		THE UNIT OF BILLING SHALL BE THE METRE			
			G1	1	A general description of the work in this section shall be given where it is not evident from the location drawings required to be provided by this document. Where the sequence of work is dictated by the design this shall be described
			G2		The following information shall be shown on the location drawings required under clause B3.1 or shall be shown on further drawings which shall accompany the bill of quantities: (a)Plan of each floor level showing the positions of and the materials to be used in all walls and partitions. (b)All external elevations showing the formation level, floor levels and the materials to be used. (Acc) (SL) (Loc) (W)
			G2	1	An item shall be given for bringing to site and removing from site all plant required for this section
			G2	2	An item shall be given for maintaining on site all plant required for this section
			G3	1	Work shall be classified as follows and each classification given under an appropriate heading: (a)Foundations (b)Load bearing superstructure (c)Non-loadbearing superstructure (CU)
G1	(a)	Brickwork and blockwork shall be measured the mean length by the average height. Fair face and facework shall be measured on the exposed face. (Acc) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)	G4	1	Brickwork and blockwork shall be measured the mean length by the average height. Fair face and facework shall be measured on the exposed face. (Acc) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)

	(a)	(i)(No deduction shall be made for) voids not exceeding 0.1 sq m (N)	G4	1	(a))(No deduction shall be made for) voids ne 0.1 sq m (N)
	(a)	(ii)(No deduction shall be made for) Flues, lined flues and flue block where the voids and the work displaced do not together exceed 0.25 sq m in sectional area. (N)	G4	1	(b)Flues, lined flues and flue block where the voids and the work displaced do not together exceed 0.25 sq m in sectional area. (N)
G1	(b)	Labours on different kinds of work shall be given separately	G4	2	Labours on different kinds of work shall be given separately
G1	(c)	Labours on old work shall be so desc	G4	2	Labours on existing work shall be so desc
G1	(d)	Curved work shall be so desc stating the mean radius. Curved fair face and curved facework shall be so desc stating the radius on face. Rough cutting within the thickness (or the provision of curved bricks or curved blocks) shall be given in the description of curved work. (Acc) (Cut) (D) (Enu) (SL) (Loc) (MsA) (Rad) (T) (W) (Wp)	G4	3	Curved work shall be so desc stating the mean radius. Curved fair face and curved facework shall be so desc stating the radius on face. The provision of curved bricks or curved blocks tb given in the desc of curved work. Rough cutting within the thickness deemed to be inc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (MsA) (Rad) (T) (W) (Wp)
G1	(e)	For work in underpinning see Section H hereof	G4	4	Work in underpinning tb given in accordance w Section H
G2	(a)	For rules relating to Section G gen, see clause G1 hereof.			
G2	(b)	Particulars of the following shall be given:- (i)Kind, type and size of bricks (ii)Type of bond (iii)Composition & mix of mortar	G5	1	Particulars of the following shall be given:- (i)Kind, quality and size of bricks. Purpose made bks tb so desc. (ii)Type of bond (iii)Composition & mix of mortar
G2		Deductions of brickwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full brick courses displaced and as regards depth to the extent only of the full half brick beds displaced. (N)	G5	2	Deductions of brickwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full brick courses displaced and as regards depth to the extent only of the full half brick beds displaced. (N)

G2		For brickwork built fair both sides or built entirely of facing bricks see clauses G24 to G28 hereof.			
G2	()	For brickwork in connection with boilers see clauses G29 to G31 hereof.			
G3	(a)	<p>Brickwork of 2 B thickness & over in each of the following classes shall be reduced to 1 B & given sep in sq m. Brickwork of under 2B thickness in each of such classes shall be given sep in sq m stating the thickness.</p> <p>Classification shall be as follows:-</p> <p>(i)Walls (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(ii)Filling old openings (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(iii)Skins of hollow walls (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(iv)Dwarf supports under fittings, tanks, pipes and the like (grouped together) (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>See clause G4 (i) below</p>	G5	3	<p>Bkk in each of the following classes tb given sep in sq m stating thickness. Walls in trenches the width of which (inc any msmts for working space in accordance with clause D12) does not exc the thickness of the wall by more than 0.50m and deeper than 1.00m from the top of the excavation to the base of the wall in each of such classes shall be given separately.</p> <p>(a)Walls (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(b)Filling existing openings. (Acc) (CU)(D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(c)Skins of hollow walls (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(d)Dwarf support walls (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(e)Projections (measured beyond the face of the wall) of footings and chimney breasts. (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p>
G3	(a)	(v)Isolated piers & chimney stacks (grouped together). Walls having a length on plan ne 4 times their thickness (except where caused by openings) shall be classified as isolated piers. (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)			(f) Isolated piers & chimney stacks (grouped together). Isolated piers defined as walls having a length on plan ne 4 times their thickness (except where caused by openings) (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)

		<p>(vi) Battering walls (ie walls of uniform thickness built battering. (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(vii) Bkk used as fmwk. Tempy strutting shall be given in the desc. (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>See clause G4 (ii) below</p> <p>(viii) Refractory brick lining to flues. (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p> <p>(ix) Brick damp proof courses (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p> <p>(x) Vaulting (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p>		<p>(g) Battering walls defined as walls of uniform thickness built battering. (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(h) Bkk used as fmwk. Tempy strutting shall be given in the desc. (Acc) (CU) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(j) Backing to masonry. Cutting and bonding to masonry shall be given in the description. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (MsA) (N) (T) (W) (Wp)</p> <p>(k) Refractory brick lining to flues. (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p> <p>(l) Brick damp proof courses (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p> <p>(m) Work in raising extg structures, stating starting ht above grd at which bkk commences. (Acc) (CU) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)</p>
G3	(b)	<p>(See clause G3(a) above) Where the thickness of work is not a multiple of ½ brick, the rough cutting shall be given in the description of work under 2B thick but shall be given in accordance w clause G10 hereof in the case of work over 2B thick (Acc) (Cut) (D) (Enu) (Inc) (SL) (Loc) (T) (W) (Wp)</p>		
G4		<p>Brickwork of any thickness in each of the following classes shall be reduced to 1B and given separately in sq m. Classification shall be as follows:</p> <p>(i) Projections (measured beyond the face of the wall) of footings, attached piers, chimney breasts, plinths, bands,</p>		

		oversailing courses etc.,(grouped together). Rough cutting for projections which are not a multiple of ½ B shall be given in accordance with clause G10 hereof. (Acc) (CU) (Cut) (D) (Enu) (Inc) (SL) (Loc) (T) (W) (Wp)	G5	4	Projections (measured beyond the face of the wall) of attached piers, plinths, bands, oversailing courses and the like,(grouped together) shall be given in metres stating the width and depth of the projection <i>See also clause G5.3.(i) above</i> (Acc) (CU) (Cut) (D) (Enu) (Inc) (SL) (Loc) (T) (W) (Wp)
G4		(ii)Backing to masonry. Cutting and bonding brickwork to masonry shall be given in the description. (Acc) (Cut) (CU) (D) (Enu) (SL) (Loc) (MsA) (T) (W) (Wp)			See clause G5.2 (j) above
G5		Brickwork of any thickness in each of the following classes shall be given in sq m stating the thickness. Cutting and bonding new to old and extra material for bonding shall be given in the desc stating any special method of bonding. Classification shall be as follows:- (i)Thickening old wls (msd beyond face of the old wl) (Acc) (Cut) (D) (Enu) (SL) (Loc) (MsA) (T) (W) (Wp) (ii)Projections on old wls (msd beyond face of the old wl) of attached piers, chimney breasts & the like (grouped together) (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G6	1	Brickwork of any thickness in each of the following classes shall be given separately. Cutting and bonding new to existing and extra material for bonding shall be given in the desc stating any special method of bonding: (a)Thickening existing wls (msd beyond face of wl) given in sq m stating the thickness. (Acc) (Cut) (D) (Enu) (SL) (Loc) (MsA) (T) (W) (Wp) (b) Projections on existing wls (msd beyond face of the old wl) of attached piers, chimney breasts & the like (grouped together) given in m stating the width and thickness (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G6		Brickwork in tapered walls (ie walls of diminishing thickness from base to top) shall be given in sq m stating the av thickness, whether one or both faces are battered and the rate of batter. Rough cutting within the thickness shall be given in the description (Acc) (Cut)(D) (Enu) (SL) (Loc) (T) (W) (Wp)	G7		Brickwork in tapering walls, defined as walls of diminishing thickness from base to top, shall be given in sq m stating the av thickness, whether one or both faces are battered and the rate of batter. (Acc) (Cut)(D) (Enu) (SL) (Loc) (T) (W) (Wp)

G7		Grooved bricks shall be given in sq m as EO the brickwork in which they occur. (EO)	G8		Grooved bricks shall be given in sq m as EO the brickwork in which they occur. (EO)
G8	(a)	Forming cavities in hollow walls shall be given in sq m stating the width of the cavity. Wall ties shall be given in the description stating the type and spacing. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G9	1	Forming cavities in hollow walls shall be given in sq m stating the width of the cavity. Wall ties shall be given in the description stating the type and spacing. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G8	(b)	Closing cavities at ends of hollow walls or at jambs of openings shall be given in lin m stating the width of the cavity & method of closing. (Acc) (Cut) (D) (DW) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G9	2	Closing cavities at ends of hollow walls and at jambs or sills of openings shall be given in m stating the width of the cavity & method of closing. (Acc) (Cut) (D) (DW)(Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G9		Brickwork in eaves filling shall be added to the general brickwork. The labour in eaves filling shall be given in lin m (measured overall) stating the thickness of the wall (Acc) (Cut) (D) (DW)(Enu) (SL) (Inc) (Loc) (T) (W) (Wp)			
G10	(a)	Rough cutting shall be given in sq m and shall be deemed to comprise any or all of the following:- Rough cutting against soffits Rough cutting at squint or birdsmouth angles Rough cutting at rebated reveals except where both dims are a multiple of ½ B. Rough cutting around steel sections. Rough cutting within the thickness of walls over 2 B thick & not a multiple of ½ B in thickness as clause G3(b) hereof. Rough cutting to proj which are not a multiple of ½ B as clause G4(i) hereof. Rough raking cutting Rough splay cutting Rough curved cutting (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)	G10		Rough cutting shall be deemed to be included with the brickwork except to form chamfered angles and rounded angles which shall each be given separately in m stating the width, radius or girth. No distinction shall be made between horizontal raking vertical and curved angles. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)*

G10	(b)	Rough cutting at square angles and vertical abutments shall be deemed to be inc with the bkk (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			
G10		Rough cutting to form chamfered angles and rounded angles shall each be given separately in lin m stating the width radius or girth. No distinction shall be made between Horizontal raking vertical and curved angles. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)			See clause G10 above
G10		Rough cutting on brick vaulting at groin points, intersections and ribs (grouped together) shall be given in lin m stating the thickness of the vaulting. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			
G11		Horiz rough chases in new work for edges of floors, landings and roofs shall be deemed to be inc with the bkk. Other horiz rough chases & all raking vert and curved rough chases shall each be given sep in lin m stating the size. No ddt of bkk shall be made for any rough chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G11		Horiz rough chases in new work for edges of floors, landings and roofs shall be deemed to be inc with the bkk. Other horiz rough chases & all raking vert and curved rough chases shall each be given sep in m stating the size. No ddt of bkk shall be made for any rough chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G12		Rough arches (measured the mean length on face) shall be given in lin m as EO the brickwork in which they occur stating the thickness and the number of rings in the arches. Rough cutting on arches and walls shall be given in the description of the arches. (Acc) (Cut) (D) (Enu) (EO) (SL) (IW) (Loc) (T) (W) (Wp)	G12		Rough arches (measured the mean length on face) shall be given in lin m as EO the brickwork in which they occur stating the thickness and the number of rings in the arches. Rough cutting on arches and walls shall be deemed to be included with the brickwork (Acc) (Cut) (D) (Enu) (EO) (SL) (IW) (Loc) (T) (W) (Wp)

Editions 5m and 6					
G13		Bond ends of new wls to old tb given in lin m stating bond & thickness of wl. Cutting pockets in old wk & extra mat for bonding t b given in the desc (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)	G13		Bond ends of new wls to extg tb given in m stating kind of bond & thickness of wl. Cutting pockets in extg wk & extra mat for bonding t b given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)
Brick Facework					
G14	(a)	For rules relating to Section G generally see clause G1 hereof			

G14	(b)	The rules relating to facework shall apply equally to fair face on brickwork	G14	1	The rules relating to facework shall apply equally to fair face on brickwork
G14		Particulars of the following shall be given:- (i)Kind and quality of facing bricks where different from those in the body of the work. Purpose made bricks shall be so described (ii)Size of facing bricks where different from those in the body of the work and the method of bonding such facings to the backing. (iii)Type of bond except in the case of fair face (iv)Composition and mix of mortar for pointing where different from that in the body of the work (v)Method of pointing. Does it mean type?	G14	2	Particulars of the following shall be given:- (a)Kind and quality of facing bricks. Purpose made bricks shall be so described (b)Size of facing bricks where different from those in the body of the work, and the method of bonding such facings to the backing. Type of bond except in the case of fair face Composition and mix of mortar for pointing where different from that in the body of the work (v)Method of pointing
G14		Facework shall be given as EO the bkk on which it occurs. Pointing shall be given in the description. (Acc) (D) (Enu) (EO) (SL) (Loc) (T) (W) (Wp)	G14	3	Facework, except as clause G14.9, shall be given in sq m as EO the bkk on which it occurs. Pointing shall be given in the description of the work. (Acc) (D) (Enu) (EO) (SL) (Loc) (T) (W) (Wp)
G14	()	Deductions of facework for string courses, sills, lintels, plates and the like shall be msd as regards height to the extent only of the full brick courses displaced. (N)	G14	4	Deductions of facework for string courses, sills, lintels, plates and the like shall be msd as regards height to the extent only of the full brick courses displaced and as regards depth to the extent only of the full half brick beds displaced (N)
G14	()	For half brick and 1 B wls built fair bs or built entirely of facing bricks see clauses G24 to G28 hereof. (Acc) (Cut) (D) (DW) (Enu) (SL) (IW) (Loc) (Ls) (R) (Rad) (Sh) (T) (W) (Wp)			
G15	(a)	Facework over half brick wide to walls, piers, chimney stacks, returns and the like (grouped together) shall be given in sq m (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G14	5	Facework over half brick wide to walls, piers, chimney stacks, returns and the like shall be given in sq m (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G15	(b)	Facework not ex half brick wide to reveals, returns, soffits, offsets, exposed edges and sup items of sunk or projecting wk etc (grouped together) tb given in lin m as facewk to margins irrespective of actual width. Curved margins & shaped margins shall each be so desc. Ends and angles deemed tb inc. (Acc) (D) (Enu) (SL) (Inc) (IW) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G14	6	Facework n.e.112mm wide to reveals, returns, soffits, offsets, exposed edges and sup items of sunk or proj wk etc (grouped tog) tb given in m as facewk to margins irrespective of actual width. Curved margins & shaped margins tb each so desc. Ends & Ls deemed tb inc. (Acc) (D) (Enu) (SL)

					(Inc) (IW) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
Editions 5m and 6					
G15	(c)	Facework built overhand shall be so described (Ad)	G14	7	Facework built overhand shall be so described. (Ad)
G15	(d)	Facework to panels and aprons not exceeding one sq m each shall be so described stating the number. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G14	8	Facework to panels and aprons not exceeding 1m ² each shall be enumerated & described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G15	(e)	Facework to vaulting shall be so desc (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (Sh) (T) (W) (Wp)			
G15	(f)	Battered facework shall be so desc stating the rate of batter. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (R) (T) (W) (Wp)	G14	11	Battered facework tb so desc stating rate of batter. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (R) (T) (W) (Wp)
G15	(g)	Facewk sunk or proj less than half brick from the gen face of the wall shall be so desc stating depth of set back or set forward. Rough cutting within thickness and extra material shall be given in the description (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G14	12	Facewk sunk or proj less than half brick from the gen face of the wall shall be so desc stating depth of set back or set forward. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G16	(a)	Fair cutting (which shall be deemed to penetrate half brick into the wall) t b given in lin m. Classification tb given as follows:- (i)Fair cutting at vertical abutments (ii)Fair cutting against soffits (iii)Fair raking cutting & fair splayed cutting (grouped together) (iv)Fair curved cutting (Acc) (CU) (Cut) (D) (Enu) (Inc) (SL) (Loc) (R) (T) (W) (Wp)	G14	13	Fair cutting except fair curved cutting shall be deemed to be included with the brickwork. Fair curved cutting which shall be deemed to penetrate half brick into the wall tb given in m (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
G16	(b)	Fair cutting on brick vaulting at groin points, intersections and ribs (grouped together) shall be given in lin m. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (Sh) (T) (W) (Wp)			
G17	(a)	Fair vertical internal angles and fair vertical external angles shall be deemed to be included with the facework except that in the case of glazed brick facework such angles shall each be given separately in lin m. (Acc) (Inc) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G15	1	Fair vertical internal angles and fair vertical external angles shall be deemed to be included with the facework except that in the case of glazed brick facework such angles shall each be given separately in m. (Acc) (Inc) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G17	(b)	Fair battered internal angles and fair battered external angles shall each be given sep in lin m. (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (R) (T) (W) (Wp)	G15	2	Fair battered internal angles and fair battered ext angles shall each be given sep in m. (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (R) (T) (W) (Wp)
G17		Fair squint angles and fair birdsmouth Ls shall ea be given sep in lin m stating the method of forming (eg fair cut; fair cut and	G15	3	Fair squint angles and fair birdsmouth angles shall each be given separately in lin m stating the method of forming

		rubbed; purpose made) (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)			(Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G17		Fair chamf Ls, fair rdd Ls & fair mo Ls tb ea given sep in lin m stating width, radius or girth & method of forming (eg fair cut; fair cut & rubbed; purpose made). Horiz, raking, vert and curved Ls shall ea be so desc. Ends, int mis, ext mis & irreg mis shall ea be enum sep. (Acc)(Cut) (D) (Enu) (SL) (IW) (Loc) (Ls) (R) (Rad) (S) (T) (W) (Wp)	G15	4	Fair chamf Ls, fair rdd Ls & fair mo Ls shall ea be given sep in m stating width, rad or girth & method of forming. Horiz, raking, vert & curved Ls tb ea so desc. Ends, int mis, ext mis & irreg mis shall ea be enum sep. (Acc)(Cut) (D) (Enu) (SL) (IW) (Loc) (Ls) (R) (Rad) (SL) (T) (W) (Wp)
Editions 5m and 6					
G17	()	Fair chases shall be given in lin m stating the size. Facework to back and sides shall be given in the description. Horizontal , raking, vertical and curved chases shall each be so described. No ddt of brickwork or facework shall be made for any chase. (Acc) (D) (Enu) (SL) (Inc) (IW) (Loc) (N) (R) (Rad) (T) (W) (Wp)	G15	5	Fair chases shall be given in lin m stating the size. Facework to back and sides shall be given in the description. Horiz, raking, vert and curved chases shall each be so desc. No ddt of brickwork or facework shall be made for any chase.(Acc) (D) (Enu) (SL) (Inc) (IW) (Loc) (N) (R) (Rad) (T) (W) (Wp)
G18	(a)	Facework to flush plain bands ne 300mm wide formed with facing bricks which differ in kind or size from the general facings shall be given in lin m stating the width of the band,. Horiz, raking, vertical and curved bands shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)	G16	1	Facework to flush plain bands ne 300mm wide formed with facing bricks which differ in kind or size from the general facings shall be given in lin m stating the width of the band,. Horiz, raking, vertical and curved bands shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
G18	(b)	Facework to sunk and projecting plain bands ne 300mm wide t b given in lin m stating kind of facing bricks where they differ from those in the gen facewk, the width of band and depth of set back or set forward. Horiz, raking, vert and curved bands shall each be so desc. Facework to margins, rough cutting within the thickness & extra material shall be given in the desc of the bands. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G16	2	Facework to sunk and projecting plain bands ne 300mm wide t b given in m stating kind of facing bricks where they differ from those in the gen facewk, the width of band and depth of set back or set fwd. Horiz, raking, vert and curved bands shall each be so desc. Facework to margins shall be given in the desc of the bands. Extra material shall be deemed to be inc in the bkk (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G18		(further to clauses G18 (a) & (b)) Fair ends & irreg Ls each tb enu sep. Stopped ends & other Ls deemed to be inc with the items. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G16	3	Fair ends and irreg. angles shall each be enu sep. Stopped ends and other Ls deemed to be inc with the items.(Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G18		Facework to plain bands over 300mm wide tb dealt with as facework to walls. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G16	4	Facework to plain bands over 300mm wide tb dealt with as facework to walls. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)

G19	(a)	Facework to flush, sunk or proj brick on edge bands, brick on end bands, dentilled bands, basket pattern bands, moulded or splayed plinth cappings, moulded string courses, moulded cornices & the like shall ea be given sep in lin m stating the width of band & depth of the set back or set forward. Horizontal, raking, vertical and curved members shall ea be so desc. The type of moulded or splayed bricks (eg stock pattern; purpose made; cut & rubbed) tb stated. Moulded or splayed bands entirely of headers or stretchers tb so desc. Facework to margins, rough cutting within the thickness and extra material shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Sh) (T) (W) (Wp)	G17	1	Facework to flush, sunk or proj brick on edge bands, brick on end bands, basket pattern bands, moulded or splayed plinth cappings, moulded string courses, moulded cornices & the like shall ea be given sep in m stating the width of band & depth of the set back or set forward. Horizontal, raking, vertical and curved members shall ea be so desc. The type of moulded or splayed bricks tb stated. Moulded or splayed bands entirely of headers or stretchers tb so desc. Facework to margins shall be given in the description. Extra mat tb deemed to be inc with the brickwork. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Sh) (T) (W) (Wp)
G19	(b)	Ends, int angles, ext angles & irregular angles shall each be enum sep (D) (Enu) (SL) (Inc) (Loc) (Ls) (Sh) (T) (W) (Wp)	G17	2	Ends, int angles, ext angles & irregular angles shall each be enum sep. (D) (Enu) (SL) (Inc) (Loc) (Ls) (Sh) (T) (W) (Wp)
G20	(a)	Flush, sunk and proj tile creasings shall each be given sep in lin m as EO the bkk in which they occur stating the number of courses and the depth of the set back or set forward. Horiz, raking, vertical and curved members shall ea be so desc. (Acc) (D)(CU) (EO) (R) (Rad) (SL) (W) (Wp)	G18	1	Flush, sunk and proj tile creasings shall each be given sep in lin m as EO the bkk in which they occur stating the number of courses and the depth of the set back or set forward. Horiz, raking, vertical and curved members shall be so desc.. (Acc) (D) (CU) (EO) (R) (Rad) (SL) (W) (Wp)
G20	(b)	Fair ends and irreg angles shall ea be enumerated separately. Stopped ends and other angles shall be deemed tb inc with the items. (CU) (IW)	G18	2	Fair ends and irreg angles shall ea be enumerated separately. Stopped ends and other angles shall be deemed tb inc with the items. (CU) (IW)
Editions 5m and 6					
G21	(a)	Facework to flush quoins formed with facing bricks which differ in kind or size from the general facings shall be given in lin m (measured on the vertical angle) stating the average girth and the method of jointing between quoin and general facework. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G19	1	Facework to flush quoins formed with facing bricks which differ in kind or size from the general facings shall be given in m (measured on the vertical angle) stating the average girth and the method of jointing between quoin and general facework. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G21	(b)	Facewk to sunk & projecting quoins shall each be given sep in lin m (msd on the vertical angle) stating the av girth, depth of set back or set forward and method of jtg between quoin and gen facewk. Facewk to	G19	2	Facewk to sunk & projecting quoins shall ea be given sep in lin m (msd on vertical angle) stating av girth, depth of set back or set forward & method of jtg bet quoin and gen facewk.

		margins, rough cutting within the thickness & extra mat shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)			Facewk to margins shall be given in the desc. Extra mat shall be deemed to inc with the brickwk (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G21		Cut and rubbed quoins shall be so desc. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G19	3	Cut and rubbed quoins shall be so desc. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G21		Tile insets in quoins and rustications in quoins shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G19	4	Tile insets in quoins and rustications in quoins shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
G22		(further to clauses G18 (a) & (b)) Facework to arches (measured the mean length on face) shall be given in lin m stating the width on face, the width of the exposed soffit and the outline of the arch. (Acc)(D)(Enu)(SL)(Loc)(Sh) (T) (W) (Wp)	G20	1	Facework to arches (measured the mean length on face) shall be given in lin m stating the width on face, the width of the exposed soffit and the outline of the arch. (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)
G23		Facework to tumbings of buttresses shall be enumerated stating the size. Fair and rough cuttings shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (R) (T) (W) (Wp)	G20	2	Facework to tumbings of buttresses shall be enumerated stating the size (Acc) (Cut) (D) (Enu) (SL) (Loc) (Sh) (R) (T) (W) (Wp)
		Brickwork built fair both sides or entirely of facing bricks			
G24	(a)	For rules relating to Section G generally see clause G1 hereof			
G24	(b)	Particulars in accordance with Clauses G2(b) and G14 hereof shall be given			
G24		Deductions of brickwork shall be msd in accordance with clause G2 hereof. (MsA)			
G24		Pointing shall be given in the desc of the work on which it occurs. (DW)			
G25	(a)	Half brick walls and one brick walls built fair b s or entirely of facings shall ea be given sep in sq m Classification shall be as clause G3(a) hereof. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G14	9	Half brick walls and one brick walls built fair b s or entirely of facings shall ea be given sep in sq m stating the thickness. Pointing shall be given in the description of the work upon which it occurs (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G25	(b)	Fair returns (eg ends of wls; reveals of opgs) shall be given in lin m stating the width in stages of 4 ½ “. (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)	G14	10	In the case of walls built fair both sides or entirely of facing bricks, fair returns to ends of wls or reveals of opgs shall be given in m stating the width in half-brick stages and in the case of fair returns which are not an exact half brick the nearest half brick above the actual width (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)

G25		Fair cutting, fair angles and fair chases shall be given in accordance w clauses G16 and G17 hereof. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)			
G25		Plain bands, ornamental bands, cornices, tile creasings, quoins and arches shall be given in accordance w clauses G18 to G22 hereof. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)			
G26	(a)	Sills, thresholds, copings and steps built of fair faced brickwork or entirely of facings shall each be given separately in lin m stating the size and the method of forming (eg all headers on edge; all stretchers on end). Horizontal, raking, vertical and curved work and work set weathering shall each be so desc. Rough cutting to bkk and fair cutting to facework shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)	G21	1	Sills, thresholds, copings and steps built of fair faced brickwork or entirely of facings shall each be given separately in lin m stating the size and the method of forming. Horizontal, raking, vertical and curved work and work set weathering shall each be so desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
Editions 5m and 6					
G26	(b)	Ends, internal angles, external angles and irregular angles shall each be enumerated separately. (IW) (Ls)	G21	2	Ends, internal angles, external angles and irregular angles shall each be enumerated separately. (IW) (Ls)
G27		Key blocks, corbels, bases to pilasters, cappings to pilasters and cappings to isolated piers shall each be enumerated separately stating the size. Rough cutting to brickwork and fair cutting to facework shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G22		Key blocks, corbels, bases to pilasters, cappings to pilasters and cappings to isolated piers shall each be enumerated separately stating the size. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G28		For brick pavings see section U hereof	G23		Brick pavings shall be given in accordance with section T
Brickwork in connection with boilers					
G29	(a)	For rules relating to Section G generally see clause G1 hereof			
G29	(b)	Particulars in accordance with clauses G2(b) and G14 hereof shall be given			

G30	(a)	Boiler seatings and boiler flues together with their associated labours shall be given in detail in accordance with the relevant clauses hereof under an appropriate heading. Firebrick and fireclay work shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G24	1	Boiler seatings and boiler flues together with their associated labours shall be given in detail in accordance with the relevant clauses hereof under an appropriate heading. Firebrick and fireclay work shall each be so desc.(Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G30	(b)	Boiler seating blocks and curved flue covers shall ea be given sep in lin m stating the size. Pieces of irregular shape shall be enumerated stating the size.(Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)	G24	2	Boiler seatings and boiler flues together with their associated labours shall be given in detail in accordance with the relevant clauses hereof under an appropriate heading. Firebrick and fireclay work shall each be so desc. (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)
G31		Chimney shafts together with their associated labours shall be given in detail in accordance with relevant clauses hereof under an appropriate heading stating the no., the size on plan, the shape & overall ht. Chimney shafts of different shapes and hts shall ea be given sep. Those requiring to be built from outside scaffolding shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)	G25		Chimney shafts together with their associated labours tb given in detail in accordance with relevant clauses hereof under an appropriate heading stating the no., size on plan, shape & overall ht. Chimney shafts of different shapes and hts shall ea be given sep. Those requiring to be built from outside scaffolding shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)
Blockwork					
G32	(a)	For rules relating to Section G generally see clause G1 hereof			
G32	(b)	Particulars of the following shall be given:- (i)Kind, type and size of blocks. Purpose made blocks shall be so desc (ii)Surface finish of blocks (eg keyed, smooth, glazed) (iii)Type of bond in the case of glazed blocks (iv)Composition and mix of mortar for bedding, jointing and pointing (v)Method of pointing	G26	1	Particulars of the following shall be given:- (i)Kind, type and size of blocks. Purpose made blocks shall be so desc (ii)Surface finish of blocks (eg keyed, smooth, glazed) (iii)Type of bond in the case of glazed blocks (iv)Composition and mix of mortar for bedding, jointing and pointing (v)Method of pointing
G32		Msmts of wls shall be taken between attached piers. The thickness of attached piers tb taken as the combined thickness of wall and pier. Attached or isolated piers (except where caused by openings) having a length on plan n e four times thickness shall be classified as piers and those having a length over four times the thickness and those caused by opgs shall be classified as walls. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G26	2	Msmts of wls shall be taken between attached piers. Piers, defined as walls having a length on plan not exceeding four times the thickness, whether attached or isolated (except where caused by openings) shall be measured as the combined thickness of the wall and the pier. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G32		Deductions of blockwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full block courses	G26	3	Deductions of blockwork for string courses, sills, lintels, plates and the like shall be measured as regards height to the extent only of the full

		displaced. (Acc) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)			block courses displaced. (Acc) (D) (Enu) (SL) (Loc) (N) (T) (W) (Wp)
G32	()	Pointing shall be given in the desc of the work on which it occurs. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)	G26	4	Pointing shall be given in the desc of the work on which it occurs. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)
G32	()	For glass blockwk see clause G42 hereof.	G26	5	Glass blockwork shall be given in accordance with clause G36
			G26	6	Blockwork designed to be built without cutting blocks shall be given separately
Editions 5m and 6					
G33	(a)	Blockwork shall be given in sq m stating the thickness. Classification shall be as follows:- (i)Walls and partitions (grouped together) (ii)Filling old openings (iii)Skins of hollow walls (iv)Dwarf supports under fittings, tanks, pipes and the like (grouped together) (v)Piers and chimney stacks (grouped together) (vi)Isolated casings (ie blockwork detached from other blockwork and not exceeding 1.5 m mean girth on plan) (vii)Blockwork used as fmwk. Tempy strutting shall be given in the desc. (Acc) (CU) (D) (Enu) (SL) (T) (W) (Wp)	G27	1	Blockwork shall be given in sq m stating the thickness. Walls in trenches,the width of which (including any measurement for working space in accordance with clause D12) does not exceed the thickness of the wall by more than 0.50 and deeper than 1.00 m from the top of the excavation to base of the wall, shall be given separately. Classification shall be as follows:- (a)Walls and partitions (grouped together) (b)Filling existing openings Skins of hollow walls Dwarf support walls (c)Piers and chimney stacks (grouped together) (d)Isolated casings (ie blockwork detached from other blockwork and not exceeding 1.5 m mean girth on plan) (e)Blockwork used as fmwk. Tempy strutting shall be given in the desc. (f)Work in raising existing structures, stating the starting height above ground at which blockwork commences (Acc) (CU) (D) (Enu) (SL) (T) (W) (Wp)
G33	(b)	Blockwork finished with a fair face and blockwork finished with facing blocks different from those in the body of the work shall each be so desc stating whether to one or both faces	G27	2	Blockwork finished with a fair face and blockwork finished with facing blocks different from those in the body of the work shall each be so desc stating whether to one or both faces
G33		Filling ends of hollow blocks or providing special blocks with solid ends shall each be given separately in linear m as EO the work in which they occur. (Acc) (D) (Enu) (EO) (Ht) (Loc) (T) (W) (Wp)	G27	3	Filling ends of hollow blocks or providing special blocks with solid ends shall each be given separately in linear m as EO the work in which they occur.(Acc) (D) (Enu) (EO) (SL) (Loc) (T) (W) (Wp)

G33		Fair returns (eg ends of wls; sides of piers and chimney stacks; reveals of opgs) shall be given in lin m stating the width. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G27	4	Fair returns shall be given in lin m stating the width.(Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G34		Blockwork in backing to masonry shall be given in sq m stating the av thickness. Cutting & bonding blockwk to masonry shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G28		Blockwork in backing to masonry shall be given in sq m stating the thickness. Cutting & bonding blockwk to masonry shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G35		Forming cavities in hollow walls shall be given in accordance with clause G8 hereof. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G29		Forming and closing cavities in hollow walls shall be given in accordance with clause G9. (Acc) (D) (Enu) (IW)(SL) (Loc) (T) (W) (Wp)
G36		Blockwk in eaves filling shall be added to the general blockwk. The labour in eaves filling shall be given in lin m (msd overall) stating the thickness of the wall. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G30		Blockwk in eaves filling shall be added to the general blockwk. The labour in eaves filling shall be deemed to be inc except where the blockwork is designed to be used without cutting the blocks in which case it shall each (sic) be given in metres (msd overall) stating the thickness of the wall. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G37	(a)	Rough cutting shall be given in lin m stating the thickness of the blockwk. Classification shall be as follows:- (i)Rough cutting against soffits (ii)Rough cutting at irregular angles and irregular intersections (grouped tog) (iii)Rough raking cutting and rough splay cutting (grouped tog) (iv)Rough curved cutting (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G31	1	Rough cutting shall be deemed to be inc with the blockwork except to form chamfered angles and rounded angles which shall each be given separately in metres stating the width, radius or girth. No distinction shall be made between horizontal, raking, vertical and curved angles. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G37	(b)	Rough cutting at square angles, square intersections and vert abutments shall be deemed tb inc w the blockwk. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)			
G37		Rough cutting ard steel sections shall be given in lin m stating the girth of the cutting in stages of 150mm. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G31	2	Rough cutting around steel sections on blocks designed to be used without cutting the blocks shall each be given in metres stating the girth of the cutting in stages of 150mm . (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G37		Rough cutting to form chamf angles and rounded angles shall each be given in lin m stating the width, radius or girth. No distinction shall be made between horiz,			

		raking, vert & curved Ls. (Acc) (Cut) (D) (Enu) (SL) (Loc) (Ls) (T) (W) (Wp)			
G38		Rough chases shall be given in accordance with clause G11 hereof. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G32		Rough chases shall be given in accordance with clause G11. No deduction of blockwork shall be made for any rough chase. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G39		Bonding ends of new blockwork to other types of construction shall be given in lin m stating the thickness of the blockwork. Forming pockets in new construction, cutting pockets in old construction & extra mat for bonding shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G33		Bonding ends of new blockwork to other types of construction shall be given in lin m stating the thickness of the blockwork. Forming pockets in new construction, cutting pockets in existing construction & extra mat for bonding shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G40		Fair cutting shall be given in lin m stating the thickness of the blockwk. Classification shall be as follows: (i)Fair cutting at vertical abutments. (ii)Fair cutting against soffits (iii)Fair cutting at irregular angles and irregular intersections (grouped together) (iv)Fair raking cutting and fair splay cutting (grouped together) (v)Fair curved cutting. (Acc) (Cut) (CU) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	G35	1	Fair cutting shall be deemed to be included with the blockwork except that fair cutting on blockwork designed to be used without cutting the blocks shall each be given in metres stating the thickness of the blockwk. Classification shall be as follows: (d)Against vertical abutments. (a)Against soffits (b)At square intersections ()At irregular angles and irregular intersections (grouped together) (fRaking cutting and splayed cutting (grouped together)
			G35	2	Fair curved cutting tb given in metres stating the thickness of the blockwork (Acc) (Cut) (CU) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)
G41	(a)	Fair vert int & fair vert ext Ls shall be deemed to be inc with the blockk except that in the case of glazed blockk such Ls each tb given sep in lin m. (Ls)	G34	1	Fair vertical internal and external angles shall be deemed to be inc with the blockwork except that in the case of glazed blockwork or blockwork designed to be used without cutting the blocks such angles shall each be given separately in metres. (Ls)
G41	(b)	Fair chamfered angles & fair rdd Ls each tb given sep in lin m stating width, radius or girth. Horiz, raking, vert & curved Ls each tb so desc. Stopped ends, int mis, ext mis & irreg mis shall each be enum separately. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G34	2	Fair chamfered angles & fair rdd Ls each tb given sep in m stating width, radius or girth. Horiz, raking, vert & curved Ls each tb so desc. Stopped ends, int mis, ext mis & irreg mis shall each be enum separately. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)

G41		Fair chases shall be given in accordance w clause G17() hereof. (Acc) (D) (Enu) (SL) (Inc) (IW) (Loc) (N) (R) (T) (W) (Wp)	G34	3	Fair chases shall be given in accordance w clause G15.5 hereof. (Acc) (D) (Enu) (SL) (Inc) (IW) (Loc) (N) (R) (T) (W) (Wp)
G42	(a)	Glass blockwork in walls and panels shall be given in sq m stating the size & thickness of the blocks. For r/f see clause G47 hereof.(Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G36	1	Glass blockwork in walls and panels shall be given in sq m stating the thickness of the blockwork. R/f shall be given as clause G39 (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G42	(b)	Bedding the perimeter of glass blockwkw in mat different from the mortar shall be given in lin m stating the width and the kind of bedding material. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G36	2	Bedding the perimeter of glass blockwkw in mat different from the mortar shall be given in lin m stating the width and the kind of bedding material (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
Editions 5m and 6					
G43		Particulars of the following shall be given:- (i)Kind and quality of damp proof material (ii)Gauge, thickness or substance (eg wt per sq ft) of sheet material (iii)Number of layers (iv)Composition and mix of bedding materials	G37	1	Particulars of the following shall be given:- (i)Kind and quality of damp proof material (ii)Gauge, thickness or substance of sheet material (iii)Number of layers (iv)Composition and mix of bedding materials
G44	(a)	Slate damp proof courses and sheet damp proof courses (eg bitumen felt; sheet lead; sheet copper) over 225mm or one brick wide shall each be given sep in sq m. Such work ne 225mm wide tb given in m stating the width. No allowance in msmnt shall be made for laps & this shall be stated in the desc. No ddt shall be made for voids ne 0.50. Horizontal, raking, vertical & curved work shall each be so desc. Cutting to curve shall be given in the desc of work in curved walls. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)	G37	2	Damp proof courses over 225mm wide shall be given in m ² . Such work ne 225mm wide shall be given in lin m stating the width. No allowance in measurement shall be made for laps & this shall be stated in the description. No ddt shall be made for voids ne 0.50. Horizontal, raking, vertical & curved work shall each be so desc. Cutting to curve shall be given in the desc of work in curved walls. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)
G44	(b)	Damp proof courses with cavity gutters in hollow walls shall be so desc.(Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G37	3	Damp proof courses forming cavity gutters in hollow walls shall be so desc .Ends angles and intersections shall each be enum separately. Performed or prefabricated ends angles and intersections shall be so described. (Acc) (CU) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G44		Pointing exposed edges of damp proof courses shall be deemed to be included with the damp proof courses. (Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)	G37	4	Pointing exposed edges of damp proof courses shall be deemed to be included with the damp proof courses.

					(Acc) (D) (DW) (Enu) (SL) (Loc) (T) (W) (Wp)
G45		For brick damp proof courses see clause G3(a)(ix) hereof			
G46		For asphalt damp courses see section L hereof	G38		Asphalt damp-proof courses shall be given in accordance with Section L
Sundries					
G47		Reinforcement in wls shall be given in lin m stating the width. No allowance in msmt shall be made for laps and this shall be stated in the description. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G39		Reinforcement in wls shall be described and given in lin m stating the width. No allowance in msmt shall be made for laps and this shall be stated in the description (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G48	(a)	Raking out jts or hacking faces of wls (or both) to form key shall be given in sq m stating the nature of the work to be hacked (eg engineering bk; glazed bkk; conc block) and the purpose for which the key is reqd. (Acc) (D) (Enu) (F) (SL) (Loc) (T) (W) (Wp)	G40	1	Raking out jts or hacking faces of wls (or both) to form key shall be given in sq m stating the nature of the work to be hacked and the purpose for which the key is reqd. (Acc) (D) (Enu) (F) (SL) (Loc) (T) (W) (Wp)
G48	(b)	Hacking by special mechanical means shall be so described (Acc) (D) (F) (Enu) (SL) (Loc) (T) (W) (Wp)	G40	2	Hacking by special mechanical means shall be so described (Acc) (D) (Enu) (F) (SL) (Loc) (T) (W) (Wp)
G48		For grooved bks see clause G7 hereof			
G49		Cement wash on steelwork shall be given in sq m.			
Editions 5m and 6					
G50	(a)	Preparing tops of old walls to receive new walls shall be given in lin m stating the thickness of the old wall. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G41		Preparing tops of existing walls to receive new walls shall be given in m stating the thickness of the existing wall. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G50	(b)	Beds of mortar to cover rivets of girders under walls shall be deemed to be included with the walls which shall be measured from the top surface of the girders. (Acc) (D) (Enu) (SL) (Loc)			
G51		Weather fillets & L fillets ea to be given sep in lin m stating width. Curved fillets to be so desc irrespective of radius. Ends & Ls to fillets deemed to be inc. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)	G42		Weather fillets & L fillets ea to be given sep in lin m stating width. Curved fillets to be so desc irrespective of radius. Ends & Ls to fillets deemed to be inc. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)

G52	(a)	Bedding plates shall be given in lin m (except where wls are msd over plates without ddt) stating the width of bed where over 125mm. (Inc)	G43	1	Bedding plates shall be given in lin m (except where wls are msd over plates without ddt) stating the width of bed (Inc)
G52	(b)	Bedding corrugated sheeting and the like shall be given in lin m stating the width of the bed. Pointing to one or both sides shall be given in the description. (Inc)	G43	2	Bedding corrugated sheeting and the like shall be given in m stating the width of the bed. Pointing to one or both sides shall be given in the description. (Inc)
G52		Bedding wood frames and sills shall be given in lin m. Pointing to one or both sides shall be given in the desc. (Inc)	G43	3	Bedding wood frames and sills shall be given in m. Pointing to one or both sides shall be given in the desc. (Inc)
G53		Wedging and pinning up new work to underside of old construction in cases where the load is to be transmitted to the new work shall be given in lin m stating the thickness of the work. The materials for wedging and pinning shall be described. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G44		Wedging and pinning up new work to underside of existing construction in cases where the load is to be transmitted to the new work shall be given in m stating the thickness of the work. The materials for wedging and pinning shall be described. (Acc) (Cu) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G54		Cutting grooves for water bars and the like shall be given in lin m (Cut)	G45		Cutting grooves for water bars and the like shall be given in m (Cut)
			G46		Expansion and designed construction jts shall be described and given in m stating the size. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G55	(a)	Raking out joint or cutting groove for turned in edge of flashings shall be given in lin m. Horiz, raking, stepped, vertical and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G47	1	Raking out joint or cutting groove s for turned in edge s of flashings shall be given in m. Horiz, raking, stepped, vertical and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
G55	(b)	Raking out and enlarging joint or cutting groove for nib of asphalt shall be given in lin m. Horiz, raking, vert and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)	G47	2	Raking out and enlarging joint or cutting groove for nib of asphalt tb given in lin m. Horiz, raking, vert and curved work shall each be so desc. Pointing shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Loc) (R) (Rad) (T) (W) (Wp)
G56	(a)	(i)Building in metal windows, metal doors and the like (complete with frames) shall each be enum sep stating the over-all size. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp) (Wt)	G48	1	(i)Building in metal windows, metal doors and the like (complete with frames) shall each be enum sep stating the over-all size. (Acc) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp) (Wt)

G56	(a)	(ii)B i strong room doors, safe doors & the like (complete with frames) shall each be enum sep stating the o'all size, the approx wt & floor level. B i or c & p lugs, bedding frames & ptg to one or both sides shall be given in the desc. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp) (Wt)	G48	1	(ii)B i strong room doors, safe doors & the like (complete with frames) shall each be enum sep stating the o'all size, the approx wt & floor level. B i or c & p lugs, bedding frames & ptg to one or both sides shall be given in the desc.. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp) (Wt)
Editions 5m and 6					
G56	(b)	(i)Building in ends of lintels, bearing bars, steps, timbers and the like as the work proceeds shall be deemed to be inc. with the brickwork and blockwork items. (Acc) (D) (Enu) (SL) (Inc)(Loc) (N) (T) (W) (Wp)	G48	2	(i)Building in ends of lintels, bearing bars, steps, timbers, steel sections and the like as the work proceeds shall be deemed to be inc. with the brickwork and blockwork items. (Acc) (D) (Enu) (SL) (Inc)(Loc) (N) (T) (W) (Wp) except that
G56	(b)	(ii)Building in ends of steel sections shall be enum stating the size as Clause A4(b) hereof. No deduction shall be made for any ends mentioned in this paragraph. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)	G48	2	(ii)Building in ends of steel sections to blockwork designed to used (sic) without cutting the blocks shall be enum stating the size as follows: Small – ne 250mm in depth Large – 250 – 500mm in depth Extra large – ex 500mm in depth No deduction shall be made for any such ends. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)
G56		(i)Cutting and pinning ends of lintels, steps, timbers, tubular rails, brackets and the like (grouped together) shall be enumerated irrespective of size. No deduction shall be made for any ends mentioned in this paragraph. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (N) (T) (W) (Wp)	G48	3	(i)Cutting and pinning ends of lintels, steps, timbers, tubular rails, brackets and the like (grouped together) shall be enumerated irrespective of size. No deduction shall be made for any such ends (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (N) (T) (W) (Wp)
			G48	3	(ii)Cutting and pinning ends of steel sections shall be enum stating the size as clause G48.2 No deduction shall be made for such ends.
G57	(a)	Holes for pipes, tubes, bars, cables, conduits and the like members (grouped together) shall be enumerated stating the size of the member as clause A4 hereof and the thickness of the work. Fixing pipe sleeves shall be given in the description. (Acc) (Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)	G49	1	Holes for pipes, tubes, bars, cables, conduits and the like members (grouped together) shall be enumerated stating the thickness of the work and size of the member as follows: Small – ne 55mm dia Large – 55-110mm dia Extra large – ex 110mm dia Fixing pipe sleeves shall be given in the description. (Acc) (CU)(Cut) (D) (Enu) (SL) (Inc) (Loc) (T) (W) (Wp)

G57	(b)	Holes for ducting, trunking, tray & the like members (grouped tog) to be enumerated stating sectional area of member in stages of 0.025 sq m & thickness of work. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G49	2	Holes for gratings, ducting, trunking, trays & like members (grouped tog) to be enumerated stating sectional area of member in stages of 0.10 m ² & thickness of work. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G58		Mortices, sinkings and the like shall each be enumerated separately stating the size or purpose. Running mortices with lead or mortar shall be given in the description. (Acc) (Cut) (D) (DW) (Enu) (SL) (Inc)(Loc) (T) (W) (Wp)	G50		Mortices, sinkings and the like shall each be enumerated separately stating the size or purpose. Running mortices with lead or mortar shall be given in the description. (Acc) (Cut) (D) (DW) (Enu) (SL) (Inc)(Loc) (T) (W) (Wp)
G59		Making good walls and making good fair face or facings in connection with any of the labours mentioned in clauses G56, G57 and G58 hereof shall be given in the description of such labours. Making good plasterwork and other finishings shall be given in accordance with Section U hereof. (DW)	G51		Making good walls and making good fair face or facings in connection with any of the labours mentioned in clauses G48-50 shall be given in the description of such labours. Making good plasterwork and other finishings shall be given in accordance with Section T (DW)
G60		Forming small openings in walls and building in air-bricks, ventilating gratings, soot doors and the like shall each be enumerated separately stating the size of the opening, the nature of the wall & its thickness. Lintels and arches shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G52		Forming small openings in walls and providing and building in air-bricks, ventilating gratings, soot doors and the like shall each be enumerated separately stating the size of the opening, the nature of the wall & its thickness. Lintels and arches shall be given in the desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G61	(a)	Parging and coring flues shall be given in lin m stating the internal size of the flue where over 0.25 sq m in sect area. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G53	1	Parging and coring flues shall be given in m stating the internal size of the flue where over 0.25 sq m in sect area. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G61	(b)	Fireclay linings and precast concrete linings to flues shall each be given separately in lin m stating the size. Cutting to form easings and bends in linings and cutting walls around linings shall be given in the description. For ddt of bkk see clause G1(a) hereof. (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)	G53	2	Fireclay linings & precast conc flue linings shall each be given sep in m stating the size. Cutting to form easings and bends in linings and cutting walls and linings shall be given in the desc. For ddt of bkk see clause G4.1 (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)
G61		For refractory brick linings to flues see clause G3(a)(viii) hereof	G53	3	For refractory brick linings to flues see clause G5.3k
G62		Gas flue blocks shall be enumerated stating the type of block and the size and number of flues in each block. The method of bldg shall be desc. (eg built-in; free standing). Rough cutting on walls and the flue blocks shall be given in the description of built in	G54		Gas flue blocks shall be enumerated stating the type of block and the size and number of flues in each block. The method of bldg shall be desc. Rough cutting on walls and flue blocks shall be deemed to be included. For

		flue blocks. For deduction of brickwork see clause G1(a) hereof (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)			deduction of brickwork see clause G4.1 (Acc) (Cut) (D) (Enu) (SL) (Inc) (IW) (Loc) (T) (W) (Wp)
G63		Chimney pots shall be enum stating the type and size. Setting and flaunching shall be given in the description (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)	G55		Chimney pots shall be enum stating the type and size. Setting and flaunching shall be given in the description (Acc) (D) (Enu) (SL) (Loc) (Sh) (T) (W) (Wp)
G64	(a)	Stoves, grates, mantels, ranges and similar units shall each be enumerated separately stating the type and the size. Setting in fireplace opgs & providing any concrete and brick backings shall be given in the description stating the width of the fireplace opening. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G56	1	Stoves, grates, mantels, ranges and similar units shall each be enumerated separately stating the type and the size. Setting in fireplace opgs & providing any concrete and brick backings shall be given in the description stating the width of the fireplace opening. (Acc) (Cut) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
Editions 5m and 6					
G64	(b)	Surrounds, hearths and similar units shall each be enumerated separately stating the size, the nature of the material (eg tile; marble) and the condition in which each unit is supplied (eg loose parts: pre-slabbed). Assembling and jointing or building up loose parts and setting shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G56	2	Surrounds, hearths and similar units shall each be enumerated separately stating the size, the nature of the material and the condition in which each unit is supplied. Assembling and jointing or building up loose parts and setting shall be given in the description. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
Centering					
G65	(a)	Particulars of the following shall be given:- (i)Nature of the surface to be supported (eg brickwork; blockwork) (ii)Shape of surface (eg flat; segmental; semicircular; groined) (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G57	1	Particulars of the following shall be given:- (a)Nature of the surface to be supported (b)Shape of surface. (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
G65	(b)	Centering left in shall be so described (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G57	2	Centering left in shall be so described (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
G65		Centering with supports over 3.50 m high shall be so desc stating the height in further stages of 1.5m (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)	G57	3	Centering with supports over 3.50 m high shall be so desc stating the height in further stages of 1.5 m (Acc) (D) (Enu) (SL) (Loc) (R) (Rad) (Sh) (T) (W) (Wp)
G65		Centering shall be msd as the actual surface tb supported. Strutting, shoring, bolting, wedging, easing, striking and	G57	4	Centering shall be msd as the actual surface tb supported. Strutting, shoring, bolting, wedging, easing,

		removing shall be deemed to be included with the items			striking and removing shall be deemed to be included with the items
G66	(a)	Centering for flat soffits over 300mm wide and ne 2m span shall be given in sq m. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G57	5	Centering for flat soffits over 0.30m wide and ne 2.00m span shall be given in sq m. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G66	(b)	Centering for flat soffits n.e 300mmwide and ne 2m span shall be given in linear m stating the width. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G57	6	Centering for flat soffits n.e 0.30m wide and ne 2.00 m span shall be given in m stating the width. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G66		Centering for flat soffits over 2m span shall be enumerated stating the span of the opening and the width of the soffit (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)	G57	7	Centering for flat soffits over 2m span shall be enumerated stating the span of the opening and the width of the soffit. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)
G66		Centering for sloping soffits shall be so described (Acc) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)	G57	8	Centering for sloping soffits shall be so described (Acc) (D) (Enu) (SL) (Loc) (R) (T) (W) (Wp)
G67		Centering for curved soffits and vaulted soffits shall each be given separately in sq m. (Acc) (D) (Enu) (SL) (Loc) (Rad) (T) (W) (Wp)			
G68		Centering for segmental, semicircular, invert and other curved arches shall each be enumerated separately stating the span of the opening and the width of the soffit. The rise shall also be stated except in the case of semicircular arches (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)	G57	9	Centering for segmental, semicircular, invert and other curved arches shall each be enumerated separately stating the span of the opening and the width of the soffit. The rise shall also be stated except in the case of semicircular arches (Acc) (D) (Enu) (SL) (Loc) (Rad) (Sh) (T) (W) (Wp)
G69	(a)	Raking cutting, curved cutting, cutting to groin points, cutting to intersections, cutting against ribs and the like labours shall each be given separately in linear m. Scribed edges and splayed edges shall be deemed to be inc w the items. (Cut) (D) (Enu) (Sh) (SL) (Loc) (R) (Rad)	G57	10	(a) Raking cutting, curved cutting, and the like on centeringv shall each be given separately in m. Scribed edges and splayed edges shall be deemed to be inc w the items. (Cut) (D) (Enu) (Sh) (SL) (Loc) (R) (Rad)
G69	(b)	Notching for key blocks, projecting voussoirs and the like shall each be enum sep stating the size or girth. (Cut) (D) (Enu) (SL) (Loc)	G57	10	(b) Notching for key blocks, projecting voussoirs and the like shall each be enum sep stating the size or girth. (Cut) (D) (Enu) (SL) (Loc)
		Protection			
G70		Protecting the work in this section shall be given as an item	G58		Protecting the work in this section shall be given as an item
H1 47	(a)	Underpinning work shall be given as a section in the bill	H1	1	Underpinning work shall be given as a section in the bill
H1 44	(b)	Any information available concerning the nature of the site shall be given in accordance with clause D1 (a) hereof.	H1	3	Information regarding the nature of the ground shall be given in accordance with clause D3

H1 47		(i) A description of the existing structure (eg wall; pier) to be underpinned shall be given stating its location, its length or size on plan, the depth of the new work below the base of the existing foundation and the limit of length to be carried out in one operation. (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (Tpt) (W) (Wp)	H1	2	The location and extent of the work and particulars of the existing structure to be underpinned shall be shown on the drwgs required under clause B3.1 or shall be shown on further drwgs which shall accompany the BQ. (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (Tpt) (W) (Wp)
		(ii): Underpinning which is curved on plan shall be so described (R)	H1	6	Underpinning which is curved on plan shall be so described (R)
			H1	4	The limit of length to be carried out in one operation and the number of sections the Contractor may be permitted to undertake at any one time shall be stated (Acc) (D) (Enu) (SL) (IW)
H1 45		Underpinning reqd to be executed from inside extg bldgs. shall be so desc. Handling mats and getting them in or out of such buildings shall be deemed to be inc with the items. (Acc) (D) (Enu) (Ht) (IW) (Loc) (T) (W) (Wp)	H1	5	Underpinning which may be carried out from both sides, or which is required to be carried out from one side only or from within an existing building shall each be given separately and so desc (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
H2 46		For rules relating to Section H generally see clause H1 hereof			
			H2	1	An item shall be given for bringing to site and removing from site all plant reqd for this section of the work
			H2	2	An item shall be given for maintaining on site all plant required for this section of the work
H3 49	(a)	Temporary supports to work to be underpinned shall be given as an item. Particulars of such supports shall be given where practicable. (Acc) (D) (Enu) (Ht) (IW) (Loc) (T) (Tpt) (W) (Wp)	H3	1	Temporary supports to work to be underpinned shall be given as an item stating any particular requirements. (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (Tpt) (W) (Wp)
H3 53	(b)	(i) Allowances for working space (which shall not be subject to adjustment if more or less space is actually required) shall be made in the measurements of excavations.	H3	2	(i) Allowances for working space (which shall not be subject to adjustment if more or less space is actually required) shall be measured horiz from the face of the wall to be underpinned (or where projecting foundations are to be retained from the face of such projection) and shall be related to the total depth of the excn (msd from the top of the prelim trench to the u/side of the u/pinning work). The allowances from the face of the wall or projecting foundation shall be as follows: (a) 1.00 m where total depth of excavation does not exceed 1.50m

					(b) 1.50 m where total depth of excn is 1.50 - 3.00m 2.00 m where total depth of excn is over 3.00 m
H3 54	(b)	(ii)(i)The width of the working space (measured horizontally from the face of the wall to be underpinned, or where projecting foundations are to be retained from the face of such projection) shall be related to the total depth of the excavation (measured from the top of the preliminary trench to the underside of the underpinning work). The allowances shall be as follows:- (ii)(i)1m from the wall or projecting foundation where the total depth of the excavation does not exceed 1.5. (ii)(ii)1.50m from the wall or projecting foundation where the total depth of the excavation is over 1.5 but does not exceed 3m (ii)(iii)2m from the wall or projecting foundation where the total depth of the excavation is over 3m.			
H3 50 51 52		Excavation shall be given in accordance with clauses D6 to D18 hereof subject to the following:- (i)Excn prelim trenches down to level of base of the extg fdn shall be so desc. (ii) Excn below level of base of extg fdn shall be so desc. (Acc) (D) (Enu) (Ht) (IW) (Loc) (T) (Tpt) (W) (Wp)	H3	4	Exc tb given in acc with clauses D10 - 11 subject to the following:- (a)Excn prelim trenches down to level of base of extg fdn tb so desc. (b) Excn below level of base of extg fdn shall be so desc. (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (Tpt) (W) (Wp)
H3 55		Cutting away projecting foundations shall be given in lin m stating the number of courses of footings and the dimensions of concrete to be removed. (Acc) (Cut) (D) (Enu) (Ht) (IW) (Loc) (T) (Tpt) (W) (Wp)	H3	5	Cutting away projecting foundations shall be given in m stating the number of courses of footings and the dimensions of concrete to be removed (Acc) (Cut) (D) (Enu) (SL) (IW) (Loc) (T) (Tpt) (W) (Wp)
			H3	6	Preparing the underside of the existing work to receive the pinning up of the new shall be given in m stating the width of the extg wk. (Acc) (D) (Enu) (SL) (IW) (Loc) (T) (W) (Wp)
H4 56		Disposal of water shall be given in accordance with clause D19 hereof. (Acc) (D) (Enu) (Loc) (W) (Wp)	H4		Disposal of water shall be given in accordance with clauses D25 and 26 (Acc) (D) (Enu) (Loc) (W) (Wp)
H5 57		Planking and strutting shall be given in accordance with clauses D20 & D21 hereof subject to the following:-	H5	1	Earthwork support shall be given in accordance with clauses D14- 24 subject to the following:-

		<p>(i)P and s to preliminary trenches shall be so desc.</p> <p>(ii)Planking and strutting below the level of the base of existing foundation (measured to back, front and both ends of the underpinning also between each section of the underpinning) shall be so described.</p> <p>(Acc) (D) (Enu) (Ht) (Loc) (T) (W) (Wp)</p>			<p>(a)Earthwork support to preliminary trenches shall be so desc.</p> <p>(b)Planking and strutting below the level of the base of existing foundation (measured to back, front and both ends of the underpinning also between each section of the underpinning) shall be so desc. (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)</p>
H6 58		<p>Conc wk shall be given in accordance with Section F hereof. Brickwork, pinning up and damp-proof courses shall be given in accordance with section G hereof. Asphalt work shall be given in acc w Section L hereof. (Acc) (Cut) (D) (DW) (Enu) (SL) (Loc) (T) (Tpt) (W) (Wp)</p>	H6		<p>All other work in connection with underpinning shall be given in accordance with the rules of the applicable work section (Acc) (D) (Enu) (SL) (Loc) (T) (W) (Wp)</p>
			H7		<p>Protecting the work in this section shall be given as an item</p>

A.6. List of codings for SMM editions

Acc	= Access to the site or workpiece
Ad	= Adverse conditions (heat, cold, height, pressure, water, etc)
C	= Convenience for measurement
Cl	= Clarity
CU	= Classification unnecessary
Cut	= Cutting required
D	= Dimensions
DW	= Different Workpiece
E	= Error, inaccuracy or omission
Enu	= Enumerate
EO	= Extra over
Extg	= Existing work
F	= Face treatment (not application of different material)
Inc	= Include(d) in another item
IW	= Incremental working,
Loc	= Location
Ls	= Angles, mitres, squints etc
M	= Method
MsA	= Measure around
N	= Measurement always net
O	= Different Operation
P	= Provisional
Pat	= Pattern
PP	= Position plant
Pr	= Protection
R	= Rake or slope
Rad	= Radius
Sep	= Separated
Seq	= Sequential work
Sh	= Shape
SL	= Starting level
T	= Temporary item
Tpt	= Transport (verb)
U	= Unfair, inequitable
W	= Working space

A.7. Table of frequencies of codings for SMM editions

It cannot be stressed too strongly that no coding is more important than any other coding. There is no point in ranking their frequency because they are all equal in that respect. They are not parts of a whole, they are separate ‘ideas’. It is as if they came from a child’s pocket; two marbles, three toffees, one pencil, one small frog, a mouth organ, and so on. There appears to be little or no connection between any of them, so there is no ranking that can be done on inspection, (although the child may recognise connections, e.g. five marbles swapped for the frog).

Because of this, it has been decided to list the codes in their alphabetical order, and to place the various editions side by side in a table. The meaning of each code has been shown previously, so only the codes are listed. It is possible that the only aspect that will be demonstrated by this method is the researcher’s uniformity, or lack of same. It is also possible that another researcher can see connections.

It must be noted that because the SMM sections examined (Earthwork, Concreting and Masonry) are exactly the same for SMM2 as SMM1, (differences being in Slater and Tiler section), the figures for SMM2 are duplicates of SMM1. A similar situation arises with SMM5 and SMM5(metric). The clauses examined have precisely the same content, so that the codings will be the same: they are identified in the table in bold type.

Table A.7.1. Frequencies of Codes..

Code	SMM Edition						
	1	2	3	4	5	5M	6

Acc	215	215	226	210	244	244	276
Ad	9	9	8	10	12	12	9
Alt	5	5	5	6	6	6	6
C	5	5	5	3	5	5	-
Cl	2	2	1	1	1	1	-
CU	-	-	-	15	71	71	53
Cut	65	65	70	63	79	79	75
D	221	221	233	220	300	300	352
DW	7	7	13	16	34	34	13
Enu	107	107	219	213	286	286	361
EO	4	4	3	5	16	16	25
E	-	-	-	1	-	-	-
F	3	3	3	11	25	25	20
Inc	13	13	11	15	17	17	29
IW	16	16	16	19	14	14	28
Loc	107	107	221	209	272	272	345
Ls	45	45	42	40	30	30	7
M	1	1	1	5	5	5	3
MsA	2	2	1	2	2	2	12

N	22	22	24	32	25	25	29
O	10	10	11	7	6	6	35
Pat	1	1	1	-	-	-	-
P	1	1	3	6	6	6	-
PP	-	-	1	11	16	16	20
Rad	20	20	23	21	55	55	34
R	25	25	25	25	57	57	53
Sep	-	-	-	8	10	10	-
SL	194	194	198	206	255	255	285
Sh	52	52	49	53	54	54	26
T	167	167	175	120	165	165	188
Tpt	52	52	55	92	121	121	25
U	4	4	1	2	3	3	1
W	205	205	222	208	261	261	342
Wp	212	212	225	220	274	274	343
Wt	10	10	9	13	17	17	5

APPENDIX B

Case study photographs

Photo E.1.1



Photo E.1.2.



Photo E.1.3

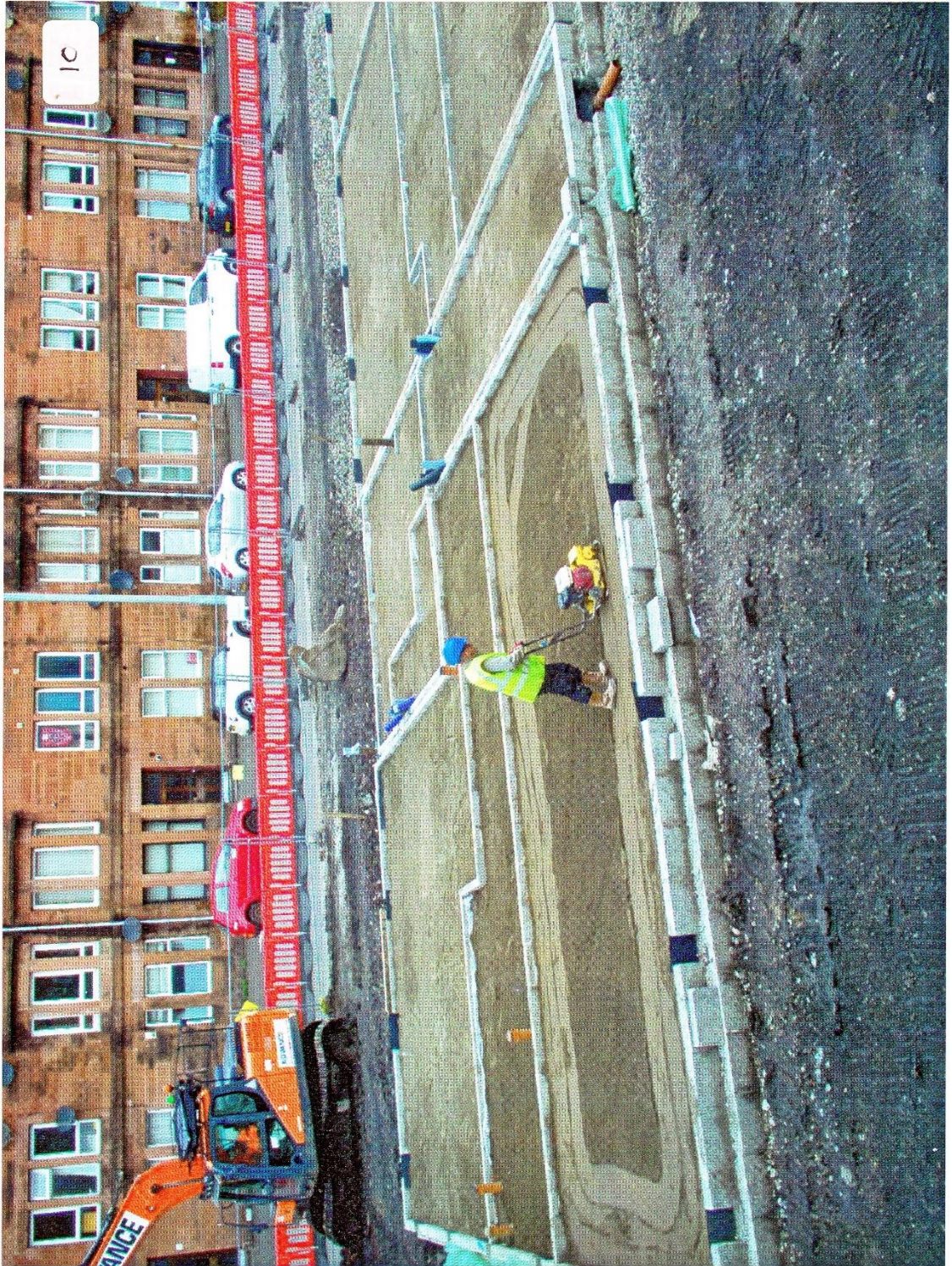


Photo E.1.4



Photo E.2.1



Photo E.2.2.



Photo E.2.3.



Photo E.2.4.



Photo E.2.5



Photo E.2.6.



PhotoE.3.1.



Photo E.3.2



Photo E.3.3.



Photo E.3.4.



Photo E.4.1.



Photo E.4.2.



Photo E.4.3.



Photo E.4.4.



Photo E.4.5.



Photo E.4.6.



Photo E.4.7.



Photo C.1.1.



Photo C.1.2.



Photo C.1.3



Photo C.1.4.



Photo C.1.5.



Photo C.1.6.



Photo C.2.1.



Photo C.3.1.



Photo C.3.2.



Photo C.3.3.



Photo C.3.4.



Photo C.3.5.



Photo C.3.6.



Photo C.3.7.



Photo C.3.8



Photo C.3.9.



Photo C.3.10.



Photo C.3.11.



Photo C.4.1.



Photo C.4.2.



Photo C.4.3.



Photo C.4.4.



Photo C.5.1.



Photo C.6.1.



Photo C.7.1.



Photo C.7.2.



Photo C.7.3.



Photo C.7.4.

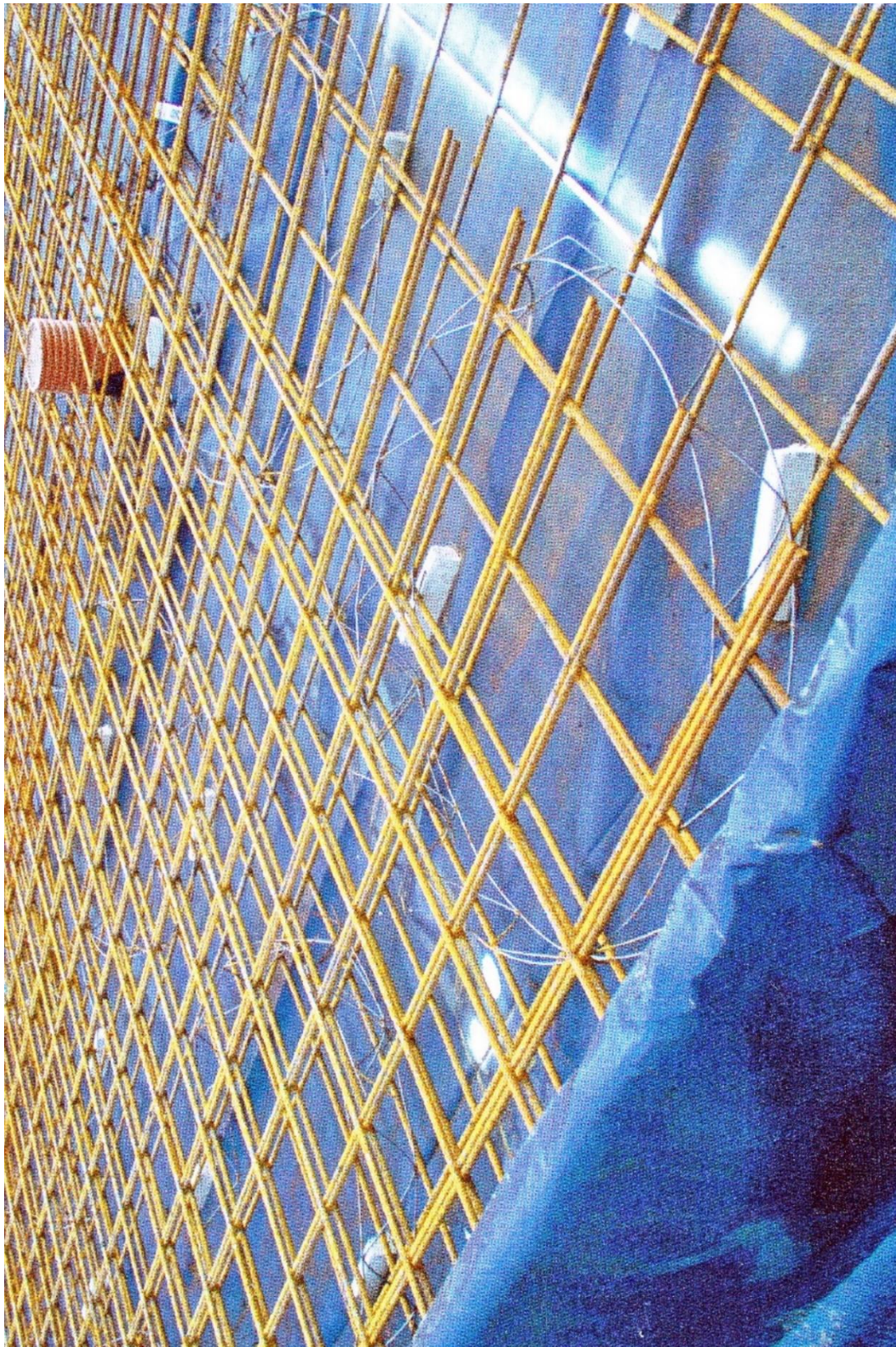


Photo C.7.5.



Photo C.8.1



Photo C.8.2.



Photo C.8.3.



Photo M.1.1.



Photo M.1.2.



Photo M.1.3.



Photo M.1.4.



Photo M.1.5.



Photo M.1.6.



Photo M.1.7.



Photo M.2.1



Photo M.2.2.



Photo M.3.1.



Photo M.4.1.



Photo M.5.1.



Photo M.5.2.



Photo M.5.3.



Photo M.6.1.



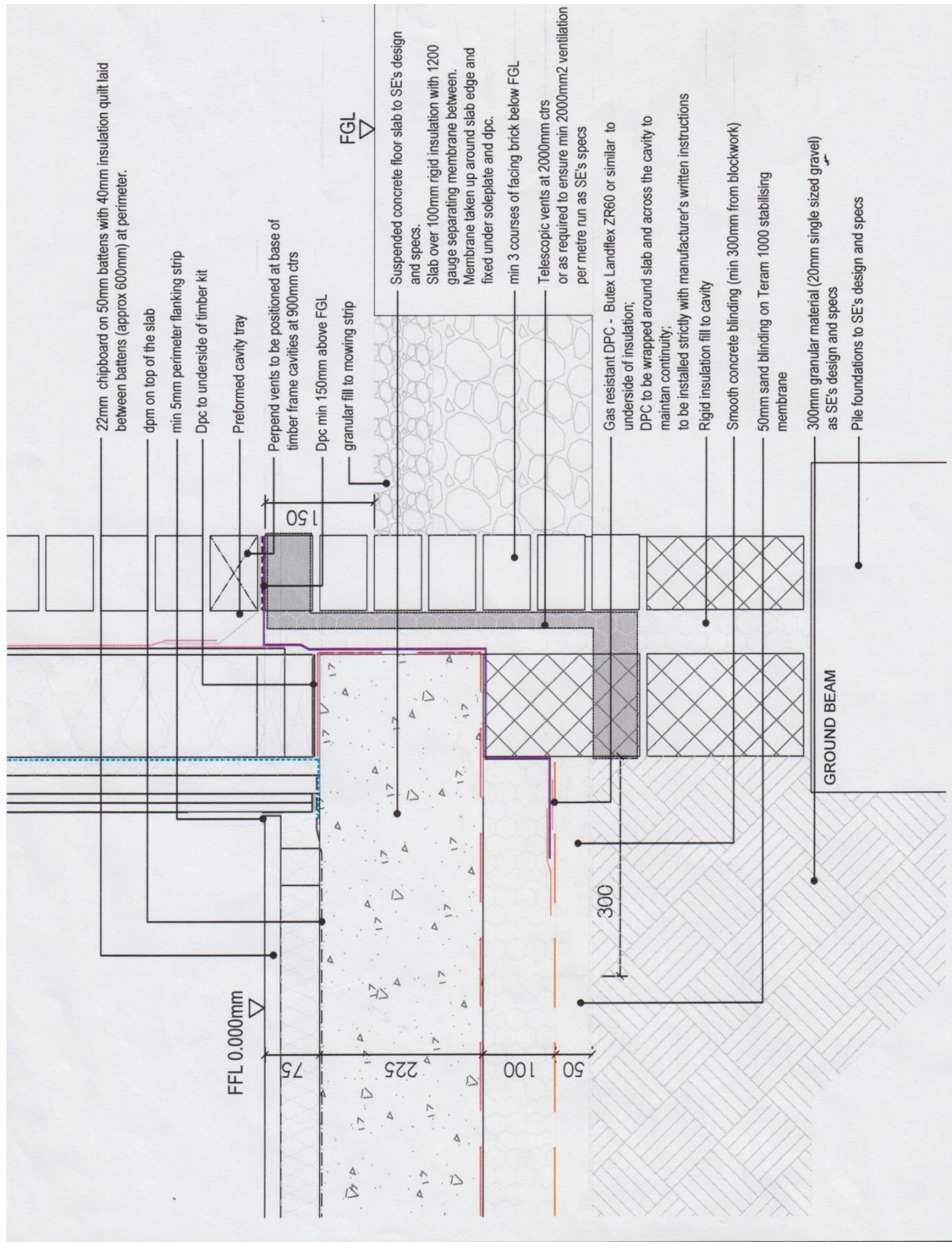
Photo M.7.1.



Appendix C

C.1. Drawings.

C.1.2. Site 1, Ground floor slab, edge detail.



Appendix C.2. List of verbs.

C.2.1. Introduction.

This appendix contains a list of words which have been considered for use in describing actions involved in building work. Against each word are codes, the meanings of which are as follows:

- A. The verb indicates the tool used in performing the action
- B. The material worked upon is indicated, or a characteristic such as shape, grain, texture.
- C. A workpiece 'name' is indicated, or a characteristic such as position .in the building, function, or relation to other workpieces.
- D. It is a synonym of another appearing in the list.
- E. The 'action' represented by the word can be broken down into parts that can be described by other words on the list.
- F. It describes a result requiring no action by operatives, being due to factors out of their control, eg., a characteristic of the material, such as 'absorb', or chemical action between materials, e.g., 'set'. They involve more than one material.
- G. The verb is a homonym e.g., 'grade' to a carpenter could mean sorting timber into various qualities; to an excavator driver it means 'working to a gradient'.
- H. The verb does not indicate an action producing a workpiece, and sometimes requires a 'passive' rôle of the operative, e.g., 'to cool', 'to expose', 'to keep clear'. Such verbs can apply to one material only, unlike those coded 'F'.
- P. This code indicates a preferred verb.
- Q. Indicates an item which cannot be included in any of the foregoing categories.

Of the verbs listed, those coded 'A' to 'G' inclusive cannot be considered as actions because they do not comply with the requirements. Those coded H whilst not producing a workpiece as defined contain some words which describe important stages in production and therefore require more consideration.

The preferred verbs, 'P', have generally been chosen because they are the most commonplace available and hence likely to be the most useful in communicating instructions to operatives.

Some, preferred during early examination, were later rejected as being synonymous with or replaceable by one or more preferred verbs, which is why some have more than one coding.

A proportion of verbs were rejected for more than one reason, but this has not been shown because it might be confusing.

In some cases a short definition has been given to clarify the coding, particularly in the case of synonyms.

Because they are verbs, the word 'to' is inferred before each.

C.2.2. List of verbs

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Abrade										O	
Absorb							X				
Accelerate							X				
Adapt	Alter				X						
Add	Place/pour a material on another				X				X		
Adhere	Stick				X						
Adjust	Alter				X						
Aerate						X					
Agitate	Stir or vibrate				X						
Align						X					
Allow										O	
Alter						X					
Anchor	Hold in position				X						
Anodise						X					
Apply	Place a fluid upon a surface					X					
Ashlar				X							
Asphalt			X								
Assemble						X					
Attach						X					
Attend						X					
Backfill						X					

Bag	Texture a surface with sacking	X											
Bail				X									
Bale				X									
Barrow		X											
Basket out		X											
Batch	Collect or measure in batches				X								
Batten	Add or fasten with battens		X										
Batter	Form at an angle with vertical			X									
Bead	Make or fix bead or beading		X										
Beam fill	Filling between joists/rafters			X									
Bed				X									
Bench	Conc fill to base of manhole					X							
Bend												O	
Bevel	Form a splayed shape			X									
Blast						X							
Bleach							X						
Blend	Mix or match												
Blind	Fill interstices in hardcore etc.			X									
Block bond				X									
Block out				X									
Blow out						X							
Board	Cover with boarding		X										

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Boast	Texture surface with boaster	X									
Body in	Give depth by applying several coats					X					
Boil				X							
Bolt			X								
Bond	Lay brick/stone to pattern			X							
Bone	Use boning rods for levels					X					
Bore	Hole or perforate				X						
Boss	Dress around complex shape				X						
Bottom up	Trim excavation base to level				X						
Box				X							
Brace				X							
Braze	Join by brass welding				X						
Break										O	
Brick up			X								
Brush		X									
Buff	Polish				X						
Build						X					
Build in						X					
Burn										O	
Burn off						X					

Burnish	Polish				X							
Bush	Provide with a bush			X								
Bush hammer		X										
Butt	Place two pieces end to end			X								
Butter	Place mortar on a brick			X								
Cable			X									
Calibrate						X						
Cant	Move to angle; not vertical			X								
Cap off				X								
Carcass	Fix 'bare bones' of a building			X								
Carry	Move				X							
Carry out	Move or execute				X							
Cart away	Remove				X							
Carve	Cut to a shape			X								
Case	Encase, surround a material					X						
Cast						X						
Caulk	Pack a space tightly			X								
Cement wash			X									
Center	Erect centering					X						
Chamfer	Cut edge of material at angle			X								
Chase	Cut a groove			X								

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Check										O	
Chip	Cut off in small pieces			X							
Chisel		X									
Chop	Cut in irregular pieces			X							
Clamp		X									
Clean										O	
Clear away	Remove				X						
Clearcolle			X								
Clench	Hammer over end of nail			X							
Close										O	
Coat	Cover with a fluid				X						
Colour	Cover with paint/stain				X						
Comb		X									
Compact										O	
Compress	Compact				X						
Concrete			X								
Connect						X					
Consolidate	Compact				X						
Construct						X					
Convert						X					
Convey	Move					X					

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Disconnect						X					
Dismantle						X					
Dispose of						X					
Distemper			X								
Distribute						X					
Divide	Separate				X						
Dovetail				X							
Dowel			X								
Drain						X					
Draw through						X					
Dredge						X					
Dress										O	
Drill		X									
Drive										O	
Dry out						X					
Dry pack						X					
Dub out						X					
Dust			X								
Earth	Complete circuit to earth					X					
Ease						X					

Edge				X								
Embed				X								
Emboss				X								
Emulsify							X					
Enamel			X									
Encase						X						
Enlarge						X						
Erect						X						
Etch						X						
Evaporate							X					
Examine											O	
Excavate					X							
Execute						X						
Expand											O	
Expose						X						
Extend						X						
Extract											O	
Face	Provide a surface			X								
Fasten	Join, hold together				X							
Feather	Taper off				X							
Felt			X									
Fence				X								
Fill				X								

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Finish						X					
Fire						X					
Fit						X					
Fix						X					
Flag			X								
Flange				X							
Flatten										O	
Flat	Rub down gloss surface				X						
Flaunch						X					
Float	Finish with a float	X									
Floor				X							
Flute	Form grooves				X						
Fold	Bend a flexible material				X						
Fork		X									
Form	Give form or shape to					X					
Frame				X							
Gauge								X			
Gild						X					
Glaze			X								
Gloss			X								
Glue			X								

Gouge		X											
Grade								X					
Grain				X									
Grease			X										
Grit			X										
Grind	Abrade				X								
Groove				X									
Grout	Pour cement grout		X										
Grub up	Remove				X								
Guillotine		X											
Hack off	Remove				X								
Hack out	Remove				X								
Hack up	Remove				X								
Halve	Make a 'halved' joint			X									
Hammer		X											
Handle	Move				X								
Hand pack	Hand used as a tool	X											
Hang						X							
Harden							X						
Harrow		X											
Haul	Move				X								
Haunch						X							
Heat												O	

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Hinge			X								
Hoist	Move upward				X						
Hold										O	
Hole	Cut a perforation				X						
Hone						x					
Hook				X							
House				X							
Identify										O	
Impregnate						X					
Include									X		
Indent				X							
Infill				X							
Insert	Place in a hole				X						
Inspect	Check				X				X		
Install						X					
Insulate				X							
Investigate										O	
Jack		X									
Join						X					
Joint	Join with a joint				X						
Joist			X								

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Lip	Fix material to an edge			X							
Liquify						X					
Load	Place on transport				X						
Locate	Place in position or find							X			
Loosen										O	
Lop	Cut off				X						
Lower	Move downward				X						
Lubricate	Apply a lubricant				X						
Luff	Move jib up or down				X						
Machine		X									
Maintain						X					
Make good						X					
Make up						X					
Marble				X							
Mark										O	
Mask	Cover to protect adjacent work				X						
Match	Compare for similarity/ Board							X			
Measure										O	
Metallize					X						
Mitre				X							
Mix										O	

Model						X						
Mortise	Make part of a joint			X								
Mould						X						
Mount						X						
Move											O	
Nail			X									
Neutralise							X					
Notch				X								
Offload	Remove from transport					X						
Offset	Change direction (of a pipe)			X								
Oil			X									
Open											O	
Overhaul							X					
Pack	Place tightly in position					X						
Pad	Stuff, cover, fill with soft material			X								
Paint			X									
Panel							X					
Paperhang			X									
Parge	Plaster, particularly flues						X					
Pare	Cut by slicing or shaving					X						
Partition				X								
Paste			X									

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Pave	Cover with slabs					X					
Pebbledash			X								
Pellat	Cover screw head with pellat					X					
Perforate					X						
Piece in (out)	Cut & shape material to replace cut out					X					
Pile	Position & place a pile					X					
Pin			X								
Pitch	Cover in pitch, place pile, timber roof							X			
Place										O	
Plane		X									
Plank & strut			X								
Plant	Place & nail in position					X					
Plaster			X								
Plate	Electro plate or fix steel plate							X			
Plough		X									
Plug	Place material tightly in hole				X						
Plumb	Work as plumber, check vertical				X						
Point	Place mortar in masonry joint				X						
Polish										O	

Position	Place				X								
Pour												O	
Precast						X							
Prefabricate						X							
Prepare						X							
Preserve						X							
Press						X							
Pressure grout						X							
Pre-stress						X							
Prick up	1 st coat plaster to metal lath		X										
Prime	1 st coat of paint			X									
Prop	Support					X							
Proportion	Measure					X							
Protect							X						
Provide											X		
Pull down							X						
Pull through	Clean									X			
Pump		X											
Pun	Compact					X							
Push	Move					X							

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Punch		X									
Quieten						X					
Rack	Place in rack, rake, batter							X			
Raise	Move upward				X						
Rake	Use rake, work not vertical							X			
Rake out	Remove mortar from joint				X						
Ram	Compact				X						
Ramp	Place or fix at angle				X						
Rebate	Groove on an edge			X							
Receive									X		
Reduce	Make smaller or lower					X					
Reduce levels	Dig to specific level				X						
Regulate						X					
Reinforce	Strengthen			X							
Reinstate	Replace previously existing					X					
Remove	Move away				X						
Render	Coat with mortar					X					
Renew						X					
Repair						X					
Retain	Hold in position				X						

Riddle	Sieve	X											
Rig						X							
Rip	Saw along grain			X									
Rivet			X										
Rod		X											
Roll	Move, consolidate				X								
Roll up												O	
Roof				X									
Rotate					X					X			
Rough cast						X							
Roughen				X									
Rough in	Bring workpiece to rough shape					X							
Round				X									
Rout	Use a router	X											
Rub down	Abrade				X								
Run						X							
Sand			X										
Sand blast			X										
Saw		X											
Scabble	Roughen			X									
Scaffold			X										

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Scale	Remove scale, use ruler							X			
Scarf	Joint in specific way			X							
Scarify		X									
Score						X					
Scrape		X									
Scratch					X						
Screed	Place layer of mortar mix					X					
Screw			X								
Scribe	Cut to fit irregularities					X					
Scrim			X								
Scroll	Form particular shape			X							
Seal							X				
Secure	Fasten or hold					X					
Seed			X								
Select										O	
Separate	Set aside, cut off							X			
Service						X					
Set	Become solid, place.							X			
Set aside	Move				X						
Set out						X					
Shape				X							

Sharpen				X								
Shear	Break or cut				X							
Sheet	Protect with sheets		X									
Sheet pile			X									
Shield	Protect				X							
Shore	Support				X							
Shot blast						X						
Shot fire					X							
Shutter						X						
Sieve		X										
Signwrite				X								
Silence					X							
Sink	Cut into surface for screw											
Size	Coat with size, check size							X				
Skim	Apply thin plaster coat			X								
Slab			X									
Slake	Add water to quicklime							X				
Slate			X									
Slew	Rotate, swivel				X							
Slide	Move				X							
Slot				X								
Slot screw			X									
Smooth				X								

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Soak							X				
Soil			X								
Solder			X								
Solidify							X				
Sort										O	
Sow					X						
Spade face		X									
Spike			X								
Splay				X							
Split			X								
Spray					X						
Spread					X						
Square	Make square, put right							X			
Squeeze					X						
Stabilise						X					
Stack				X							
Stain				X							
Staple			X								
Start									X		
Stick						X					
Stiffen							X				

Stipple				X								
Stir											O	
Stop	End, apply stopping							X				
Straighten				X								
Strain					X							
Stress					X							
Stretch					X							
Strike	Remove, hit.				X							
Strip	Remove				X							
Strut	Support				X							
Support	Hold in position				X							
Surround				X								
Suspend	Hold in position				X							
Swage	Produce particular shape			X								
Sweep	Clean				X							
Swivel	Move around pivot				X							
Take down	Remove				X							
Take from	Move				X							
Take off	Remove				X							
Take out	Remove				X							
Take up	Remove				X							
Tamp	Compact				X							
Tank				X								

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Tap	Cut thread, strike gently				X						
Tape			X								
Taper				X							
Tee off				X							
Temper						X					
Tenon				X							
Tension	Tighten				X						
Test						X					
Texture				X							
Thatch			X								
Thicken						X					
Thin						X					
Thread	Cut a thread				X						
Throat				X							
Throw out	Remove				X						
Tie				X							
Tighten										O	
Tile			X								
Till	Dig				X						
Timber			X								
Tin			X								

Tint				X								
Tongue				X								
Touch in					X							
Transport	Move				X							
Trap				X								
Treat	Apply a coating				X							
Trench				X								
Trim	Cut off surplus, fix a trim								X			
Trowel		X										
Tunnel				X								
Turn					X							
Twist											O	
Undercoat				X								
Underpin				X								
Unload	Remove from transport				X							
Unroll											O	
Uphold	Hold in position				X							
Vaporise								X				
Varnish			X									
Veneer					X							
Ventilate				X								
Vibrate	Compact	X										
Wallpaper			X									

C.2.2. List of verbs (continued)

Verb	Definition or alternative	A	B	C	D	E	F	G	H	P	G
Wash	Clean				X						
Water			X								
Waterproof				X							
Wax			X								
Weather	Shape to drain water			X							
Weigh					X						
Wedge		X									
Wedge and pin						X					
Weld					X						
Welt	A particular shape			X							
Wheel	Move				X						
Wipe	Clean				X						
Wire up			X								
Withdraw	Remove				X						
Work around									X		
Work into									X		
Work up						X					
Wrap				X							
Wreath	Produce particular shape			X							