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**AN INVESTIGATION OF ANODISED ALUMINIUM DECORATIVE
APPLICATION AS A TECHNIQUE FOR MALAY CONTEMPORARY CRAFT
PRACTICE**

JEFFRY AZHA SAIDIN

A thesis submitted to the University of
Northumbria at Newcastle in partial fulfilment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

School of Design
University of Northumbria at Newcastle

August 2004
Vol. 1 (Main Text)

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ABSTRACT

"An Investigation of Anodised Aluminium Decorative Application as a Technique for Malay Contemporary Craft Practice".

The Malaysian aluminium industry has been of considerable economic importance to the country yet its craft potential for surface decoration has never been explored. Aluminium can absorb and hold dyes by anodising it, thereby colouring the surface of the metal. *Batik* is a popular craft on the Malaysian east coast and makes a major contribution to the Malaysian craft economy. It has long been established as an accepted means of creating decorative cloth for traditional and official costume using particular dyes and a traditional textile printing process. There are similarities to the natures of both these processes in terms of their use of dyes for decorative application. Thus, the purpose of this research was to establish the appropriateness and applicability of developing an integrated process of batik and anodised aluminium, with the anticipation that it can offer decorative opportunities to Malay contemporary craft practice.

To fulfil this purpose, this research utilised an experimental practice-led methodology based on a combination of Action research and case study methods as a mode of inquiry. The research began with a review of the historical and contemporary practices of the decorative applications of batik and anodised aluminium and their geographic distribution, the industrial and socio-economic context of aluminium resources and their usage. A survey of contemporary Malaysian craft practice compared data from the Malaysian Handicraft Development Corporation (MHDC) with evidence from showrooms concerning the range of contemporary craft artefacts. Qualitative research involved semi-structured interviews with people connected with craft practice, which provided data on types of batik decoration. This identified areas of craft practice that lend themselves to experimentation with surface decoration and the potential range of collaborators for the experimental case studies. Experiments were conducted on the application of batik reactive dyes as the colourant for anodising aluminium and in relation to possible methods of creating surface patterns. Evidence from the experiments were used to create reference materials for case studies of craft practice on the application of the integrated process. The case studies then involved; presentation of the integrated process to a selected range of craft practitioners, a questionnaire to determine their attitude and understanding to the process, their perception of its cultural value and market potential, hands-on experience of the integrated process guided by the reference materials derived from the earlier experiments, and semi-structured interviews to reveal the general appreciation and recommendations of craft practitioners to the process.

The findings from the research process demonstrate that batik dyes can be integrated with anodised aluminium as a new decorative process in Malaysian craft practice. Interviews with craft practitioners revealed that aluminium has not been previously utilized as a material for the crafts and the engagement of selected practitioners in the action research case studies showed that there is value in exploring this integrated process to create new opportunities for Malaysian crafts practice. The peer review from organisations representing stakeholders from the Malaysian community correlated and validated these conclusions in terms of artistic, professional, educational and commercial standpoints. The findings indicate that the research constitutes a process for the introduction of other new materials and techniques to the Malaysian craft making community.

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ABBREVIATIONS

ALCOM	Aluminium Company of Malaysia
ALUM	Aluminium
ARTHIST	Art History
BBMB	Batik Malaysia Berhad
CDR	Centre for Design Research
F/ART	Fine Art
F/BASED	Forest Based
GRAPH	Graphic
INDUST	Industrial
KLCC	Kuala Lumpur City Centre
KLIA	Kuala Lumpur International Airport
MARA	Majlis Amanah Rakyat
MARDI	Malaysian Agriculture Research and Development Institute
MHDC	Malaysian Handicraft Development Corporation
MIA	Malaysian Institute of Art
MIDA	Malaysian Industrial Development Authority
R/DES	Research Design
SIL	Silver
SIRIM	Standards and Industrial Research Institute of Malaysia
UiTM	Universiti Teknologi Mara
UNCTAD	United Nations Conference Trade and Development
UNN	University of Northumbria

ACKNOWLEDGMENTS

I am greatly indebted to my Principal supervisor Director of Studies, Dr. R.A. Young (CDR) University of Northumbria (UNN), for kindly providing guidance throughout the development of this study. His comments have been of greatest help at all times. Gratitude also goes to other members of supervision team, Professor James More, Head of School of Design and Mr. Trevor Duncan, Head of 3-D Design Department, for the help extended to me, the valuable discussion that I had with them during the course of the research. Many thanks to Professor Mike Press from Sheffield Hallam University and Mr. Rickard Wittingham from University of Northumbria, for their willingness to be my external examiners.

Specials thanks are due to Malaysian Handicraft Development Corporation (MHDC), Universiti Teknologi Mara, Aluminium Company of Malaysia (ALCOM), Standard and Industrial Research Institute of Malaysia (SIRIM) for their support in organising my case studies in Malaysia. The episode of acknowledgement would not be complete to all Malaysia Craft Practitioners involved in the research without their time, interest and information the collection of data and research findings presented here would not be possible. I am also indebted to the Universiti Teknologi Mara (UiTM) for its financial and support to undertake this study.

I wish I would never forget the cooperation I received from member of the Centre for Design Research is gratefully acknowledge. I will be failing my duty if I do not mention New Media Department staff especially Joyce, Grant, Yves and David for their timely help.

I also want to thank my parents, who taught me value of hard work by their own example. Lastly, I am grateful to my wife Rabitah for the inspiration and moral support she provided throughout my research work. Without her loving support and understanding I would never have completed my present work. Particularly I owe to my children's Nawar, Izzaty, Ashraf, Amirul and Nabilah for their sacrifice.

CHAPTER 1

INTRODUCTION, PURPOSE AND APPROACH

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CHAPTER ONE: INTRODUCTION, PURPOSE AND APPROACH

The main purpose of this chapter is to discuss the background and the reasons behind the current research. Section 1.1, explains an introduction concerning the opportunities of aluminium as a craft medium in Malaysian context. This provides information on the use of aluminium in global applications and the technology of anodised aluminium. The craft background of batik was also explained in relation to the research work. Section 1.2., describes the potential of aluminium to absorb dyes through the process of anodising, the formation of the Malaysian Handicraft Development Corporation (MHDC) as a key government organisation responsible for the craft industry and finally the development of metal work concerning the use of materials. Section 1.3 explains the research aim of the investigation. Section 1.4 and Section 1.4.1 provide explanations of the methodological approach by defining the concept of practice-based research. Section 1.5, explains the relationship of Action Research and Practice-Based research. Section 1.6 describes how data was collected through five stages as explained in Stage 1: literature search and review, Stage 2: craft survey, Stage 3: qualitative interviewing, Stage 4: experimental process and finally Stage 5: case studies of craft practice. Section 1.7 provides a guide to the organisation and presentation that described seven chapters of the thesis.

CHAPTER ONE: INTRODUCTION, PURPOSE AND APPROACH

1.1 Introduction

The aim of this research is to explore the opportunities for using aluminium as a craft medium in Malaysia in relation to its ability to anodise colour.

In the 21st century, aluminium is considered a modern material because it is light in weight. This has been revealed in the literature of Untracht (1992, p.31) concerning 'lightweight' that aluminium is categorised as the light metal group which also includes other metals such as magnesium and titanium etc. It is also ubiquitous to global production and can be the design solution for a wide range of products. It is less expensive than other metals and can be seen in the bodywork of cars such as the Audi (A8 series), camping materials, household items, architectural components etc. Malaysia began manufacturing aluminium in 1960. Globally, a few inspired craft practitioners began using aluminium sensitively as a craft material in 1980. Aluminium is a non-degradable, ecologically sound material and is readily available in Malaysia. Although its use poses a conflict in terms of ecological issues such as the pollution from bauxite mining during the extraction of aluminium, preventive measures have been taken by the aluminium industry. This matter has been a prime consideration in sustainable conduct policy within the industry, which encompasses the issues of economy, environment and social responsibility (International Aluminium Institute 2000). In a report by United Nations Environment Programme (UNEP 2002 p.3) concerning sustainable development guidelines for best practices from the aluminium industry, the industry are committed to increasing global recycling activities. The European Aluminium Association (1999, p.3) also ascertain that recycling aluminium makes sense economically, technically and, of course, ecologically. Another characteristic of aluminium, is that it has metallic qualities and decorative potential through *anodising*, as Idriss (1994, p.2) points out that aluminium without some surface treatment is like good wood without varnish.

The *anodisation of aluminium* is an electrochemical process, which creates a porous coating, giving aluminium the ability to absorb dyes, thereby colouring its surface.

Historically this technology has been used by industry for functional industrial applications. Jacques Bougie (1998) the President of the Aluminium Association urged world manufacturers to pursue aluminium as the 'material of choice' in the 21st century. Elizabeth Goring (1999, p.29), commented that the use of aluminium remains relatively little exploited by jewellers as a material of creative expression.

In the area of textiles, *batik* is a popular craft on the Malaysian east coast (MHDC 1992). Batik is the skilful transfer of a decorative design onto cloth by a traditional method using melted wax as a resist to dye agents. The technique relies on the pattern being established on cloth by line drawing made in melted wax. The pattern is then painted with reactive dyes, then chemically sealed from leaching. Batik has long been the accepted means of creating decorative cloth for traditional and official costume in Malaysia. The production of batik makes a major contribution to the Malaysian craft economy. According to a recent report from '*Karyaneka*', the marketing agency for MHDC, *batik* artefacts contribute the highest volume of sales of Malaysian crafts and are greatly in demand (Karyaneka 1999, p.64).

1.2 Rationale for the study

Aluminium, like batik, utilizes dyes in its decorative industrial application. Chemical literature reveals a special dye for aluminium, which is different from textile dyes (Fishlock 1962, p.300). The Clariant Corporation (1999), is the largest supplier of dye chemicals to global markets to include Malaysia and caters for the batik makers of high quality decorative fabrics. Through local contact with the Malaysian supplier, three grades of dyestuff have been identified which originated from Germany, Switzerland and India. Literature also reveals that aluminium can absorb any dyes. Both batik and anodisation have similar processes of dying for decorative application. Jewellers from the United Kingdom, who have gained an international reputation and whom the researcher has reviewed, include Jane Adam (1999). Adam produced her current work in anodised aluminium with a decorative application strongly influenced by Indian textiles. This fruitful example might create a new opportunity for the development of decorative treatments of aluminium in Malaysian

craft practice. Roslan (1991, p.95) also viewed aluminium in her research work as a new material for the future of craft production.

Amran (1999) has conducted recent research concerning the nature and development of Malaysian crafts. In his draft PhD. thesis chapter on the subject of the "*Taxonomy and Hierarchy of Traditional Malay Craft Practices in Malaysia*", he mentions that traditional materials employed by the craft practitioners especially in the area of metalsmithing, originate from the production of court artefacts. However the craft artefacts that are available today have changed their direction to a more commercial objective.

Currently, the Malaysian craft industries contribute a key element to the Malaysian Economy. The Malaysian Handicraft Development Corporation (MHDC) was formed in 1979 by the Malaysian government to ensure the development of national crafts in Malaysia. Due to this, various craft activities have been implemented, supported and new opportunities created for new generations of craft entrepreneurs with the mission to help the Malay craft practitioners.

In the long history of Malaysian metal work, craftsmen utilized silver and brass as a means of representing the traditions of Malaysian craft practice (Osman 1994 p.22). Such metal artefacts are delicately engraved with traditional motifs to reflect Malaysian cultural identity and this is of some importance to the local and tourist markets. Although these materials are locally available, at present there is uncertainty among the Malay craft practitioners as to their future because of the increasing cost of these precious and semi-precious metals (Wan Ismail 2001). Due to such costs, Malaysian craft metal artefacts are expensive for local and tourist consumers, resulting in a slowdown of sales for the industry. From the contextual research conducted in relationship to craft practitioners, craft marketers and designers within the field, it appears that aluminium may have considerable economic importance to the Malaysian craft industries (Saidin 2001).

Due to the strong traditional methods of contemporary Malaysian craft practitioners and a fundamental lack of their knowledge about aluminium technology, aluminium,

in the Malaysian context, is still a much-unused material. However, aluminium is an inexpensive metal in relation to Malaysian traditional craft materials and it is in abundant supply in Malaysia.

The earliest form of Malaysian batik production utilised dyes extracted from a large variety of natural resources such as fruits, seeds, leaves, roots, bark and the heartwoods of various types of tree (Roojen 1993, p.29-30). In the 20th century particularly in the 70's, the long tradition of using natural dyes in Malaysian batik making saw changes in dyeing application of batik to synthetic dyes, commonly used fibre reactive dyes imported from overseas such as Switzerland, Germany and India. Literature about the chemistry of dye substances specifically from Fishlock (1962 p.300) and LaPlantz (1988 p.114) revealed that there are differences between anodised aluminium dyes and fibre reactive dyes used in textile making. In relation to this, due to its long establishment in dyeing application of batik making through its colourful design on fabric, the hypothesis of this research is to enable aluminium and the anodising process to be integrated for decorative applications in the batik industry using contemporary batik dyes i.e. fibre reactive dyes. The completion of the research will also test and validate the appropriateness of the decorative application among craft practitioners in order to find their receptivity towards the technique. The validation will therefore identify the specific areas of craft that are interested and able to adapt this technology for the development of Malaysian new craft product design. It will also validate the methods that have been used to explore the introduction of new materials and processes within Malaysian craft practice.

1.3 Research Aims

The principle aim of this study is to explore anodised aluminium decorative application with the integration of batik dyes. It is hoped this integration will provide opportunities for Malaysian craft practice. The main objectives are:

- To explore colour variations in anodised aluminium using Malaysian batik reactive dyes.

- To document colour samples derived from the exploration for reference in developing decorative application for craft practice.
- To test and validate the appropriateness and receptivity of the decorative application technique to specific areas of Malaysian craft design and practice.

In relation to the above aims and objectives, the purpose of this programme is to address two questions posed in the present study. They are:

- Can the batik process be integrated with the process of anodising aluminium to provide a new decorative application for the Malaysian craft industries?
- Can that integrated process be embedded in Malaysian craft practices and represent opportunities to develop new aesthetic values or sustain traditional Malaysian cultural values?

1.4 Practitioner Based Research

1.4.1 Review of Methodologies for Practice Based Research

To achieve these objectives, the researcher realised that it would be necessary to create a body of evidence of practical work in order to justify the investigation on the issues. In academic research specifically Art and Design, the term ‘practice-based research’ or ‘practice-led research’ has been established within this field since the 1980’s and features practitioners’ central to inquiry through their own practice (Gray and Douglas 1996). In the Malaysian context this field of enquiry is relatively new. A recent example is the research conducted by Yan (2000), the first Malaysian who pioneered practice based methodology in his Ph.D research title, “*A Methodology for Fine Art Formulation Applied to Investment Casting Mould.*” His research relates to the investigation of the potential use of cuttlefish bone powder as an ingredient of moulding material for investment casting for bronze and glass. He utilised practice-based research as an approach to explore the theme, where the outcome of the research provided a potential application as a means of communicating the feasibility

to the practitioners of Fine Art and Craft. He also felt that this method would retain the vernacular transfer of 'know how', as he identified that the very network of communication is no longer sustainable within the current trend of craft practice, on which it has depended and which has largely disappeared. Yan's pioneering example of this methodological approach has given the researcher a precedent from which to extend the scope of practice-led application, specifically to the Malaysian Art and Design education.

Malins , Ure and Gray (1996) defined the concept of 'practice-led' research as research initiated in practice and carried out through practice. They address in their report, *The Gap: Addressing Practice-Based Research Training Requirements for Designers*, which suggests that:

"...practiced-based research is the most appropriate form of research for designers since the new knowledge from the research is directly applicable to the field and because the researcher is making best use of their existing skills and tacit knowledge of the subject".

(Malins , Ure and Gray 1996, p.1)

Gray also mentioned some of the specific methods used in practiced-based research in relation to information gathering. These are summarised below:

- Making art/design work
- Observation and drawing (in all forms)
- Sketchbook/notebook, idiosyncratic notation/symbol
- Visual diaries/self reflection/personal narrative/critical writing
- Photography/video sound
- Models/ experimentation with materials
- Concept mapping, diagrams
- Use of metaphor and analogy
- Organisational and analytical matrices, flow charts, story boards
- Multimedia/hypermedia applications

- Modelling/simulations, soft systems
- Electronic databases, visual and textual glossaries and archives

The above specific methods can also be integrated with social science methods, usually adapted in some way, e.g.:

- Case study
- Participant observation
- Personal constructs
- Interviews, questionnaires
- Multidimensional analysis
- Evaluative techniques like semantic differential, multiple sorting

To support this methodological approach, Gray (1996 p.18) also presented some evidence of practice-led research done by previous doctoral researchers in Art and Design. One of the examples given, from the research work done by Iain Burt, who adopted a role as a ‘facilitator’ in a collaborative project, with whom he employed two practitioners as part of his case studies in his investigation of hypermedia. Another example is the work done by John Pengelly to produce a series of large-scale prints, which explore the creative possibilities of safe, environmentally sensitive and sustainable materials and processes. Although this research embodies and visualises the key concepts of the research, his research work is completely accessible and methodologically transparent.

The above listed criteria have helped to form the conceptual framework of the researcher and this study, where the term ‘practice’ has been used to provide evidence of practical work on anodised aluminium decorative application in the study’s Experimental Process. The results of this process are then used to test the receptivity of Malaysian craft practitioners. The decorative technique was also made accessible to the craft practitioner participants through the assistance of an audio-visual presentation, which enabled them to produce their own decorative samples of anodised aluminium in specially organised craft workshops.

1.5 Action Research as a Potential Research Method and Tool

1.5.1 Rationale

The body of practical work produced through the Experimental Process, has provided 'evidence', in line with the primary aim of the investigation, to explore colour variations in anodised aluminium using Malaysian batik reactive dyes. The results from the experiments were documented for reference in developing decorative applications for craft practice.

The action research literature comprised various texts in order to define its potential application in this present study. The definition gathered focus on the relation of the study to conduct a feasible research that required interaction or participation from the craft community in order to gauge their receptivity to the integrated process. Thus from McNiff, Lomax, and Whitehead (1996) were found to have developed views of Action research that were thought to be appropriate to the perspective of the researchers, in conducting an Action research project:

'...action research is a way of defining and implementing relevant professional development. It is able to harness forms of collaboration and participation that are part of our professional rhetoric but are rarely effective...[it] ...starts with a single committed person focusing on his/her practice. It gains momentum through the involvement of others as collaborators. It spreads as individuals reflect on the nature of their participation, and the principle of shared ownership is established. It can result in the formation of a self-critical community: extended professionals in the best sense of the term.'

(Lomax 1990b p.10)

In another definition by Dick (1993 p.8), he explains that as the name suggests, action research methodology has the dual aims of action and research....He defines *action* as; to bring about change in some community or organisation or program. While *research*, relates to understanding on part of the researcher or the client, or

both (and often some wider community). He also described the use of action research from his experiences, which gives a main emphasis on 'action', with research as a fringe benefit that may take the form of increased understanding on the part of those most directly involved. The result from the application of this methodology is the outcomes of change and learning for those who take part. Both approaches required action to inform understanding, and understanding to assist action.

In an example of a recent PhD study by Warbuton (2001) she argues that Action Research methodology lends itself to any practice-led research programme that has utilised its research materials, activities and outcomes of everyday life of practice. She also acknowledges the opinion of Archer who suggest that the practitioner activity can be deemed as a research activity if it has a positive answer to the following five questions:

“was the practitioner activity an enquiry whose goal was knowledge?
was it systematically conducted?
were the data explicit?
was the record of the conduct of the activity ‘transparent’?
were the data and the outcome validated in appropriate ways?”

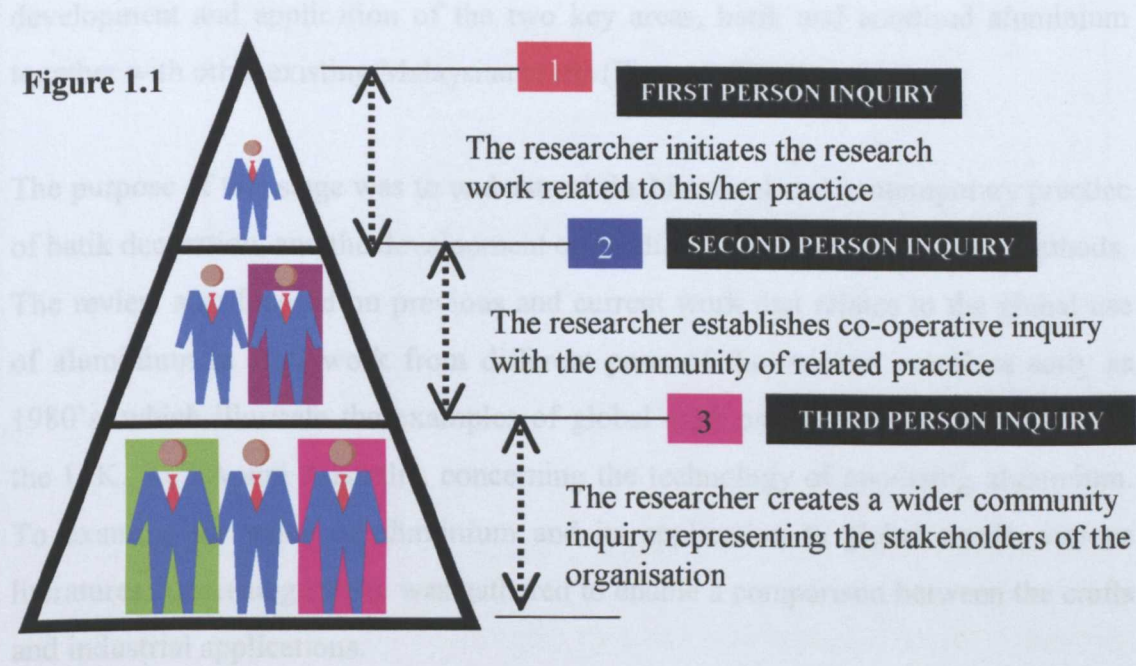
These questions posed by Archer define the true quality of practitioner activity, which also defines research activity as ‘a systematic enquiry whose goal is communicable knowledge. Archer also cited (Frayling’s) presentation, concerning the three classifications in respect of Art and Design research;

- Research ABOUT practice,
- Research FOR THE PURPOSES of practice, and
- Research THROUGH THE MEDIUM OF practice.

The classifications above denote the important of ‘practice’ in research work, which coincide with the theoretical approach of Action Research mode of enquiry. Warbuton (2001 p.74) considered her research work as ‘practice and practitioner-based’, which is concerned with research through the medium of practice. She also concluded and believed that, in order for practitioners to articulate their implicit

process, Action Research methodology is the most appropriate research method to adopt.

A paper presented by Reason (2001), “ *Learning and Change through Action Research*” provides a clear route to the process of inquiry using Action research practice. He explained that the level of inquiry involving a person or practitioners in Action research practice must integrate the First, Second and Third person inquiry (Figure 1.1). The *First Person inquiry* as described by Reason, referred to the researcher who realised and identified a problem within his community or organisation etc. as an issue that he or she was going to initiate in the research work.



LEVEL OF INQUIRY IN ACTION RESEARCH PRACTICE

The *Second Person* inquiry addresses the researcher’s ability to inquire face to face with the community concerning the issue. The final inquiry of the *Third Person*, attempts to create conditions that awaken and support the inquiring qualities of first- and second-person research/practice in a wider community. Thus this reaction will empower participants to create their own knowing-in-action in collaboration with others.

In relation to this study, the researcher’s *first person* inquiry concerned the investigation of anodised aluminium decorative application as a technique for Malay

contemporary craft practice. The *Second Person* inquiry involved the researcher in qualitative interviews with the craft practitioners concerning their nature of craft practice. Finally the *Third Person* inquiry of the study, presented the research work to a wider craft community involving peer review in selected organisations.

1.6 Data Collection Method

1.6.1 Stage One: Literature Search and Review

This stage of the literature search, reviewed the Malaysian context, the history of development and application of the two key areas, batik and anodised aluminium together with other existing Malaysian crafts (Figure 1.2).

The purpose of this stage was to understand the historical and contemporary practice of batik decoration, and the development of anodised aluminium decorative methods. The review also focused on previous and current work that relates to the global use of aluminium in craft work from different parts of the western world as early as 1980's, which illustrate the examples of global craft practitioners view point from the U.K., U.S.A and Australia, concerning the technology of anodising aluminium. To examine the value of aluminium and its application to global needs, various literatures concerning its use was gathered to enable a comparison between the crafts and industrial applications.

1.6.2 Stage 2: Craft Survey

A survey was conducted in Malaysia, which focused on contemporary Malaysian craft artefacts, in particular, those involving applied surface decoration. The information gathered in this survey was then reviewed and correlated against one secondary and one primary source of data. They were:

- Catalogues provided by MHDC and
- The researcher's survey of craft artefacts from the '*Karyaneka*' showroom

Figure 1.2

FIRST PHASE OF RESEARCH 1 PROJECT			
RESEARCH OBJECTIVES	RESEARCH QUESTIONS	METHODOLOGY	
To describe the historical and contemporary practice of batik decoration	What is batik?	STAGE 1 Literature search of the history of development and application.	
To describe the development of anodised aluminium decorative methods	What is anodised aluminium?		Review of previous local and global surveys concerning the geographic distribution, the industrial and socio-economic context of aluminium resources and usage.
To review and describe Malaysian craft practices in particular regard to those involving applied surface decoration	What are the Malaysian craft practices? Which practices lend themselves to batik types of decoration?	STAGE 2 (SURVEY) Compilation and categorization of secondary sources data from the Malaysian Handicraft Development Corporation and primary sources data from showrooms concerning the range of contemporary Malay craft artefacts. (Crafts Council)	STAGE 3 (QUALITATIVE QUESTIONNAIRE) Questionnaire survey using semi-structured interviews and open-ended questions will be carried out with the Malaysian craft practitioners/collaborators (craft makers, designers and educators) identified from stage 2 (Oppenheim). The criterion for the selection of the craft practitioners is based on their having made a significant contribution towards Malaysian craft design. The questions to be posed concern the nature of their craft practice. The development of the questionnaire will be based on the critical factors related to purpose, process and people, company culture and people in the craft industries (Champy). The purpose of the survey is to provide data on batik types of decoration and to identify specific areas of craft practice that potentially lend themselves to experimentation with surface decoration. The data will be compiled for cross reference analysis and synthesis. of the case studies finding will be explained qualitatively (Miles and Huberman). Another purpose of this stage is that the researcher will identify the sample range of collaborators for the experimental case studies in Stage 5

The secondary data reviewed a catalogue that was recommended by the Corporate Communications and Administration department of MHDC. They were deemed appropriate, because of their unique accessibility to any interested researcher wishing to understand the nature of Malaysian handicrafts. The two catalogues that were chosen fulfil the research objective of the survey. Both identify varieties of handicrafts pursued by contemporary Malaysian craft practitioners.

To check the validity of data about the crafts identified in the MHDC catalogues, the primary source gathered by the researcher, compiled a range of craft artefacts from the main '*Karyaneka*' (MHDC Marketing Agency) showroom. The researcher selected this showroom because it shows the most comprehensive range of indigenous crafts produced by Malaysian craft practitioners.

The survey produced a correlation of the craft artefacts using the factors below in order to gain an understanding of the nature of contemporary Malaysian craft practices. They are:

- contemporary craft practice,
- material usage,
- process and technique, and
- decorative application

The analysis of the studio survey that was conducted depicts the current artefacts of the contemporary Malaysian craft practice, which were marketed by '*Karyaneka*' and sold to the public. The survey also reviewed the range of artefacts in '*Infokraf*' Malaysia, displayed as collections of MHDC Designers and craft practitioners work from all over the region (MHDC 1990). The initial analysis has helped the researcher to:

- check the validity of the crafts present in the catalogue,
- compile and classify the contemporary Malay craft practices and artefacts,
- identify the potential of integrating Anodised Aluminium with specific areas of craft practice and,
- determine the key areas to experimentation in Phase 2 of the investigation.

The same method has been used to analyse the craft artefacts in this section.

1.6.3 Stage 3: Qualitative Interview

Qualitative interviewing in Malaysia involved with the selected respondents of the appropriate sphere of craft practice identified in the Stage 2 survey. The process of analysis of the semi-structured interview data relied on the qualitative methods advocated by (Miles and Huberman 1999) and (Yin 1993). These illustrate the use of meta-matrices in qualitative analysing. Data from the interview has been transcribed and transferred to meta-matrix charts. These charts help the researcher to filter

information from the three categories of respondents i.e.: *craft makers, designers and educators*. Nine respondents for this interview were selected based on their having made a significant contribution towards Malaysian design. The criterion for selection was based on the commitment that individuals have portrayed in their craft activities or organisation in terms of production, design and consultation work, which helped the researcher to established corroboratory evidence (Yin 1989 p.89). For example one respondent from the selected craft makers has established a good relation with government and private sectors in producing craft artefacts that reflects certain organisations e.g in the making of trophies, gifts and souvenirs for special events. Designers in this selection also have applied their creativity in designing crafts for the country, by utilising waste materials such as coconut shells that has generated a new craft specialisation. Whereas with Educators, the selection was based on their experience in their specialisation, for example one of the respondents representing the University Technology Mara (UiTM), is one of the committee members of the Malaysian Design Council who are aware of the development of Malaysian product design. To summarise this, the criteria for this selection of respondents was generally based on experience and performance within their crafts specialization, which the researcher had gathered during the field study, through local contacts available in the craft directory produced by MHDC (MHDC 2001). Their participation also provided an insight to the researcher on craft issues, which needed to be explored in the development of the questionnaire in Phase 3.

1.6.4 Stage 4: Experimental Process

In Malaysia the way that practitioners communicate the process of their crafts is by inheriting the knowledge and expertise from one generation to the next, through a process and culture of apprenticeship involving observation, word of mouth and through trial and error. The processes are not written down, making it difficult for a new generation to follow (Yan 2001). In relation to this issue, the research conducted here was meant to generate explicit knowledge within Malay craft practitioners. As the literature review concerning the decorative process technique of anodising aluminium is not available in Malaysia, the researcher's task in this phase was to develop a practical procedure to be applied by the craft practitioners in the third

SECOND PHASE OF RESEARCH

experiment also combines LaPlantz's (1988) methods in the utilisation of anodised aluminium chemicals to produce a compendium of colour finishes and variations

Experiment 2 the potential of the knowledge developed in Experiment 1 was to enable design versatility in the decorative application and integration of Malaysian batik reactive dyes. This experiment was to determine the specification and formulation of the print pastes used in the controlled application of the dye during the colouring process in relation to selected examples of patterning method and design.

The methods and designs selected were based on those identified in Phase 1, which related to different types of motif that are often used in the decorative application of Malaysian craft artefacts such as geometric form, floral, animal species or any combination of those. Data was recorded with reference to Hughes and Rowe (1983) in their previous research on brass colouring (patination)

Compilation from both experiments formed a source of reference for the decorative application of the integrated process in the case studies.

1.6.5 Stage 5: Case Studies of Craft Practice

In Stage 5, the craft practitioners selected in **Stage 3** will have tested and validated the integrated process developed in **Stage 4** (Figure 1.4). The data gathered from the case studies enabled an analysis of the receptivity of the decorative application technique to specific areas of Malaysian craft design and practice.

Using action research methods as suggested by McNiff (1996) and McKernan (1996) to conduct the research participation in the organization, the craft practitioners were encouraged to explore the decorative process of anodised aluminium in the case studies. This gave them the opportunity to produce decorative samples, which reflect their understanding gained from visual presentation (Chapter 6). A semi-structured interview was used to seek information from the case study craft practitioners in order to find their general appreciation of the process and their recommendations (Oppenheim 1992).

Figure 1. 4

THIRD PHASE OF RESEARCH PROJECT 3		METHODOLOGY
RESEARCH OBJECTIVES	RESEARCH QUESTIONS	
To determine the appropriateness of the combined process in terms of its ability to represent pattern, motif and decorative forms associated with existing craft practices.	Does the integrated craft procedure offer these kinds of value to the future development of the Malay craft industry?	<p>STAGE 5 (CASE STUDIES OF CRAFT PRACTICE)</p> <p>The craft practitioners selected in Stage 3 will test and validate the integrated process developed in Stage 4 by carrying out case study projects based in their own field of craft practice. The data gathered from the case studies will include an analysis of the receptivity (Osgood) of the decorative application technique to specific areas of Malaysian craft design and practice using Semantic Differential score questionnaire. This was derived from the presentation of visual evidence of practice of the Experimental Process. The craft practitioner was encouraged to explore the decorative process of anodised aluminium with reference to the guided material of the technique. This will lend an opportunity to produce decorative samples (Mcniff, Lomax and Whitehead)</p> <p>A semi-structured interview (Oppenheim) will be used to seek information from the case study craft practitioners, based upon their hands on experience. In order to find their general appreciation of the process and their recommendations, the key areas for the questions will focus on the appropriateness of anodised aluminium for craft practice, the suitability of the decorative process, the cost effectiveness and the effectiveness of guidelines and reference material provided by the researcher. Cross case analysis of the case study interview responses (Yin) will be gathered from the recommendations of craft practitioners presented in the craft workshop.</p>
To derive recommendations for the Malay craft industry concerning the applicability of the integrated batik surface decoration and anodised aluminium method	Can recommendations be formed which suggest a new method of decorative application can be provided for the Malay craft industry?	<p>Peer review meetings of the proposed collaborators (Mcniff, Lomax and Whitehead) will be held in this penultimate stage to ascertain final recommendations the commercial and educational value of the decorative procedure to craft artefacts.</p> <p>Conclusions will be drawn about the recommendations concerning the appropriateness of the integrated craft practice as a translator of Malay craft aesthetic cultural value.</p>
		<p>STAGE 6</p> <p>The determination of guidelines and recommendations through the correlation of the case studies with the literature search and surveys. Production of the thesis.</p>
The final presentation for the examination will involve a written thesis including documentation and illustration of the experimental artefacts created during the research, which exhibit the findings of the investigation.		

Cross-case analysis of the case study interview responses Yin (1994) were gathered from the recommendations of the craft practitioners.

Two peer review meetings of the case study collaborators from MHDC, Karyaneka, Malaysian Design Council, Aluminium Company (ALCOM), SIRIM and UiTM were held to determine final recommendations and to ascertain the commercial and educational value of the decorative procedure to Malaysia craft artefact and

practices. Conclusions were drawn about the recommendations concerning the appropriateness of the integrated craft practice as a translator of Malay craft aesthetic cultural value.

1.7 Order of Presentation

These sections provide a guide to the organisation and presentation of the thesis. The first of these chapters features the introduction. The thesis consists of seven chapters which are described below:

Chapter Two presents a compilation of the literature review, describing the historical and contemporary development of batik surface decoration and anodised aluminium production from local and global perspectives. The review provides comprehensive evidence on these processes, specifically relevant to anodised aluminium, the batik process, craft practice, design education and design management and their potential to form a new craft product development process.

Chapter Three describes the survey, which was primarily conducted in Malaysia. This focuses on the contemporary Malaysian craft artefacts, in particular involving applied surface decoration. The information gathered in this survey is then correlated with one source of secondary data and one source of primary data i.e., the handicrafts catalogue provided by MHDC and the researcher's review of craft artefacts available in the '*Karyaneka*' showroom, a craft marketing agency for MHDC. The survey also studied the range of craft artefacts in the '*Infokraf*' Malaysia. Compilations from the survey, produced a cross comparison of the craft artefacts using four factors i.e.: contemporary craft practice, material usage, process and technique and finally decorative application. These analyses help the researcher to gain an understanding of the nature of contemporary Malaysian craft practices. Initial analyses also helped the researcher to check the validity of the crafts present in the catalogue, to compile and classify the contemporary Malay craft practices and artefacts, to identify the potential of integrating anodised aluminium with specific areas of craft practice and finally to determine the key areas of the Experimental process.

Chapter Four describes case studies that utilise qualitative interviewing with selected Malaysian craft practitioners. The selection of the respondents of the appropriate sphere of craft practice was identified during the survey with the assistance of **MHDC**. This chapter also explained the development of questionnaires used in the interview and presented the analyses of the findings by explaining the procedure used through the meta-matrices format based on a qualitative method methodology.

Chapter Five describes the practical procedure of the Experimental Process concerning the decorative technique of anodising aluminium. The procedure is explained in details and gave information on the type of aluminium used, preparation and the decorative process involving two experimental procedures i.e.: **Experiment 1** (Single Colour Anodising) and **Experiment 11** (Multi Colour Anodising) This chapter also presents the findings of the experimental process from the integration of aluminium and Malaysian batik reactive dyes, which were displayed using a series of decorative samples. Compilation from both experiments is regarded as experimental evidence and a source of reference for the decorative application of the integrated process; applied in the case studies of craft practice.

Chapter Six explains the succeeding case studies that were carried out, on the application of anodised aluminium using batik reactive dyes as a decorative process for aspects of craft practice. This chapter explains the process of peer review using action research involving the participation of selected Malaysian craft practitioners. It also explains the process of selection and engagement of the practitioners (Designers, Educators and Craft Makers) and the preparation of the case studies to test their receptivity to the application of the integrated process of decorative work. The explanation includes the apparatus used in the case studies, which involved the presentation of visual evidence from the Experimental Process and Hands-on experience by the craft practitioners. The method of determining the receptivity of the craft practitioners concerning the decorative process was also explained, employing Semantic Differential score questionnaires and a similar approach to the analysis of data, using the meta-matrices format utilised earlier in the case studies of qualitative interviewing. Finally, the Chapter explains the Peer Review process with

the identified group of representative stakeholders, their views from the interviews to determine the final recommendations concerning the commercial and educational value of the decorative procedure to Malaysian craft artefacts and practices.

Chapter Seven presents the process of determining of guidelines and recommendations through the correlation of the case studies with the literature search and the peer review. Recommendations arising from the current research and suggestions for future research are also considered.

CHAPTER 2

LITERATURE SEARCH AND REVIEW

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CHAPTER TWO: LITERATURE SEARCH AND REVIEW

The purpose of this chapter is to discuss the literature concerned with the history of development and application of the two research key areas; batik and anodised aluminium, in contact with other existing crafts. Section 2.1.1, provides an initial explanation about the definition of crafts and its role to the Malaysian economy. Section 2.1.2 illustrates the distribution of craft types with reference to a map of the crafts, explaining the availability within its natural resources. Section 2.1.3 describes the production of crafts with emphasis on the role of Malaysian Handicraft Development Corporation and 'Karyaneka' in promoting craft activity. Section 2.2 describes the Malaysian batik industry in which Section 2.2.1 explains the historical and contemporary practice of batik, and provides a definition of batik. The development of Malaysian batik, tracing the history of this craft, style, decorative application technique and its contribution to Malaysian craft is described in Section 2.2.2. Section 2.2.3 elaborates on the significance of Malaysian batik to in terms of it's cultural symbolism and its economic value. The development of anodised aluminium decorative application is explained in section 2.3, which describes the history of aluminium in section 2.3.1. The global application of aluminium is explained in Section 2.3.2 and Section 2.3.3 describes the technology of anodised aluminium and its definition. This section also provides some examples of craftwork from artists around the globe that use this technology. Section 2.3.4 explains the status of aluminium in Malaysian industry. A summary is drawn and conclusions are made in Section 2.4

2.1 Malaysian Craft

2.1.1 Definitions of the Crafts

Literature by Davies (1993, p.8) provided a detailed definition of ‘craft’, which she defined in terms of two perspectives of the craft environment:

1. A **producer (craftsperson)** formulates a concept and, by exercising certain skills, uses the necessary tools to fashion from suitable materials an end product (crafted object) that will be meaningful to the user by fulfilling a need and for evoking an aesthetic response and
2. An **artist** formulates a concept and, by exercising skills, uses the necessary tools to fashion from suitable materials a work of art that will aesthetically communicate the artist’s concept to a receiver.

Both definitions delineate the nature of craft making, where the end result of the process represents an aesthetic contribution by the maker to society. Johnson (1998) also viewed that craft practitioners tend to produce concrete, three-dimensional objects. The crafts are grounded in materials, processes, techniques; a way of working and thinking which involves the whole person: body and mind. A bodily intelligence. The crafts, also, cannot easily be detached from its past (Johnson 1998 p.17)

In Malaysia the word craft is more familiar with the term “handicraft”. Ismail (1988 p.3) a Malaysian artist, poet and craft writer pointed out that handicrafts are also called artefacts and are closer to art. She cited in her literature that the term handicrafts originate from the German word *kraft*, which means strength, secure and skill and the phrase is “knowledge of power”. In the process of making handicrafts she said, “*one must be alert when choosing the basic material for this will lead to the systematic development of the design right from the earliest stage until the work of art is produced*”. This shares some similarity to the definition of craft stated earlier by Davies (1993)

In a report made by Marzuki from a Malaysian newspaper concerning, *“Towards a Viable Handicraft Industry”* (NST 23rd January 1988) the definition of handicrafts accepted by many countries, issued by the United Nations through the Conference on Trade and Development was:

“handicraft is a manual skill-intensive product produced with or without the use of tools, simple instruments or implements operated directly or indirectly by the craftsmen” (UNCTAD)

To understand the definition of craft, Davies (1993 p.3) relates this terminology to the detailed description of the craft process which she described as:

1. A producer working in a particular craft will fabricate an end product of some sort.
2. The design of this product will be based on a concept in the mind of the producer and will be motivated.
3. This concept will be influenced by the producer's knowledge, training, experience, and attitudes and will presumably follow the principles of good design.
4. The concept will be translated into a tangible form by the producer's hands.
5. The producer's facility with their hands will be governed by the degree of skill and dexterity, which is dependent on training and experience.
6. Suitable materials will go into the fabrication of the product. The producer will have adequate knowledge of the properties, limitations and integrity of the materials and will fashion them with every refinement of technique and method.
7. Tools necessary to the fabrication of the product will be so skilfully manipulated that they will become extensions of the producer's hands, eye and mind.
8. The end product will function as a utilitarian and or decorative object and be aesthetically pleasing in either case. It may or may not be a one-of-a-kind object, though there will inevitably be minor variations because of hand production if a number of similar objects are made.

9. The product will find an owner or user who will acquire it for its utilitarian or decorative value. The product will, in all likelihood, be more expensive than a mass-produced object.

In relation to Davies' above explanation to the craft process, items 2 and 3 describe the influence of the product design derived from the producer's knowledge, training, experience and attitudes. Evans (1998 p.34) in his working paper, "*Significant Work: Towards a Framework for the Understanding of Craft Practices*", cited Dörmér, on the issue of craft that craft relies on tacit knowledge. Tacit knowledge is acquired through experience and it is the knowledge that enables you to do things as distinct from talking or writing about them.

Dörmér(1994 p.13) said that, tacit knowledge is the preferred phrase for craft knowledge among academics. Concerning craft knowledge Dörmér (p.18) explained that a knowledge that frequently uses precise language whose beauty derives from the craft person's close knowledge to the material, the tools and the processes. Such language reflects the real components of a craft's discipline. Those aspects as mentioned by Dörmér, align with McCullough perceptions cited by Evans (p.39) on the primacy of 'medium' to all 'significant work':

..." To give work substance, we require a medium. The action of our hands, eyes, and tools must be mediated. Our personal knowledge and skills must be given a habitual setting for practice...The meeting of tool and medium provides a locus for skills...substance mediate action...To mediate is not only to shape but also to communicate. Because a medium shapes the way a tool conducts an author's intent, it provide a locus for expression, and becomes subject to interpretation. In this way, a medium communicates between the author and audience....In the case of the crafts, interpretations focus specifically on content and form...Understanding of structure is implicit; it is learned through experience...Moreover, the understanding is in terms of workability and practices, rather than to any theoretical constitution. Thus people worked metals for centuries without any notion of lattices and free electrons. Acute knowledge of a medium's structure comes not by theory but through involvement." (McCullough cited by Evans 1998 p.39)

Press and Cooper (2003 p. 198-199) suggest that ‘the new designer’ in the 21st Century should possess craft skills and knowledge known as ‘*intelligent maker*’. Craft knowledge provides an understanding and appreciation of quality, detail and sensual experience. Press and Cooper also suggest that designers should also function as a ‘*knowledge worker*’ which they need to understand, apply and create knowledge through practice so that the creation and application of knowledge requires the designer to be a flexible net worker and adept communicator. The designer should also understand business, management, and marketing in order to regard themselves as ‘*sustainable entrepreneurs*’. And finally, designers should be an ‘*active citizen*’ in carrying out design tasks to serve local and global communities.

In relation to Press and Cooper’s criteria of the new designers in the 21st Century, Yusof Ahmad, one of MHDC Designers, was responsible for designing and producing prototypes. His craft specialisation involved using mixed-medium materials such as wood, shell, coconut etc. In an article on “*Creativity and new ideas essential*” (The Malay Mail, 27th September 1991) in relation to craft making, he mentioned that in the designing and making of craft products, the artefacts should be practical and easy to produce. He stressed that it is just not enough to come up with a sample without giving due consideration to research and marketing. He also prefers and suggests that a manual on certain craft production i.e. guided material for certain craft making should be available to the trainers, to help them to teach and to ensure the concept is fully understood.

The contribution of the crafts industry to Malaysia is that it has helped to preserve the cultural heritage and has provided an economic input to local and global tourism (The Malay Mail, 27th September 1991). In this article, “*Growing Demand For our Handicraft: More Youth To Be Trained at Various Production Centre*”, Datuk Sulaiman Othman, ex-Director General of the MHDC, the organization has identified the nature of the Malaysian handicraft industry that contributes to the following aspects:

- Handicraft was regarded as a hobby or individual endeavour, group or association activity. The output of craft products is minimal and not market oriented. Such

activities like this have a high aesthetic value, but do not give satisfaction to others except to the buyer. These craft activities satisfy only the producer of the crafts with little economic value.

- The craft produced from natural resources result in traditional forms. This comes under items whose usage has been carried down through generations, thus the craft activity is primarily directed to individual use and not for business purposes. These craft items are produced in limited quantity.
- With utilitarian handicrafts (“krafgunaan”), stress is laid on the function of the object even though aesthetics are also important. These objects have the potential for wide usage and great marketability. Usually they lend themselves to “volume production”;
- Art handicrafts are produced in small quantities but have high artistic quality.
- Commercial handicrafts are seen a lot in the market today. Many of these objects are produced in mass quantities or by “imitation using machines”

All these activities mentioned, enable a continuous development of handicraft production with the assistance of the Malaysian Handicraft Development Corporation (MHDC). Craft entrepreneurs with good quality production capability who are able to meet the demand within overseas companies, are encouraged by MHDC to participate in international craft exhibitions. This allows the craft entrepreneur to promote their products and build business contacts within their area of craft practice i.e the World Handicraft Fair in Frankfurt, Germany. As a result of the intervention from MHDC also, about \$300 million worth of handicraft items are exported to the European market yearly (The Malay Mail, 27th September 1991).

2.1.2 Distribution of Malaysian Crafts

The nature of craft practice that has been established, depends on the availability of natural resources within the Malaysian region. A Statement made by Osman concerning the importance of natural resources said:

“before the handicraft industry can proceed in the manner we aim for, the future generations must be led to understand the uniqueness and God-given natural resources of Malaysia.”

(Osman, NST January 1988)

This statement reflects the distribution of crafts identified by MHDC, illustrated in (Figure 2.1) which is contained in the literature of Osman et al (1994 p.231). East Malaysia, which comprises of thirteen states or regions, are well known to local and global tourists through their specialisation in the production of craft artefacts.

The study by Osman et al (1994) mapped the occurrence of different crafts against the geography of Malaysia. This started in the north of the Malaysian Peninsular in the states of Perlis and Kedah which is close to the neighbouring country of Thailand. Here, their study saw no indication of craft specialisation. But the literature published by MHDC (1999), *“Legacy and Vision”* shows that the region around the state of Kedah has a rich history of artistic traditions and was one of the earliest states to set up schools to train students in crafts like gold and silver working, batik printing, pottery and weaving. But this activity has diminished due to the influx of handicrafts produced by neighbouring countries, which are cheaper than the crafts made by the local people. Although MHDC has established handicraft outlets in these states, the diminishing activity can't be avoided because of the price competition. Another factor that has worsened the situation is the middlemen that promote crafts from Thailand and spread their craft marketing strategy through the use of 'door to door' salesmen. Furthermore, they have produced flexible payment schemes for selling these crafts i.e easy payment schemes.

reflect Malaysian cultural values. Sometimes Pewter is also associated with other rival materials such as silver, where replication is made in an attempt to revive the traditional crafts made from silver. Items such as bracelets, lime boxes, belt buckles are replicated based on historical references to exclusive artefacts in Malay society i.e. those associated with the Royal family.

The state of Negeri Sembilan is famous for its traditional wood carving which has an influence from Indonesia. This craft can be seen through the intricate carving of house exterior doors such as door panels. In addition to carving, this state is also rich in crafts made from rattan such as basketry, living and dining room furniture.

Melaka is a state which has a famous association with the cultural songs ‘Dondang Sayang’ (Hand drum and violin) and the legend of the Malay warrior ‘Hang Tuah’ connected with the Royal Court. This state is very close to Negeri Sembilan and is also involved in the production of basketry items made from rattan. Historically there were earlier engagements with jewellery making crafts and metalwork made from silver, such as antique silver belts and these were identified by Osman et al in their map of the Malaysian crafts.

Johor, the state in the southern part of Malaysia is known for their traditional culture song ‘Ghazal’ (the Accordion is the main instrument). Again, although there is no indication of craft activity on Osman’s map, the researcher’s survey has found that, this state is currently popular in terms of their decorative pottery, used as a flower vase. The decorative element employed in this craft involves a batik type of decoration, transferred using a hand painted technique with glaze finishing.

On the East Coast, Kelantan which is also situated very close to Thailand, crafts from this country also penetrated to the local craft shop. Although this happens, Kelantan maintain their distinctiveness in craft production, because it is well known for batik, pottery, silverwork and ‘songket’ (cloth decorated with gold and silver thread). The silversmiths of Kelantan are especially noted for their fine and delicate filigree (twisted silver wire) and repousse (hammered sheet silver) silver craft. Batik is a

flourishing craft in this region, and tourists never miss the opportunity to buy examples of batik products as a special gifts or souvenir.

Brassware was at one time produced very widely, although the centres of production are fewer in number today, it is still a major occupation in the state of Terengganu. Terengganu is well known as a ‘home of traditional white brass’ (tembaga putih) produced either for functional or display purposes. Batik is also well known in this region, which produces varieties of functional craft artefacts to be used in the house or hotel interior. Weaving is one of Malaysia’s best-known craft forms, with each district having its own characteristic style and motifs. The woven cloths from Terengganu have acquired an international reputation, once the exclusive preserve of the royal courts but now used widely by all sections of society in formal or on ceremonial occasions.

Pahang, which is situated along the east coast, is the largest state or region in Malaysia. Rain forests dominate the region with timber related activities being the major economic value. In the crafts, MHDC has established a training centre, which focuses on traditional wood carving due to the abundance of materials. As a result of this, intricate furniture with traditional elements are produced to cater for local and global markets. But still this craft faces a very competitive market from traditional furniture imported from Indonesia, which is cheaper due to cheap labour production.

2.1.3 The Role of Malaysian Handicrafts Development Corporation and Karyaneka

The realisation on the importance of the crafts by the Malaysian government towards the economic value of the country has led to the formation of the Malaysian Handicrafts Development Corporation (MHDC) on 1st October 1979, an agency of the Ministry of Entrepreneur Development responsible for the promoting the development of the national craft industry (MHDC 2001). In order to accomplish this, the MHDC has set up various programmes for providing services and incentives for the craft entrepreneurs. This programmes focuses on three important areas of

Malaysian Government Policy concerning the crafts (MHDC 2001 p.110-112) as described below:

i) Trade Promotion

MHDC assists the craft practitioners in promoting their products through the following Trade Promotional incentive schemes and services:

- Domestic promotion

MHDC supports 80% of the costs renting the exhibition space

- Overseas trade exhibition

MHDC bears the full cost of exhibition space and standard props and one-way transportation of products plus insurance.

- E-commerce service

Craft entrepreneurs are invited to advertise their products in MHDC's website:

[www. Malaysiancraft.com](http://www.Malaysiancraft.com) by contacting the Trade Promotion Division.

- Licensing services

Craft entrepreneurs who wish to export products can obtain the certificate of authentication for their craft products from MHDC.

ii) Research and Development

MHDC is responsible for the following:

- Product Design Assistance Service

MHDC provide consultancy service in product development to craft entrepreneurs on a cost-sharing basis. The consultancy costs is borne by MHDC whilst the entrepreneur is responsible for other related costs. The service is offered on a project basis. The entrepreneur can apply for such a service through the Research and Development Division.

- Production Incubator Centre

MHDC provides production workspace for rental to craft entrepreneurs at nine Craft Development Centres. Besides the usage of common facilities such as machinery and equipment participants are given support services in product development as well as entrepreneurial courses.

iii) Training

MHDC provides two types of training, namely Craft Skills & Academic and Technical Skills & Management Training.

- Craft Skills & Academic Training

MHDC offers training courses for a three-year period at The National Craft Institute in Rawang, Selangor. Students having completed their training at the institute will be awarded a diploma. The courses offered are in the fields of:

- batik
- ceramic
- metal
- rattan and bamboo
- wood, and
- weaving

- Technical Skill & Management Training

MHDC offers training to craft entrepreneurs in the fields of:

- design
- skill
- technology
- production and
- management

The MHDC strategy was that the crafts should no longer be preserved as a cottage industry but that the conservation of heritage and artistic expression had to be brought into the mainstream of society. To ensure that the craft industry can stand on its own, a policy of 'commercialisation' was introduced, which incorporated

production and marketing strategies with an eye to the growing tourist market. The importance of the Tourism industry has been stressed in an annual report from 'Karyaneka', a marketing arm of MHDC:

"...the handicraft industry is very dependent on the performance of the tourism industry. The main revenue generators for the handicraft industry are tourist-spending patterns exhibited during their travels to the country. Therefore, any deviation on the number of tourist arrivals in the country affects the performance of the handicraft industry."

(Karyaneka 1999 p.25)

With this aim in mind, MHDC (1999) has organised a handicraft trade counter at 'Infokraf Malaysia' (MHDC showcase) founded in 1986, where business transactions can be carried out efficiently and effectively. Booths are provided for handicraft producers offering the capability to meet local and export demands. It exhibits the very latest craft designs to the members of the public through the participation of MHDC designers and local craft makers. Infokraf events also supply information on craft-related issues such as techniques and design, which help the local craft practitioners to become aware of the current development of crafts in other countries. The centre also provides feedback from local or global tourists through craft sales for the authorities to work upon. This results in higher rewards for craftsmen through sales of their crafts work at various craft centres.

MHDC also offers a skill training program to youths aged between 18-30 at 80 production centres throughout the country (The Malay Mail, 27th September 1991) in order to transform these skills into commercially viable ones. The new production centre in Rawang, Selangor will be able to accommodate 600 trainees in the crafts training program. One example of this training program was conducted in MHDC Terengganu branch, which offers training in Songket weaving (brocaded cloth). At this centre the students learn under the supervision of an experienced weaver. Apart from the skill training the programmes also include design, product development, promotions and business practice.

The results from this training programme are correlated by the MHDC as returns in nurturing the legacy of Malaysian crafts e.g.:

- there is an ever increasing pool of trained craftsmen who are equipped to set up commercially viable concerns. Their businesses maintain a plentiful supply of products for domestic as well as international markets.
- the heritage tradition of crafts and arts is kept very much alive.

MHDC also offer technical services to selected craft villagers e.g. skill training and the development of new product lines with the help of MHDC designers. Some of the crafts that have been given a new lease of life in this way include batik, woodcarving, rattan, silver and brass work and plaiting.

'Karyaneka', the marketing and retail arm for MHDC has been established in 1981 to provide opportunities for Malaysian craft practitioners to market their craft products. Besides local craft practitioners, Designers from MHDC are also involved in testing their new craft designs to be marketed by this agency. The potential craft products designed by the Designers are produced in limited quantities to the appropriate field of specialisation identified by MHDC. The craft is then displayed for sales at *Karyaneka* outlets in the country (See Appendix 2, table 2.1). Sources from *Karyaneka*, identified six outlets that promote local craft product. These are located as follows:

- Komplek Budaya Kraf, Jalan Conlay, Kuala Lumpur.
- Bukit Bintang Plaza, Kuala Lumpur.
- Subang Parade Shopping complex, Subang Jaya
- Kuala Lumpur International Airport, Sepang
- Komplek Budaya Kraf Teluk Yu, Langkawi
- Jalan Kota, Melaka.

The annual report from *Karyaneka* (1999), make a compilation of various craft products gathered from all over the country. This showed that the craft activity

initiated by MHDC is flourishing and the craft heritage vision is already in the making (MHDC 1999).

2.2 Malaysian Batik Industry

2.2.1 Historical and Contemporary Practice of Batik Decoration

The current Malaysian Batik industry, provides a significant economic income to the country. The simplicity of its method of craft production has resulted in an increasing number of craft practitioners in this field. The nature of Batik making employs intricate pattern of Malaysian decorative motif with vibrant colours and has transformed a variation of batik designs in the marketplace.

According to Arney (1987 p.33), the earliest form of Malay batik was attributed to Minah Pelangi during the reign of Sultan (king) Zainal Abidin 11, 1773-1808. The batik 'pelangi' (rainbow) was created using a tie-resist technique, referring to the colourful result achieved after the process. Arney also cited from Gittinger (1979), Windstedt (1909) and Skeat (1902) regarding the use of batik in Malaysia in relation to Indonesian batik, which gave an explanation on how the technique was applied to the fabric using dyes. The MHDC publication (1997) on batik making reveals that the batik activity started as early as the 12th century in Java, Indonesia. From here, Malaysia received its influence, which has led to the art of batik being valued as the most traditional of handicrafts in both countries.

'Batik' is a combination of two words, as cited by Arney (1987 p.44) in the paper presented by Tri Purnoto (1979) who said the word 'titik' is related to the Malay word 'dot' while in Javanese it is mean 'amba'. In relation to this meaning, 'amba', 'ba' is extracted which then combined with 'tik' from the Malay word 'titik' that form the total word 'batik', the craft that has had a significant impact on the Malaysian economy.

A report by Ching in newspaper (NST 28th Jan 2001), “*Can batik regain its magic?*” indicates a definition of batik from two perspectives. First Ching defines batik by reference to the Encyclopaedia Britannica:

“...as a colouring method whereby wax encloses the patterned area so that other colours cannot infiltrate. This method is mainly used on cotton material and the traditional colours used are blue, brown, and red.” (Encyclopaedia Britannica)

In another definition, Ching cited from SIRIM, the government agency that was responsible for endorsing the quality of commercial products that are specifically made in Malaysia suggested that batik is:

“...a fabric on which coloured patterns are born, beginning with white cloth to which wax has been applied to bring out the patterns and afterwards dipped (in a colour mix) or drawn to bring out certain colours.” (SIRIM, as quoted in Ching 2001)

Both definitions provide a description of the nature of the batik process, which identified the elements used concerning:

- Material (fabric, wax and dyes)
- Process (pattern, dip, drawn

The interpretation of batik reflects the establishment of two techniques, *Batik Tulis* (Hand drawn) and *Batik Cap* (Block print) that are very popular with the craft community in Malaysia as the art of batik making.

2.2.2 The development of Malaysian Batik

Section 2.2.2. explains the development of Malaysian batik and traces the style of batik decorative application techniques. The earlier section mentioned two types of batik technique; Batik Tulis and Batik Cap, a popular craft that remains a leading

craft industry in the east coast region of Malaysia (Kelantan and Terengganu) as well as a major contribution to the economy. The historical background in the early 1830's, generated the idea of producing, selling and making batik. It is reflected in the wearing of batik sarongs by Indo-European women in Java (Roojen, 1996), which were also assimilated by the Nyonyas, Chinese woman in Penang, Malacca and Singapore. This continuity led Malaysian women to popularise two distinctive styles of batik costume, known as the *Baju Kebaya* and *Baju Kurung* (Figure 2.2) which are regarded as the national costumes for women.



Figure 2.2

Batik Baju Kurung

Source: MHDC

With government participation, such as the MHDC, who fostered the revival of Malaysian handicrafts and also art institutions such as the Universiti Teknologi Mara (UiTM) responsible for the education of creative designers for the craft industry, both combine efforts that have enhanced the legacy of batik making by nurturing the inherited knowledge of batik making for society. MHDC has produced an article concerning the batik process, which explains the techniques of *Batik Cap* and *Batik Tulis*. It is important to illustrate this process in the present study in order to provide an understanding of the technique, in relation to its integration with anodised aluminium and their combined application in the Experimental process.

As mentioned by Kheng (1998 p.2) in a working paper, “*Contemporary Textile Practice- Towards the Next Millennium*” has described the nature of the Malaysian

batik industry. *Batik Cap* or *Batik Block* (Figure 2.3) uses decorative mould stamps made of copper. These are designed with a handle to assist the practitioners to transfer their patterns to the fabric. The earliest form of block making as mentioned by Arney (1987 p.77) used tin or zinc but the advantage of copper is due to its thermal characteristics as it can retain heat. This allows the practitioners to duplicate their pattern a number of times in the design printing process.



Figure 2.3

***Block making process
for 'Batik Cap'***

Source: Arney, S., 1987

Kheng explained that the process of *Batik Cap* begins by dipping the block pattern into molten wax, which is then stamped continuously until it covers the whole fabric with wax images. In this circumstance the practitioners ensure that the repetition of the pattern align, to avoid any overlapping of images, which will effect the quality of the batik. The stamping process requires a support underneath the cloth usually banana stems, this traditionally was done to speed the solidification of wax during design stamping. Beside this it also ensures the sharper wax lines of the design are sharpen. Alternatively, batik practitioners sometimes used 'sponges' covered with plastic to produce a similar result of good quality stamping.

After the completion of the stamping process, the cloth covered with the wax pattern is then dipped into a dye bath that can accommodate the size of the fabric. The result of these immersions is that the waxed part will resist the dye from penetrating into the cloth. Hence the original white fabric will be visible after the washing process, which contains a chemical agent (sodium silicate) and hot water. The cloth is hung to dry. If a second colour is needed, the cloth will be re-stamped in order to resist the

second colour without washing out the first stamping. The process of waxing and dyeing will continue until the required number of colours is achieved.

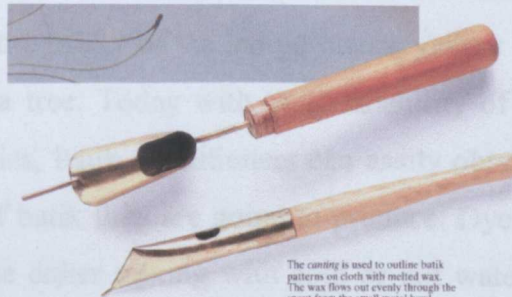
Batik Tulis is a hand drawn technique that also requires pattern transfer to produce this category of batik. This was done using a special tool called a *tjanting*, which originated in Java during the early of 17th century. The term hand-drawn already connotes a degree of patience needed for this technique, as it reflects a slow and tedious job of pattern transferring (Kheng 1998 p.3). This requires a skilful artist to draw the design and a degree of expertise in handling the *tjanting* tool.

Tjanting (Figure 2.4) are designed with similar working principles as a pen (air-brush), but this tool contains a copper reservoir filled with molten which wax acts like ink. Batik artists usually hold the tools at an angle and draw the design onto a taut stretched cloth using the wax that flows from the spout. The spout varies in sizes depending on the needs of the design that allows the artist to create various thin or thicken outlines. (Kheng 1998)

Figure 2.4

***Batik hand drawn
tools : Tjanting***

Source: Arney,S., 1987



During the *tjanting* (*canting*) process, the white cloth is stretched tautly using a wooden frame to enable easier drawing. The batik artist will either draw the pattern directly onto the cloth or outline it with a pencil by tracing. When applying the drawing on to the cloth, the artists always ensure that the temperature of the wax is appropriate to be used as it might clog the spout. This happens if the wax is too cold. If the wax is too hot, it will be very difficult to handle as the flow of the wax is very fast and it will smear the wax creating thicker lines.

After the *tjanting* process, the batik artist will start to colour by using a brush. Special categories of batik dyes are used, usually diluted in the palette or container

either with warm or cold water. During the colouring process, the exposed area of cloth will be penetrated with colour that results in partitions of decorative pattern due to traces of the wax lines. Multicoloured patterns on motifs or backgrounds can be achieved by using a similar approach as Batik Cap.

When the colouring process is completed, the fabric will be left to dry. To allow the cloth to retain its colour, it has to be fixed in a solution of sodium silicate for 8 hours. After this process, the cloth is then washed with boiling water to remove the wax and the residue of sodium silicate. Finally the fabric is washed in cold water repeatedly to get rid of the excess dye and it is then left again after which it is then ready for display or packaging. (Kheng 1998)

2.2.3 Types of Batik Dyes

Both techniques of the batik process mentioned above utilise dye to create decorative colour onto fabric. Traditionally in the early days of batik colouring process (Roojen 1993 p.31), dye was extracted from natural resources for example; some of the colours were indigo from the leaves of the indigo plants, yellow from turmeric roots and red from the Morinda tree. Today with the availability of fibre reactive dyes through chemical companies, batik practitioners can easily obtain dyestuff supplies according to the quality of batik they are going to produce. Dyes are sold by grams weight and are easy to use either mixing with cold or hot water depending on the specification provided by the dyestuff manufacturer.

Kheng (1998 p.4) also clarified the nature of the favourite colours in Malaysian batik which are bright and contemporary such as bright red, turquoise blue, pink, orange and green. There was also a demand for pastel colours from the public. In the creative use of colours, batik practitioners also use watercolour techniques that create the shading effect of the decorative application in batik design (Figure 2.5).



Figure 2.5

***Shading effect
in hand drawn
batik***

Source: MHDC

2.2.4 The Significance of Malaysian Batik

Section 2.2.4 explains the significance of batik design as a decorative application representing a formal cultural symbolism in craft making and its economic value to the Malaysian craft economy.

Malaysian craft literature reveals that the application of decorative motifs applied in craft making are interrelated to form a new way of representing the country's cultural legacy. The current practices of Malaysian batik design as described by Arney (1987) are linked with the earliest textile crafts of weaving and the use of the batik sarong, influenced by Java, Indonesia. The earliest scholars of the Malay textile Industry as cited by Arney (1987 p.33) from (Skeat 1902) and (Winstedt 1909) confirmed that this connection provided a prototype of decorative application for the current batik Industry in Malaysia.

In the early craft practice of textile weaving, Ismail (1988 p.148) categorised three different types due to differences in pattern and technique. They are:

1. ordinary weaving (with ground pattern or *corak*)
2. weaving using resist dyeing thread
3. weaving using gold/silver thread (songket)

Types 1 and Type 2 consist of the use of coloured thread made from silk where motifs are not emphasized, but Type 3, is defined by the MHDC as 'songket' the delicate interweaving of gold and coloured threads. Arney (1987 p.159) also said 'songket is called "gold thread cloth" because of the thread used in making the pattern (Figure 2.6). The rich use of traditional motifs in 'songket' provides a huge reference to other forms of craft practice although the motifs displayed in this technique are geometrical in pattern.

Another form of weaving also defined by Arney (1987) as a process whereby strips of leaves, twigs, rattan, roots, bamboo and a few other types of plants are twisted or interlaced to form a weave.

Figure 2.6 shows a close-up of a piece of 'songket' cloth. The pattern is a repeating geometric motif, specifically a diamond or star shape, created by the interweaving of gold threads into a red background. The texture appears fine and delicate.

Figure 2.6

***"Songket" or
Gold Thread
Cloth***



Source: Ismail, Z, 1988

This kind of weaving adopts a similar approach to textile weaving but the difference is the use of natural resources, which are obtained from the jungle, swamps, villages and along the beaches. The products from this type of weaving have produced various types of crafts like basketry, placemats, ornaments etc. From this example, mat weaving used extensively geometrical patterns as in 'songket' to reflect cultural motifs. Examples of some of the motifs used are illustrated in Figure 2.7.

Figure 2.7 shows a close-up of a piece of woven mat. The pattern is a repeating geometric motif, specifically a diamond or star shape, created by the interweaving of natural fibers. The texture appears coarse and rustic. The lighting highlights the natural colors of the fibers.

identity. The frequent appearance of batik motifs in contexts such as the Malaysian National flag and the railway System (KTM) interior design, has made Malaysia as a nation. As the product of the people for Malays to contribute to the nation.

Source: Ismail, Z. 1998

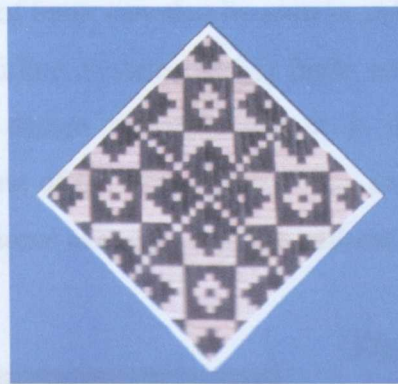


Figure 2.7

Placemat design from 'Pandanus' leaves

Source: Arney, S. 1987

One of the common elements used in batik design and weaving is the use of 'pucuk rebung (bamboo shoot)' motifs as part of decorative application. This pattern looks similar to the triangle detail usually positioned as a pattern 'border' in weaving (Figure 2.8). Usually the triangles are filled with a floral design or can be another single contrasting colour.

A report by 'Karyanika' from the Board of Director (August 1999) concerning the sales of craft outlet, from January 1999 to July 1999, stated that batik is popular in most retail outlets followed by wood craft, silver craft, and other crafts.

Appendix 2). The sales figure for batik in 1998 to RM 1.2 million (NST 28th January 2001) and in 1999 to RM 1.5 million (NST 28th January 2001).

Source: Arney, S. 1987



Figure 2.8

Bamboo shoot motif in batik design.

Batik itself has compiled various motifs, which can be divided into two styles, organic such as plants and natural elements such as birds and animals. The other styles are from geometric patterns derived from weaving (Figure 2.9). All these elements as cited by Arney from Gertz (1973), explain that cultural symbols may appear in the form of artefacts, social actions or attitudes. In relation to this theory of cultural interpretation, batik is viewed as a cultural artefact and a product of social action. Thus the creation of batik constitutes cultural symbols in the Malay culture and Malaysian society because it is the product of the people and used daily by the people. For both creators and consumers it is a medium of expressing national

identity. The frequent appearance of batik can also be seen in public events and other contexts such as the Malaysian Airline System (MAS) flight uniforms, the National railway System (KTM) interior design suggests that it is a “key symbol” for Malaysia as a nation. As the product of the Malay population, batik provides a means for Malays to contribute to the national economy and the national identity.

Source: Areney, S. 1987



Figure 2.9

*Hand drawn
batik design
depicting
floral and
animal
patterns*

A report by ‘Karyaneka’ from the Board of Directors (August 1999) concerning the sales of craft outlet, from January 1999 to July 1999 identified that batik is popular in most retail outlets followed by weaving/basketry items and others (See Table 2.1, Appendix 2). The sales figures for batik as announced by MHDC reported by Ching (NST 28th January 2001) saw an increase of sales from RM 220 million (36.7 million Pound) in 1998 to RM 250 million (41.7 million pound) in 1999 in the tourist market. The sales of batik are considered a big earner to the Malaysian craft economy. MHDC also predicted that the local market for the year 2001 is in the region of RM 60.3 million and it is estimated that the local market for batik will be about RM 97 million in the year 2005 with an increase of 10 per cent in the growth rate. MHDC also explained the challenges of the batik industry in the future, where this industry will have to face competition from low-cost producers such as China, India, Indonesia, Vietnam and Cambodia. MHDC have also said that other issues which batik entrepreneurs have to contend with, are concerns about insufficient designing, distribution channels and marketing capabilities.

In developing a new strategy for the batik industry, MHDC encourages the entrepreneur in this field to be aware of the many uses of batik in decoration, art form and office products apart from the traditional apparel products. The current

development of batik product have seen the vibrant transformation from the days it was used only for 'sarongs', now its being applied not only to cloth, but to furnishings, wall hangings, bags, dividers and even pot holders etc.. As a result of the collective effort from individuals and organizations, batik is now recognised as a traditional art. The future of this tradition depends on the continued ability to adapt to new needs and contexts and on the willingness to accept new ideas (Arney 1987).

2.3 The Development of Anodised Aluminium Decorative Methods

2.3.1 History of Aluminium

The nature of aluminium according to *The New Britannica Encyclopaedia* is that it never occurs in the metallic form, but its compounds are present to a greater or lesser extent in almost all rocks, vegetation and animals. Aluminium is considered as the second most plentiful metallic of elements on earth. It has been estimated that 8% of the Earth crust's is composed of aluminium, usually found in the form of Bauxite.

Hans Christian Orsted (1825) first isolated crude aluminium by the process of reducing the content of aluminium chloride with a potassium amalgam. Sir Humphry Davy (1809) is the person who was responsible for the name of 'aluminum' but later the word was modified to 'aluminium' in England and some European countries. Another investigation by a German Chemist, Frederick Wohler, used potassium as a reducing agent to produce aluminium powder in 1825. In 1845 he was able to determine the properties of aluminium.

Simultaneously in 1886, Charles Martin Hall in the United States and Paul-Louis-Toussaint Heroult in France, discovered the modern method of commercially producing aluminium using an electrolytic extraction process. This technology is well known as the Hall-Herout process and is still used to extract aluminium until the present day. In the 1960's aluminium moved into a first place from copper, in world production of non-ferrous metal. (Design Museum, 2002)

2.3.2 The Global Application of Aluminium

Figure 2.1.1

The use of aluminium in global application is explained in Section 2.3.2

After the beginning of the 20th century, aluminium moved from being considered as a precious metal and became a popular material in mass manufacturing. Aluminium was a scientific discovery that searched for applications. The present status has realised the enormous scope of this metal, which is now used globally due to its special characteristics of lightness, ease of forming and its durability (Figure 2.1.1).

Figure 2.1.1

Some examples of various products from Aluminium

Source: Assan Aluminium



a. Pharmaceutical Foil



b. Lid foil



c. Finstock Foil



d. Cable Foil

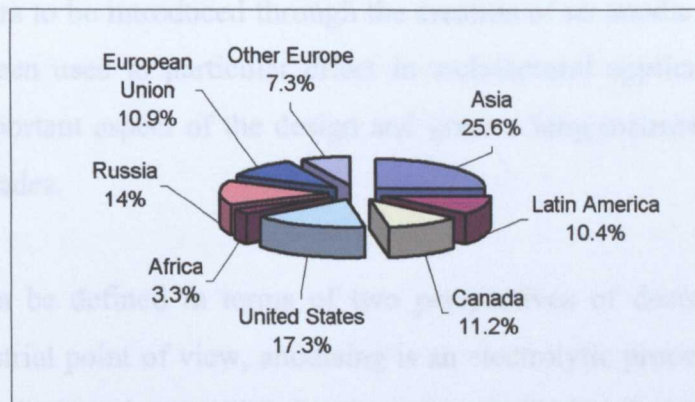
Figure 2.1.2 shows the distribution percentage within eight countries associated with the production of primary aluminium. The contribution of this production, has led the aluminium industry to widen their application globally in various sectors and market segments.

The major markets that have been established resulted in the used of aluminium in various types of application such as building and construction, transportation, consumer durable, machinery equipments and packaging (Aluminium Association 1997).

Figure 2.1.2

***Production
of Primary Aluminium***

Source: *The Aluminium
Association, Inc.*



2.3.3 The Technology of Anodised Aluminium

Section 2.3.3 explains the technology of anodising aluminium and its definition. This section also provides some examples of craftwork from global artists using this technology.

A basic explanation of the nature of application of aluminium is found on the MIT website (Materials Home Page Index) at

<http://me.mit.edu/2.01/Taxonomy/Characteristics/Aluminum.html>:

- For the designer and manufacturer of metal products, aluminium offers a unique combination of advantages in lightness, strength and corrosion resistance. Add to these the adaptability and range of forms, which are available, the principal extruded and rolled products complimented by forgings and castings, provide a logical choice for many applications.
- In architectural applications, aluminium extrusion is extensively used with varieties of design to hold door panels, windows and interior accessories. As it is exposed to the outside environment, a wide range of finishes are used which are either simply decorative or give increased protection in particular applications (Aluminium Federation 1967 p. 123). The technology of 'anodising' provides an aesthetic finish like other categories of light metal for example titanium, magnesium and tungsten, as it can accept colour through electrolytic process. With anodising, it gives greater protection in corrosive environments and enables

a whole range of colours to be introduced through the creation of an anodic film. These finishes have been used to particular effect in architectural applications where colour is an important aspect of the design and gives a long maintenance free life to building facades.

The term ‘anodising’ can be defined in terms of two perspectives of decorative application. From an industrial point of view, anodising is an electrolytic process for producing much thicker oxide coatings, which improve the physical and chemical properties of a component (Henley 1982 p.1). Craft makers in metalwork define anodising as an electrochemical process whereby a porous coating of aluminium oxide is built up on the surface of aluminium. This coating has the ability to absorb and hold dyes, thereby colouring the surface of the metal (Hubner and Schiltknecht 1960).

Both definitions when combined, indicate ‘anodising’ as a process of producing a thicker coating that enables the dye to be absorbed to provide corrosive resistance and for decorative purposes. In tracing the history of this process, the industrial application of anodised aluminium, as described by Henley, was discovered in 1923. The commercial possibilities of coloured anodising were not really exploited until the sulphuric acid process appeared in 1929. As a result of these capabilities, anodised coloured aluminium posed a threat to other finished metals and plastic. Examples of early applications included ashtrays, decorative metal ware such as fruit bowls, tea trolleys and panelling for indoor use.

This industrial development has created a significant opportunity for craft makers, which saw the potential of aluminium as a decorative application. Appreciation of aluminium as a light metal in craft making, Nesbitt (1976) cited Alexander and Street through historical reference:

“... A hundred years ago a new metal was being admired at the court of Napoleon III of France. While some nobility of his banquets were served from mere gold plates and silver cutlery, visiting potentates and the favoured few were privileged to use spoons and forks made of

aluminium. The king of Siam, visiting the French court, was delighted to receive a watch charm made of this fascinating new light metal”.

(Nesbitt 1976 p.12)

Nesbitt (1976) also discussed the development of aluminium in craft practice and stated:

“...There was a vogue for aluminium in the 1940's and, more recently, young designers have begun to take a fresh interest in aluminium as a jewellery metal”. (Nesbitt 1976 p.12)

In 1980's saw the popularity of using aluminium as a craft medium in the United States, United Kingdom and Australia. The introduction of this technique in these countries, didn't exist naturally but through the initiative and willingness to share knowledge among the craft makers (Metalsmith 1987). Airline Fisch, a jeweller and academician at San Diego University is responsible for introducing anodised aluminium technique in the United States (Figure 2.1.3). This led to the birth of famous artists like David Tisdale, Christina De Paul, David LaPlantz etc. David LaPlantz is the only artist that has produced literature on anodised aluminium techniques that has been a global reference to craft makers including the researcher himself. In the United Kingdom, the earliest work of anodised aluminium in jewellery was traced by the researcher through the collection of data from the Crafts Council, which identified the work of Eric Spiller and Sheila Teague. Their work was carried out between 1977 to 1983. Currently Jane Adam continues the legacy of the previous artists and actively exhibits her work on anodised aluminium. Her engagement with anodised aluminium started in 1977 until the present day, the only artist the researcher recalls, who is still active in this specialisation. While in Australia, Johannes Kuhnen, pioneered this technology in 1981 although he gained his experience as early as the 1970's in Dusseldorf Germany. With his public profile through exhibitions combined with teaching responsibilities he has nurtured the growth of anodised aluminium in Australia.

Since its establishment in the early 1970's, anodising aluminium was used as a means of expression in jewellery making for the metal artist. During this period of excitement by the craft makers, the technology of anodised aluminium for decorative application was acknowledged in the craft magazines internationally.

Much has been said by experienced artists using anodised aluminium in terms of its ability to absorb colour and material characteristics (Craft Council 1985). Some of the expressions from these artists has led to the interest of this researcher to integrate the advantages of anodised aluminium in the present study.

Figure 2.1.3



*Anodised Aluminum
Neckpiece
by Airline Fisch*

Source: Crafts Council

Evan (1987), an artist as well academician at Iowa State University describes his experience as follow:

“...In late 1981, I began working with anodised aluminium, drawn to its light weight, availability and low cost” (Evan 1987 p.33)

In another view by Australian craft writer, Anderson (1989) revealed that the application of anodised aluminium in craft making rooted from the industrial sphere. She also claim that anodised aluminium was considered a new material in contemporary jewellery as she described (Figure 2.1.4):

“...Additionally, the introduction of new materials such as anodised aluminium, titanium, niobium and tantalum has meant that jewellery have developed some new and individual technique for working them”. (Anderson 1998 p.17)

Figure 2.1.4

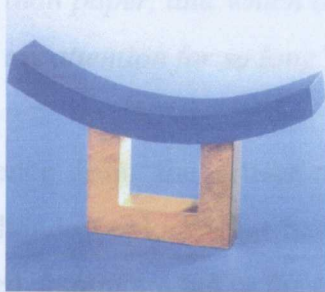


Table Sculpture

Source; Aurora, 1996

Tisdale (1985) like Chuck Evan from the United States, shared similar experiences with anodised aluminium:

“...I believe anodised aluminium is an ideal material for jewellery. Aluminium is light in weight. And it can be coloured in a wide range of hues through the use of the anodising process”. (Tisdale 1985 p.21)

And finally from Jane Adam (1999) expressed her strong interest in anodised aluminium up until the present day:

Figure 2.1.5

Anodised Aluminum from the United Kingdom.

Artist: Jane Adam

Source: Crafts Council Gallery



...”In traditional jewellery, there are not a lot of opportunities for mark and colour. I would never have made jewellery if I had not

become aware of the new jewellery movement of the 70's and 80's, when the hierarchy of preciousness was rejected in favour of new materials and expressions. I moved into the field when I began to have sense of the possibilities of anodised aluminium for colour and mark making. It allows an immediate palette which is more versatile than paper, and which can relate to form. I had no idea it would hold my attention for so long". (Jane Adam 1999 p.40)

Experience from the artists mentioned above has provided an insight for the researcher to explore what has previously been achieved in the decorative use of anodised aluminium but in the context of Malaysian craft making.

2.3.4 Aluminium in Malaysia

The Alcan Company of Canada first established aluminium production in Malaysia in 1960 as Malaysia has rich natural resources of bauxite for the production of aluminium in Johor Bharu. The first fabricating venture in South East Asia was set up in Petaling Jaya, Selangor near the capital city of Kuala Lumpur. In this venture the Alcan Group supplied the majority of the capital as well as engineering and technology while its partner Diethlem, provided minority capital as well as their experience in distribution and the sale of aluminium products. It was named the Alcan Malayan Aluminium Company Ltd. (Alcanmalay) and was officially opened by the first Malaysian Prime Minister Allahyarham Tunku Abdul Rahman in 1963. The company's name was changed to ALCOM (Aluminium Company of Malaysia Bhd.) to reflect the majority Malaysian ownership in 1976.

Four categories of aluminium are produced by ALCOM. They are:

1. **Aluminium Sheet Products** that constitute tread plates, flat sheet, coiled sheet, circles, painted coils and cladding sheet.
2. **Aluminium Building Sheet** this refers to corrugated sheet, stucco embossed and painted finished rib sheet.
3. **Aluminium Foil Products** related to fin stock, cable foil, diaphragm foil, and plain foil.

4. **Aluminium Extruded Products** including extruded profile mill, natural anodised, anotone, analok, powder and PVDF. These categories of aluminium provide finishing for various applications such as architectural, building and construction, electrical, electronic, consumer durables, transport, agriculture engineering, machinery and equipment.

Sources from ALCOM said that the choice of anodised aluminium is for protective and decorative purposes but the colour was very limited. There are only four colours available in production; black, brown, gold and silver and commonly used for framing purposes in advertising and doorframe (ALCOM 2000). ALCOM also provides ready-made aluminium discs for use by aluminium household manufacturer in the making of hollow ware, utensils, light fixtures and traffic signs. Produced to good and consistent metallurgical properties, these circles are suitable for drawing and spinning methods of operation (ALCOM 1999).

Tread plates, which are available in the marketplace, are able to withstand corrosion, are strong and lightweight and have attractive and easy to clean qualities. Aluminium non-slip surface sheet, with an embossed surface pattern, is ideal for foot traffic in places where hygiene is of major importance such as pharmaceutical and food processing plants. This type of pattern sheet is also used on platforms and in vehicle flooring applications where the lightweight and corrosion resistance properties are highly valuable (ALCOM 2000).

Coiled sheet, another form of ALCOM aluminium sheet production, offers the benefit of long length and has been used extensively in panelling such as advertising signboards and in insulation. The roll sheet is made in a wide range of alloys, tempers, sizes and finishes (ALCOM 1999).

For industrial and consumer purposes, ALCOM has produced flat sheet for the following applications: panelling, kitchen sinks, bus bodies, advertising signboards to engineering components. This flat sheet can be formed, pressed, drilled, welded and painted on for industrial or household items (ALCOM 1999).

The above brief examples of different types of aluminium produced by ALCOM alone, provides the evidence that Malaysia has an abundant supply of aluminium. With other established companies like L.B Aluminium, Alumac Industries, Alumega, to mention a few, suggests the possibility for exploitation of aluminium for various means by the craft practitioners, in terms of the abundant range of resources offered by industry.

2.4 Summary and Conclusions

Much of the literature that has been reviewed and presented, is concerned with the nature of craft practice and aluminium resources in Malaysia. The crafts are considered an important activity to the economy of the tourism industry while simultaneously representing the rich iconography of Malaysian cultural heritage. Influences from other countries such as Indonesia, has led to the emergence of batik making which is considered a ‘ Malaysian National Symbol’. The role played by the handicraft agency, MHDC, is to nurture the growth of craft activity extending the heritage by providing training and assisting in craft development. The varieties of craft displayed through its marketing agency ‘Karyaneka’ show its commitment in promoting crafts to the wider world.

The variation of craft products in Malaysia, solely depend on the availability of natural resources. The mining of bauxite, the mineral that was used to produce aluminium, attracted foreign interest by the established aluminium company, ALCOM in 1963. Its production has contributed to the use of aluminium in architectural wall cladding e.g the Petronas Twin Towers-the tallest building in the world, industrial and engineering components etc. The technology of anodised aluminium is not popularly known to the craft makers in the country due to the geographical factor and business orientation of the industry. However, through the examples from western countries like the U.K, U.S.A and Australia, where craft makers saw the opportunity that this technology has for craft making in the early 70’s, a body of knowledge can now be considered in this present study for the Malaysian craft context.

CHAPTER 3

CRAFT SURVEY

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CHAPTER THREE: CRAFT SURVEY

The purpose of this chapter is to explain the survey of Malaysian craft practice. Section 3.1, provides an introduction to the fieldwork that was carried out, explaining the review of secondary data. Section 3.2, describes the contents of the catalogue review. Section 3.3, explains the nature of the researcher's survey in the MHDC showroom and 'Infokraf' Malaysia, to provide a cross-comparison of craft artefacts with the data gathered from the catalogue review. Section 3.4 explains the craft analysis process while Section 3.5 provides a method of craft analysis through Section 3.5.1 The literature review, explains the role of the MHDC in Section 3.5.2 Section 3.6 indicates the nature of Malaysian craft distribution, which explains the different types of crafts. In Section 3.6.1, metalwork is described. In Section 3.6.2, batik, in Section 3.6.3 weaving. Section 3.6.4, pottery, and in Section 3.6.5 woodcarving. Section 3.7 explains MHDC's design activity and marketing through 'Karyaneka'. Sections 3.7.1, 3.7.2 and 3.7.3 explain craft skill training conducted by the MHDC. Section 3.8 discusses the survey findings, which describe the analysis of Malaysian craft artefacts in Section 3.8.1. Section 3.8.2 and Section 3.8.3 provide an analysis of craft artefacts from catalogue reviews of artefacts in the 'Karyaneka' showroom and 'Infokraf' Malaysia. Section 3.8.4 explains the analysis process using four factors related to Malaysian craft practice. Section 3.9 summarizes and draws appropriate conclusions.

CHAPTER THREE: CRAFT SURVEY

3.1 Introduction

In the literature search, the researcher identified that the Malaysian Handicraft Development Corporation (MHDC) has played a significant role in preserving and developing the Malaysian crafts. MHDC has its own 'design team' drawn from various disciplines, where design activity is their primary concern in contributing to the nation designs for varieties of new craft products. It is also known that 'Karyaneka' the marketing arm for MHDC is responsible for the promotion and sale of crafts across the regions. In promoting the crafts, various publications on crafts have been produced by the MHDC as a record as well as for public interest. The initial fieldwork surveyed these publications particularly with regard to those involving applied surface decoration. As said by Sidhu (1987 p.69), a survey of related studies in any field of knowledge requires the researcher to extract information about what has been done in the particular area. This will provide the basis and form the foundation upon which all future work will be built. In this case, the survey input will help the researcher's understanding of the nature of Malaysian craft practice in designing a questionnaire for qualitative interviews with identified craft practitioners. Hakim (1987 p.57) in her view, considers that survey data can easily be linked to qualitative research and provides an excellent sampling frame for linked case, studies which examine particular groups, situation or processes in greater depth.

For this present study, in June to August 2000, the survey that was conducted in Malaysia, reviewed the contemporary craft artefacts from one source of secondary data and one primary source. They are:

- catalogues provided by the Malaysian Handicrafts Development Corporation (MHDC) and
- research surveys of craft artefacts from the MHDC main showroom and from 'Infokraf' Malaysia in Kuala Lumpur.

3.2 Data Collection

3.2.1 Catalogue Review

MHDC have published several craft catalogues to provide an insight on a broad range of artefacts produced by the contemporary Malaysian craft practitioners from all over the regions. These craft publications aim to give exposure to both local and international communities.

The catalogues selected by the researcher for the compilation and classification of the contemporary craft practices and artefacts were identified during the survey, which was located in the main MHDC craft showroom. The crafts exhibited were sold to local and overseas tourist. The Corporate Communications and Administration department of MHDC also recommended that these catalogues are appropriate documents for any interested researcher, individuals or organizations, to review and understand the nature of Malaysian handicraft artefacts. Two catalogues were chosen appropriate to the researcher's objectives. They were:

- Malaysian Souvenirs and Gifts
- Malaysian heritage

3.2.2 Research Survey

To check the internal validity of data, the researcher also compiled craft artefacts from the main MHDC showroom and 'Infokraf' Malaysia. The compilation provide a cross-comparison through the 'triangulation' of data (Mckernan 1991 p.184) related to crafts identified in the catalogue, with reference to the:

- nature of contemporary craft practice
- material usage
- process and technique and
- decorative application

Mckernan cited (Elliot and Adelman, 1976; and Elliot, 1978) the term 'triangulation' as a procedure for organizing different types of evidence into a more coherent frame of reference or relationship so that they can be compared and contrasted. Data gathered from here and the literature helped the researcher to identify the potential craft practices to be integrated with anodised aluminium decorative application.

The formation of the MHDC in 1979 created an opportunity for the contemporary Malaysian craft practitioners to create craft productions for local and global markets. The craft practitioner was offered entrepreneurial schemes supported by the government such as materials, machines and expertise. They were also encouraged to venture into new crafts with the assistance of the MHDC.

3.2.3 Analysis of the Craft Survey

The purpose of this analysis is to identify the range of contemporary Malay craft artefacts through the visual evidence provided by the MHDC and the researcher's survey of the handicrafts showroom conducted between June to August 2000. The analysis of the craft artefacts helped the researcher to:

- compile and classify contemporary Malay craft practices and artefacts
- identify the potential for integrating Anodised Aluminium with specific areas of craft practice and
- determine the key areas for experimentation in Phase 2 of the investigation.

3.3 Method of Craft Analysis

3.3.1 Literature Review

As the MHDC played a prime role in preserving the legacy of the Malay crafts, the agency has been highlighted for analysis for their contribution in supporting the socio-economic importance of the Malay craft practitioners since, its formation in 1979. The MHDC has been given responsibility by the government, to support the

handicraft industry and to make certain that this industry can financially stand on its own through ‘craft incubator’ schemes, implemented for the potential craft entrepreneur. This scheme allows the craft practitioner an opportunity to produce their craft product specialization, with the supervision from MHDC for a maximum period of three years. In this period also, the MHDC assisted in promoting their craft products, workshop facilities and business entrepreneur course.

3.3.2 Malaysian Handicraft Development Corporation (MHDC)

“Crafts are symbolic mirrors of the soul of a nation. They reflect the way of life and enduring characteristics of people”(MHDC 1990). This mission depicted the importance of crafts to the Malaysian Handicrafts Development Corporation in their role of preserving the traditions of the Malaysian crafts industry. Their formation in 1979 created a platform for contemporary Malay craft practitioners to develop a sustainable future for their craftwork with the aid from the government, to ensure that the Malay could raise their standard of living, especially for villagers in the more remote regions. They were encouraged to perpetuate their ancestral skills of craft practice not to allow such skills to fade in the advent of modernity. By reviving these craft practices they can also earn a sufficient income in line with the government aim to eradicate poverty.

The functions of the Malaysian Handicraft Development Corporation (MHDC) are to:

- promote and, where necessary, to stimulate and rehabilitate traditional skill and craftsmanship,
- develop and stimulate the growth and maintain the standards of the handicraft industry by various means, including the provision of research, advisory, and extension services,
- guide, orientate, and assist existing craftsmen toward the use of modern methods of production, management, and marketing,
- regulate, develop, and improve the quality and maintain the standards of handicraft products for local and foreign markets, and

- 4.1 promote the marketing and export of handicraft products.

Since its establishment, the MHDC has played a pivotal socio-economic role and as a result of this, various types of handicraft have been identified. They provide craft practitioners with raw materials and a skilled labour force based on the availability and the expertise of the local area. The crafts and regions identified within these factors allocated were:

Table 3.1 Craft Distribution

NO	CRAFT PRACTICE	REGION
1	Batik silk-screening, weaving and silverware	Kelantan
2	Batik block printing , weaving and brassware	Terengganu
3	Wood carving and pottery	Pahang
4	Weaving	Sabah
5	Rattan and glassware	Negeri Sembilan
6	Pottery	Perak
7	Hand drawn batik and marble	Kedah
8	Weaving , hand drawn batik and pottery	Sarawak
9	Weaving and hand drawn batik	Melaka

Sources: MHDC 98

3.4 Craft Distribution

With reference to the above table (Table 3.1) the craft distribution seems to cover nine of the thirteen regions in Malaysia. It depicts the distribution of different crafts identified by MHDC. Described below a short history of the crafts identified. The following is a short history of the crafts that are identified in the table:

3.4.1 Metalwork (Brassware and Silverware)

Before and after the time that the empire of Sri Vijaya was established in Melaka, most of the states in the Malay Peninsular, especially the states, which border the Siamese (now Thailand), were considered part of the Siamese empire. The skill inherited in this era led to the emergence of silverwork particularly in the region of Kelantan. The techniques of repousse and chasing, doming and engraving to produce pattern, are still practised by Malay craft practitioners. Thin strips of metal are hand drawn into wire by pulling them through an iron plate drilled with holes of decreasing size. The smith holds the end of the wire firmly and twists it into a form. The assemblage is gently hammered flat and brushed over with a torch, which melts and diffuses the web.

The finest work of filigree or repousse silver are wrought into exotic tea or coffee serving sets, jewellery as well as presentation pieces worthy of the Royal court. The result of British colonisation spawned this craft into a high status and linked it to the possession of silver fashion artefacts for adornment and daily use.

Metalwork from brassware was located in Trengganu where this handicraft is believed to have been influenced by the Dong Son culture (Othman 1994 p. 65 and Ismail 1988 p.19). This is due to their influx in the third century B.C. It is also believed that the Dong Son community had expertise in metalwork.

Traditionally, brassware has been made through a process of lost wax casting where wax moulds were used. Most of the work is still done by hand. Brass is copper mixed with zinc and is cheaper and softer than bronze. Finished brass articles are usually smoothed using a lathe. Some are decorated with carvings, though most of the Terengganu brassware is only decorated at the edges. Among the many articles available are betel-nut boxes, rose water sprinklers and finger bowls.

3.4.2 Batik

Historical texts indicate that batik started in the 12th century on the island of Java, Indonesia. Evidence of its practice has been discovered in most Eastern and Middle Eastern countries including China, Japan Persia and Egypt. But although its actual source is unknown, it was on the island of Java that batik reached the peak of its development. The Malay batik of Kelantan and Terengganu was directly influenced by Java (Arney 1987).

In Terengganu the process of using batik and wax is believed to have started in 1913. The birthplace of Kelantan batik is at Lorong Gajah Mati, Kota Bharu. Silkscreen printing of batik is believed to be pioneered by a group of Kelantanese batik makers. This technique was imported from Siam in the early 60's and is still practised by the batik craft makers until the present day. Malaysian batik can be divided into two groups (Ismail 1988):

1) Ancient Batik

Ancient batik is believed to have been influenced from Java and India. The colours used are drawn from the universe i.e purple, depicted in primitive designs like the rooster. The batik sarong or loincloth is the symbol of this craft which has several main sections namely the head, the body and the feet (edge).

2) Modern Batik

Modern batik is depicted with various elements. It employs bright, soft, warm and harmonious colours. Motifs are mainly derived from the flora subjects created in 'Batik Tulis' and 'Batik Cap', which are considered as a new identity in Malaysian batik making. As stated by Arney (1987) both motifs and techniques employed, reflect the assimilation of historical developments and contemporary attitudes of the batik makers.

3.4.3 Weaving

Weaving flourished itself without any outside influence (Ismail 1997 p.91). The term of this craft form has produced two types of craft, which are differentiated by the type of materials being used. Weaving from natural material, 'fibre' from pandanus leaves, uses the hand weaving skill of the craft makers and their design imagination to create craft products such as colourful placemats, basketry items and sometimes for interior purposes. The other form of weaving utilises gold and silver thread and hand-loom techniques to produce a decorated cloth 'songket' filled with geometrical designs. This form of weaving is the pride of Malaysian people on the East Coast of Malaysia in Kelantan and Terengganu (Ee in Osman et al 1994)

3.4.4 Pottery

Archaeology and history has proven that pottery is the earliest crafts developed by mankind in the early stages of civilization (MHDC 1997). It was made to fulfil the needs of everyday human life and spiritual activities. Pottery in Malaysia comes in various shapes and designs. Each possesses its own uniqueness and represents the identity of the potter and the place in which it is produced. Pottery can be divided into four types in accordance with the history of its artwork (MHDC 1997 p.1). They are:

1) Labu Sayong

The state of Perak is famous for its "Labu Sayong". Sayong is a village in Kuala Kangsar, the place where "Labu Sayong" is produced. Pottery produced from here is black in colour due to the open kiln method of burning, which used padi husk and sawdust. The design of "Labu Sayong" usually has three parts, the top is small while the middle section is bulged but smaller than the bottom section. It is mainly used to store drinking water.

2) Terenang

"Terenang" is the type of pottery produced in the district of Kuala Tembeling, Pahang, famous for its pots which have a lid and three supportive stands. In the

making of this pot, the “Terenang” potter used two types of clay, that is “tembeling soil” which is yellowish in colour and “paddy soil” which is quite hard and yellow in colour.

3) Mambong

“Mambong” pottery is quite different from others due to the mixture of fine shiny sand, which gives it a shining appearance. Like others, “Labu Mambong” got its name because it is produced in Kampong Mambong (Mambong village), Kuala Krai, Kelantan. There are various types of shapes and usage for Mambong pottery such as the cooking pot, jar, steamer pot and incense burner.

4) Sarawak Vase

The Sarawak vase is more popular than those found in the Peninsula and has its uniqueness in terms of its decoration. It has various shapes and sizes to suit its function but the decoration is still influenced by ancient motifs, which are closely related to nature. Besides its function as a decorative vase it is also used as a kitchen utensil and for ritual and religious ceremonies.

3.4.5 Wood carving

The craft of woodcarving is associated with Pahang, the largest state in Malaysia. As the ancient rainforest dominates the state, woodcarving became one of the traditional major crafts activities. The MHDC has allocated the area of Temerloh and Jerantut as the centre of this specialization. Pahang woodcarvers take their inspiration from Islamic art and the rich local flora utilised the Meranti and Chengal species of wood, which are preferred for carving. Although some are decorative pieces, most have a more practical purpose. From houses to palaces, intricate designs on beams, supports, balustrades doors, screens, and furniture illustrate the exquisite craftsmanship and enduring qualities of the wood carvers.

3.5 MHDC Program and Activity

There were three main programs and activities initiated by the MHDC to restore handicraft traditions, which help in the development of contemporary Malaysian craft practitioners. They are:

3.5.1 Design Centre

The Design Centre is responsible for the development of handicrafts through its traditional and contemporary design activity. This is reflected in their craft exhibitions of new products produced by the designers in various craft disciplines. Besides designing, research activities were carried out to assist the Malay craft practitioners, in increasing their craft quality and production. The Centre is also responsible for inculcating the spirit and motivation of crafts practitioners to develop their creative talent in craft work.

3.5.2 Craft Marketing

To increase the confidence and stability of the Malay craft practitioners in their craft business, the MHDC provide marketing support. Their craft products are distributed through various channels including local and international craft shops. The formation of marketing companies such as '*Karyaneka*' in every region in Malaysia, provide an advantage to the craft practitioners to promote and sell their craft products.. Acceptance of craft products to be marketed by '*Karyaneka*', is reliant on the quality of the item produced from established craft practitioners. To preserve this quality, the MHDC has developed a quality certificate endorsement to ensure that the quality of crafts on display meets the marketing criteria.

3.5.3 Craft Skill Training

The younger generation aged 17-35 with an interest in the crafts are encouraged to apply for skill training. The MHDC craft training centre in Rawang, Selangor can accommodate 600 students (The Malay Mail 27th September 1991). Short courses on

batik, silverware, brassware, weaving, wood carving, rattan and bamboo, ceramic and horn are taught as part of the training programme. Technical and non-technical support is also given by MHDC to craft entrepreneurs, in areas related to information on the development of new technology, design trends, quality assurance, marketing strategy and new craft business.

3.6 Survey Findings

3.6.1 Analysis of Contemporary Malaysian craft artefacts

The purpose of this review was to gain an understanding of the different types of material, the processes and techniques, and the decorative applications used by the contemporary Malaysian craft practitioners. This review has led the researcher to analyse and identify the appropriate spheres of craft practice that could possibly engage with anodised aluminium decorative application.

3.6.2 Catalogue Review

The surveys, which were conducted in Malaysia, focus on the contemporary Malaysian craft artefacts, in particular, those involving applied surface decoration. The information gathered in this section is then review and analysed from are source of secondary data and one source of primary data. They are:

- Catalogues provided by MHDC and
- The researcher's survey of craft artefacts from the 'Karyaneka' showroom and 'Infokraf' Malaysia

The catalogues selected are recommended lists of materials from the Corporate Communications and Administration department of the MHDC. They are deemed, because of their uniqueness, to be the most appropriate documents for any interested researcher to understand the nature of the Malaysian handicraft artefacts. As a result two catalogues were chosen to fulfil the research objective of the survey. They were:

- Malaysian Souvenirs and Gifts (MHDC 1990) and
- Malaysian Heritage (MHDC 1990).

Both catalogues have identified varieties of handicrafts pursued by contemporary Malaysian craft practitioners which can be summarized into various categories; for example (See Table 3.2):

Table 3.2

TYPES OF MALAYSIAN HANDICRAFTS

1. Wood	5. Batik
2. Brass ware	6. Ceramic/pottery
3. Silver ware	7. Weaving
4. Pewter ware	8. Rattan/bamboo

Source : MHDC

3.6.3 Researcher Survey

To check the validity of data about the crafts identified in the MHDC catalogues, the researcher compiled a range of craft artefacts from the main 'Karyaneka' (MHDC Marketing Agency) showroom. The showroom was selected as the source of craft artefacts because it has the most comprehensive range of indigenous crafts produced by Malaysian craft practitioners.

Both compilations produce a cross comparison of the craft artefacts using the factors below in order to gain an understanding of the nature of contemporary Malaysian craft practices. They are:

- contemporary craft practices,
- material usage,
- process and technique, and
- decorative application

3.6.4 Contemporary Craft Practices

Contemporary craft practice these lists have identified twenty-one craft product categories that are presented in both catalogues. These product categories originate from different parts of the states in Malaysia (Table 3.3). These are:

Table 3.3

CONTEMPORARY CRAFT PRACTICE			
1	Brassware	12	Table accessories
2	Silverware	13	Paper weight
3	Costume Jewellery	14	Batik frame
4	Multi-purpose box	15	Wall deco
5	Ceramic vase	16	Decorative glass
6	Book marker	17	Dried leaves
7	Multi-purpose container	18	Bonzai
8	Table sculpture	19	Letter rack
9	Wooden stand	20	Dagger
10	Wooden box	21	Furniture
11	Chess box		

Source: MHDC

Materials featured in this catalogue illustrate the various types of craft artefacts produced by contemporary Malay craft practitioners. Analysis of the catalogues provided has identified the range of materials used in the different areas of craft production (Table 3.4).

In brassware products, a combination of other materials feature with brass, for example, the use of dyed palm leaf or pandanus. Embellishment through acrylic and epoxy resin applied to the brass surface has also been used. The creative combination of these materials might perhaps create new directions for other craft areas to explore. These are:

Table 3.4 methods of process and materials involved in producing a remarkably aesthetic value in the production of craft practices reflecting the skill of

MATERIALS

1	Brass	8	Horn
2	Silver	9	Brocaded cloth
3	Epoxy	10	Paper clay
4	Pandanus/palm leaf	11	Batik Fabric
5	Acrylic	12	Clay
6	Paint	13	Wood
7	Gemstone	14	Rattan

Source: MHDC

Processes and techniques of Malaysian craft practitioners still revolves around a predominantly traditional mode of practice. These could be seen in the making of brassware and silverware artefacts. The process and techniques differ between each discipline and this can be summarized as follows (Table 3.5):

Table 3.5

PROCESS/TECHNIQUE

1	Sand casting/lost wax	7	Carving	13	Hand painted marker
2	Piercing	8	Rivet	14	Weaving
3	Etching	9	Chanting hand drawn	16	Lacquering
4	Repousse and Chasing	10	Glass blowing	17	Moulding
5	Doming	11	Glazing		
6	Raising	12	Carving		

Source: Saidin

- check the validity of the crafts practice in the catalogue
- compile and classify the contemporary Malay craft practices and artefacts

Traditional methods of process and technique however have produced a remarkable aesthetic value in the production of craft products reflecting the skill of contemporary Malaysian craft practitioners.

Decorative application in the catalogue draws on a variety of sources from floral to geometric elements. One of the most often used motifs is the *awan larat*. This can be translated as ‘procession of clouds’ and is a metaphor of the gentle, natural flow of life and nature. In this section of analysis the researcher has identified various means of decorative application which are currently used (Table 3.6).

They are:

Table 3.6

DECORATIVE APPLICATION

1	Weaving dyed palm leaf	8	Coloured acrylic
2	Relief floral and geometrical	9	Wood grain
3	Matt and highly polish	10	Fish and animals
4	Painted enamel	11	Piercing
5	Batik	12	Doming
6	Lacquer polish	13	Repousse and chasing
7	Dried flowers	14	Twisted wire

Source: MHDC

Although different crafts use different types of decorative application, the overall approach by the Malay craft practitioners has successfully represented the rich iconography of Malaysian handicrafts.

3.7 Summary and Conclusions

The initial findings from the survey of Malaysian craft practice has helped the researcher to:

- check the validity of the crafts present in the catalogue,
- compile and classify the contemporary Malay craft practices and artefacts,

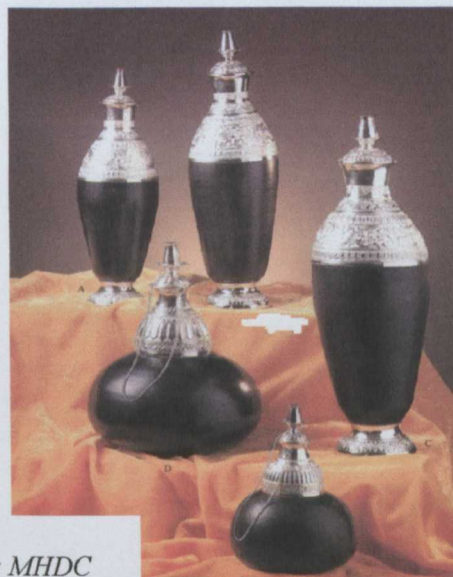
- identify the potential of integrating Anodised Aluminium with specific areas of craft practice and,
- determine the key areas for experimentation in Phase 2 of the investigation.

The survey has produced a compilation of the current artefacts produced by contemporary Malay craft practitioners, with particular regard to those involving applied surface decoration. The survey managed to review secondary source data in the form of handicraft catalogues recommended by MHDC and contrast this with the researcher's own survey of the current crafts marketed by 'Karyaneka' on display in their showroom. The survey also reviewed the range of artefacts in 'Infokraf' Malaysia

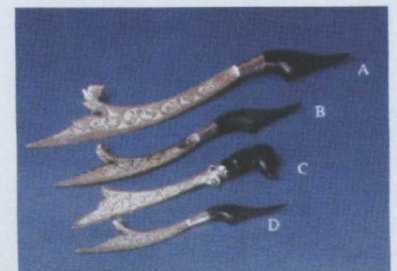
During the researcher's visit to the MHDC showrooms at 'Karyaneka' and 'Infokraf' Malaysia in the capital city of Kuala Lumpur, 120 images (See Appendix 3 p.241) were photographed. In the survey, the researcher found that the creative use of material in the artefacts reflects the ability of the craft practitioners to manipulate the natural resources available into meaningful crafts. There is a tendency for experimentation by the craft practitioners identified here using a combination of materials, for example batik with ceramic, and weaving with metalwork (Figure 3.1).

Figure 3.1

Water Container:
Silver and ceramic combination



Source: MHDC



Letter Opener:
Silver and buffalo horn

The richness of batik also appeared on many materials present in the craft artefacts such as bamboo, wood, ceramic and coconut and it is concluded that those materials cannot sustain an aesthetic impact by themselves. They have to be decorated by other means, materials or techniques.

CHAPTER 4

CASE STUDIES: QUESTIONNAIRE SURVEY OF MALAYSIAN CRAFT PRACTICE

MALAYSIAN CRAFT PRACTICE

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CHAPTER FOUR: CASE STUDIES: QUESTIONNAIRE SURVEY OF MALAYSIAN CRAFT PRACTICE

The purpose of this chapter is to explain the methodology process and outcome of the qualitative interviews in the case study survey of craft practice. Section 4.1 explains the literature review from the Crafts Council as a basis for this stage. Section 4.2, discusses the research method using a qualitative approach. Section 4.3 explains the development of the interview questionnaire. Section 4.3.1 describes the development of the questionnaire using Business Process Analysis. Section 4.3.2 discusses the final construction of the questionnaire based on the critical factors applied. Section 4.3.3 illustrates the layout of the questionnaire interview. Section 4.4 explains the nature of the interview setting. Section 4.4.1 discusses the questionnaire analysis. Section 4.4.2 explains the method of recording for the interview. Section 4.4.3 explains the duration of the interviews. Section 4.4.4 describes the term 'elite' interviewing. Section 4.5 explains the data collection process for analysis. Section 4.5.1 describes the selection of respondents. Section 4.5.2 discusses the use of meta-matrices to analyse the interview transcript. Section 4.5.3 discusses the qualitative interview findings and finally Section 4.6 summarizes and concludes the findings.

CHAPTER FOUR: CASE STUDIES: QUESTIONNAIRE SURVEY OF MALAYSIAN CRAFT PRACTICE

4.1 Overview of Research Method

The goals of research affect its method (Dane 1990 p.18). Dane also defined research as a process through which questions are asked and answered systematically. P.M Cook as mentioned by Sidhu (1985 p.1) describes research as an honest, exhaustive, intelligent searching for facts and their meanings or implications with reference to a given problem. It is a process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data. In reviewing previous methodologies for research adopted in the area of crafts, the researcher faced difficulties in finding an appropriate analogy for his proposed research. However, there have been studies by scholars related to the crafts survey done by Filmer (1987), Barnet (1987), and Knott (1994). These studies have given some guidelines to the researcher, although the methodology adopted by them is more of a quantitative approach.

Filmer in his craft survey of an independent socio-economic study of craftsmen and women in England and Wales prepared for the Crafts Council, used a quantitative type of data collection method, which relied on the input of a questionnaire. The questionnaire posed various issues related to craft practice. Similarly Barnet (1987) adopted Filmer's approach of using a quantitative survey focus on the education and training of crafts people, which was designed to review the current situation and make recommendations for future policies in education and training. While Knott extended their craft surveys on the issues raised by Filmer's work, again through a quantitative approach.

Although the approach of these studies utilized a quantitative methodology, the example of the questionnaire presented, offered a great value to the researcher's present study which relates to the issue of craft practice.

4.2 A Discussion of Research Methods

With reference to Ibrahim's (1999), research on New Product Development (NPD) in Malaysia, he described the potential of qualitative methods, which employed case studies with Malaysian SMIs and UK SMEs to explain the success of NPD. As this study initially proposed a qualitative methods approach, an assessment of the meaning and the significance of qualitative research was made by looking at the work of various authors. For example Rosmann (1998 pg.5) described qualitative research as the gathering of data in the real world. They gather what they see, hear and read from people and places and from events and activities. They do their research in natural settings rather than laboratories or through written surveys. Their purpose is to learn about some aspect of the social world and to generate new understandings that can be used by that social world. Strauss and Corbin (1990 p.17) also viewed qualitative research, as any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification. It can refer to research about persons' lives, stories, behaviour, but also about organizational functioning, social movements, or interactional relationships.

Miles and Huberman (1994 p.10) also indicate the strengths of qualitative methods:

1. Qualitative data focus on naturally occurring ordinary events in natural settings, so they offer a strong indication of what 'real life' is like. In this way it emphasizes people's 'lived experience': it is thus fundamentally well suited for locating the meanings people place on the events, processes, and structures of their lives: 'perceptions, assumptions, pre-judgements and presuppositions' can all be taken on board and connected to the social world around them.
2. Local groundedness: qualitative data are collected in close proximity to a specific situation, rather than through the mail or over the phone. The emphasis is on a specific case, a focused and bounded phenomenon embedded in its context.
3. Their richness and holism: qualitative data have strong potential for revealing complexity. They can provide 'thick descriptions', 'nested' in a real context, and can have a 'truth' that has strong impact on the reader. Since qualitative data is flexible it

gives added confidence to the phenomena being examined

4. Data are often collected over a sustained period. This makes them powerful for studying any process: In this way qualitative data can go beyond 'snapshots' of 'what?', or 'how many?' to how and why things happen as they do - and even assess causality as it actually happens in a particular setting.

5. Qualitative data have the ability to test new areas and hence can assess whether specific predictions hold true. Finally and perhaps most importantly to the processes of reflexivity and future research, qualitative data are useful as they may be used to supplement, validate, explain, illuminate or reinterpret quantitative data gathered from the same setting.

Strauss and Corbin (1990 pg 19) also describe the strength of qualitative methods to uncover and understand what lies behind any phenomenon about which little is yet known. It can be used to gain novel and fresh slants on things about which quite a bit is already known. Also qualitative methods can give the intricate details of phenomena that are difficult to convey with quantitative methods.

In selecting methods, Ibrahim (1999) described that there are no rigid rules that can be used to guide data collection techniques. According to Patton (1990) in qualitative approaches, there are three kinds of data collection: (1) in-depth, open-ended interviews; (2) direct observations; and (3) written documents. Marshall and Rossman (1994) gives a different view to the fundamental methods relied on by qualitative researchers for gathering information, they are (1) participation in the setting, (2) direct observation, (3) in-depth interviewing, and (4) document review.

Patton (1990 p.12) also describes that data collection options and strategies for any particular applied research inquiry depend on answers to several questions:

1. Who is the information for and who will use the findings?
2. What kinds of information are needed?

3. How is the information to be used? For what purposes is evaluation being done?
4. What is the information needed?
5. What resources are available to conduct the evaluation?
6. Given answers to the preceding questions, what methods are appropriate?

Since the research project study needed findings to be drawn from the real world, a qualitative questionnaire using semi structure interviews was applied to examine issues that are relevant to the processes of contemporary Malaysian craft practice such as; anodised aluminium, the batik process, craft practice, design education and design management, and their potential to form a new craft development process. By using a qualitative approach, the researcher hoped to be able to produce data on batik type of decoration and to identify specific areas of craft practice that could potentially lend themselves to experimentation with surface decoration. The anticipation was that the finding would also help the researcher to identify the sample range of collaborators for the experimental case studies to follow later (See map of the research process Chapter 1).

4.3 Development of Questionnaire

This stage involved qualitative interviews and utilised an open-ended questionnaire using a semi-structure interview posed to the selected craft practitioners identified during the craft survey (See Chapter 3). According to Meriam (1988) interviewing is a common means of collecting data. The purpose of interviewing is to find out what is in and on someone else's mind. The purpose of open-ended interviewing is not to put things in someone's mind but to access the perspective of the person being interviewed. Qualitative interviewing begins with assumption that the perspective of others is meaningful, knowable, and able to be made explicit (Patton 1990).

A qualitative questionnaire interview was chosen in this study to relate best to the mode of inquiry determined by the researcher, which was mainly interested in the meaning making and how people make sense of their lives, experiences, and their structures of the world. The other reason was that the researcher was interested in the

process and understanding gained through words and pictures (Creswell 1994), in relation to provide information on the nature of Malaysian craft practice, such as design of craft artefacts for production.

4.3.1 The Interview Questionnaire

The development of the interview questionnaire was based on the critical factors related to people, purpose, culture, process and performance, in the craft industries adopted by Ibrahim (1999). His case study approach concerned product development of industrial design and his interview questions also focused on the Business Process Analysis (Champy 1995).

4.3.2 Construction of Questionnaire

According to Ibrahim (1999) 'Reengineering the Corporation' was written with the purpose of improving business performance by showing managers how to revolutionize their key operational processes, i.e. product development. Using a concept similar to BPA, Darnton and Darnton (1997) believed that there are three elements that make up an organization: the product or service, human factors and culture. These elements are in close agreement to Champy's findings.

In constructing the questionnaire, the understanding of critical factors as described by Champy (1995), has provided themes for the design of the questionnaire. The questionnaire was developed with assistance from the research supervisors in drafting and improving it. The final questionnaire format comprised three pages, which catered for Malaysian Craft Practitioners (craft makers, designers and educators) and required twenty to thirty minutes to complete. All the questions posed to the respondents, as suggested by (Bogdan and Biklen 1982) for qualitative interviews may be used either as a primary strategy for data collection, or in conjunction with observation, document analysis, or other techniques. Qualitative interviewing utilizes open-ended questions that allow for individual variations (Patton 1990).

4.3.3 Layout of Questionnaire

There were four sections in the questionnaire interview, which utilized the critical factors related to purpose, culture, process and performance and people in the craft industry. As a result of this twelve questions were proposed where the introduction to the questionnaire sought to gather information about the respondents' category of activity i.e. (craft makers, designers and educators), their craft specialization and detailed background, the general aim was stated of the interview and the detail questions forwarded to the interviewee. The following are the contents of the questionnaire:

Section 1: Purpose

In this section three questions were posed related to purpose, which covered the nature of the craft practitioners in order to gain information on their craft background, specialization and their current craft activity.

Section 2: Culture

One question in this section asked the interviewee to elaborate on their current association with their craft specialization to reveal information on their role in craft production.

Section 3: Process and Performance

As this section is the core part of the research, six questions were designed to ask respondents about critical issues of craft activities and their experiences as craft makers, designers or educators. This section also touches on the design and production of crafts, to explore trends within Malaysian craft practice. Two questions were posed to gain the craft practitioner's views on the use of new material, particularly aluminium, on their awareness of its contribution to the global industry and as a potential craft medium.

Section 4: People

The final section required the interviewee to answer two questions, to explain their organization, the nature of their individual craftwork in terms of its successful contribution toward Malaysian craft.

4.4 Qualitative Interview

4.4.1 Qualitative Interview Analysis

Kvale (1996 p.184) stated that there are six steps in qualitative interview analysis. A **first step** is when *subjects describe* their lived world during the interview. They spontaneously tell what they experience, feel, and do in relation to a topic. There is little interpretation or explanation from either the interviewees or the interviewer.

A **second step** would be that the *subjects themselves discover* new relationships during the interview, see new meanings in what they experience and do. For example, a pupil, describing the effects of grading, comes to think of how the grades further a destructive competition among pupils. The interviewees themselves start to see new connections in their life worlds on the basis of their spontaneous descriptions, free of interpretation by the interviewer.

In a **third step**, the *interviewer, during the interview, condenses and interprets* the meaning of what the interviewee describes, and “sends” the meaning back. The interviewee then has the opportunity to reply, for example, “I did not mean that” or “That was precisely what I was trying to say” or “No, that was not quite what I felt. It was more like. . .” This dialogue ideally continues till there is only one possible interpretation left, or it is established that the subject has multiple, and possibly contradictory, understandings of a theme. This form of interviewing implies an ongoing “on-the-line interpretation” with the possibility of an “on the-spot” confirmation or disconfirmation of the interviewer’s interpretations. The result can then be a “self-correcting” interview.

In a **fourth step**, the *transcribed interview is interpreted by the interviewer*, either

alone or with other researchers. Three parts of this analysis may be discerned; first, *structuring* the often large and complex interview material for analysis. This is usually done today by transcription and by programs for computer analysis of qualitative material. The next part consists of a *clarification* of the material, making it amenable to analysis; for example, by eliminating superfluous material such as digressions and repetitions, distinguishing between the essential and the non-essential. What is essential or non-essential again depends on the purpose of the study and its theoretical presuppositions. The *analysis proper* involves developing the meanings of the interviews, bringing the subjects' own understanding into the light as well as providing new perspectives from the researcher on the phenomena. Five main approaches to the analysis of meaning are condensation, categorization, narrative structuring, interpretation, and ad-hoc methods.

A **fifth step** would be a *re-interview*. When the researcher has analyzed and interpreted the completed interviews, he or she may give the interpretations back to the subjects. In a continuation of a "self-correcting" interview, the subjects get an opportunity to comment on the interviewer's interpretations as well as to elaborate on their own original statements.

A possible **sixth step** would be to extend the continuum of description and interpretation to include *action*, in that subjects begin to act from new insights they have gained during their interview. The research interview may in such cases approximate a therapeutic interview. The changes can also be brought about by actions in a larger social setting such as action research, where the researcher and the subjects together act on the basis of the knowledge produced in the interviews.

While Miles and Huberman (1999 p.178) illustrate the use of meta-matrices. The author define meta-matrices are master charts assembling descriptive data from each of several cases in a standard format. The simplest form is a juxtaposition-stacking up- of all the single case displays on one very large sheet or wall chart. The basic principle is inclusion of all relevant (condensed) data. He came to call such charts, affectionately, "monster-dogs".

As suggested in the literature, the researcher utilized meta-matrices as Miles and Hubermann (1999) said, meta-matrices are master charts that assemble descriptive data in analysing the interview questionnaire. Cross-case analysis has then analyzed from the variables of the contents of the interview questionnaire (Yin 1989 pp 57-115)

4.4.2 Tape recording

Kvale (1996) also suggests that the preferred method of recording interviews is to use a tape recorder, as the interviewer than can then concentrate on the topic and the dynamic of the interview. The interviewees words and tone, pauses, and the like, are recorded in a permanent form that can be returned to again and again for re-listening. Ibrahim (1999) also agreed that, tape recording interviews is a well documented technique in semi-structured interviews and helps the researcher to devote full attention to asking, processing and interpreting questions and answers respectively.

In this study, all the qualitative interviews were tape-recorded. All the respondents gave consent to tape recording prior to the interview after the purpose of the study had been explained to them.

4.4.3 Duration of Interview

The interview sessions were carried out at the respondents' office, which lasted 30 to 45 minutes. These questions were posed to the selected craft practitioners drawn from various areas of the craft disciplines. The categories of craft practitioners involved are Educators, Designers and Craft Makers. Educators were represented by academics from the Universiti Teknologi Mara (UiTM). They were based in the Faculty of Art and Design, Shah Alam, Selangor. Designers were represented by staff from the Design Department of the Malaysian Handicraft Development Corporation headquarters in Kuala Lumpur. Finally the Craft Makers category involved craft practitioners from the East Coast of Malaysia.

4.4.4 Elite Interviewing

The term elite interview as described by Marshall and Rossman (1994 p.83) is a specialized case of interviewing on a particular type of interviewee. Elite individuals are considered to be influential, the prominent, and well-informed people in an organization or community and are selected for interviews on the basis of their expertise in areas relevant to the research. In the case of this study the key informants for the interviews were drawn from the individuals known as contemporary Malaysian craft practitioners and their areas of expertise included craft makers, designers and educators.

Elite interviewing has many advantages. Valuable information can be gained from these participants because of the positions they hold in social, political, financial, or administrative realms. Elite interviews can usually provide an overall view of an organization or its relationship to other organizations. They can also report on an organizations' policies, past histories, and future plans, from a particular perspective (Marshall and Rossman 1994).

For the elite interviews for this study a set of standardized open-ended questionnaires were designed for the case study. Ibrahim (1999) described that this approach makes data analysis simpler as it is possible to organize questions and answers that are similar (Patton 1987).

4.5 Data Collection of Malaysian Case Studies

4.5.1 Selection of Respondents for Interview

The selection of respondents for interview was based on the significance of their contribution towards Malaysian design in various disciplines of craft practice. For the initial case study interview, the category of respondents representing the organizations mentioned in the earlier section (See Section 4.3.2), each was represented by three respondents. The selection of the respondent was based on their standing as the key-person within their area of specialisation.

4.5.2 Interview Analysis

After the interview, all the transcriptions of an audio-recorded material was put into a word process text and assemble the text into a Meta-Matrices format as suggested by Miles and Hubermann. The stages of the process are described below (**see Appendix 4 for detail transcription of the interview results**):

1. Transcribing

As the interview of the respondents was conducted in the ‘Malay’ language, the text was first transcribed in Malay and followed up by an English translation for the process of analysis.

2. Transfer Transcribe Text into Meta-Matrices Format

- **Stage 1**

Assemble transcribed text into three columns to provide a comparison of data from the three category of respondents. (**See Appendix 4**)

- **Stage 2**

Central themes were identified by underlining relevant statements from the respondents by reference to the critical factors applied in the questionnaire (**See Appendix 4**).

- **Stage 3**

An analysis of the relevant statements from all of the respondents (educators, designers and craft makers) concerning their views on the critical factors (Purpose, Process and Performance, Company Culture and People) were then formed as the basis for the summary and conclusion of the findings related to craft practice.

4.5.3 Analysis of the Qualitative Interview Findings

The analysis of findings was undertaken using the cross-case comparison method as suggested by Yin (1989) and explained with reference to the questionnaire design. The four Business Process Analysis factors (Champy 1995) illustrated are correlated with the relevant questions:

- Question 1-5 (PURPOSE)
- Question 6-11 (PROCESS AND PERFORMANCE)
- Question 12 (COMPANY CULTURE)
- Question 13-14 (PEOPLE)

Question 1-5 (PURPOSE)

Q.1 As a craft practitioner/designer/educator, have you attended any craft courses? If yes, where and how long was the course? If no, where did you gain your experience?

The educational craft background of the respondents is from both local and overseas institutions e.g.: universities in the United Kingdom. Their area of specialization forms a process of continuity within their chosen craft disciplines. Some examples of the craft courses disciplines, which are available in Malaysia include:

- Industrial design
- Metalwork and Jewellery design
- Ceramic
- Textile
- Fashion
- Graphic
- Fine Art

Other factors of the respondents' interests in the crafts was found to be sparked by the craft background of their families, which act as a stepping stone in their decision to enrol on a specialized craft course. The interview found that the aim of

respondents at this point was to upgrade their family craft business and to extend their knowledge in designing or craft making.

Q.2 When did you start your craft/design profession, which you have established?

The establishment of the craft profession of the designer and educator respondents was found to be dependant on the courses that they enrolled on in college or craft agencies. But this differed from that of craft maker respondents that originate from their family type of businesses, where the earliest example of formation of a company by one of the respondents' fore bears started in 1911. Educators in the crafts not only played their role as academics but they also extended their craft activities on a part-time basis within their area of specialization, according to the needs from the individuals, also the influence from the private or government sectors. These kind of activities were also found to be encouraged by universities where special centres were set-up to deal with craft project requests from those interested in designing and craft making.

Q.3 What is the nature of your specialization? Is it different from what you have gained from your craft education or profession?

The craft education gained by educators, craft makers and designers seems to be relevant to their recent craft practice though their experience, observation and contact with other craft activities had equipped them with additional craft knowledge.

Because a designer is considered a creative person, the finding also identified a change of craft profession from that specialized in during the degree attained in college to that when the graduate ventured into craft business. The indication was that Designers will grab whatever opportunity can help them to survive in the craft world.

Craft makers', exposure to the crafts lies within their original area of expertise and their awareness of craft demand as perceived by customer needs. Their craft

specialization was found to stay unchanged, but they are adventurous in dealing with craft materials. Traditional craft makers seem to reject new technology e.g: in brassware making, they maintained traditional casting using clay and padi husk moulds, although sand casting, which has been researched by SIRIM has a similar technique but with new casting technology. A similar case was found to occur in the craft production of Batik, where new machines were introduced to speed up the production of traditional hand-painted batik through computerized technology but they failed to capture the hearts of Batik craft makers.

Designers in craft agencies like the MHDC, were given the opportunity to engage in sales and marketing. This allowed them to constantly be aware of the demand in the craft markets, which can guide them to provide good designs to cater for local and global markets.

Q.4 Are you involved in selling or commissioning craft artefacts? If yes, what range of artefacts and prices and where do you market them?

The nature of the crafts that flow into the local markets varies amongst craft practitioners and their style of craft production was found to be capable of being divided into two types:

- a) “One-off” production, and
- b) Batch production

“*One-off*” production is also termed ‘special edition craft’, with either a low or high volume order. For instance, it is common practice for certain events or occasions organized by individuals, the government or private agencies to make a gift souvenir or an award for local events such as the ‘National’ Day. This commissioning type of practice is usually priced at an agreeable rate between both parties and depends on the design, time scale, types of materials, and volume of the order. This type of production is done on either a full- time or a part-time basis. Educators and designers are particularly hooked on this method.

A *Batch production* type of craft refers to production with a larger volume and also applies to individuals, the government or private agencies but it is specially produced for distribution beyond the states in Malaysia. Craft makers usually practise this kind of production and they have their own special showroom as part of their sales strategy. They often have contact with tourist operators where foreign and local tourists are invited to see their products or even to observe craft demonstrations.

Designers or Educators with no production unit mainly rely on craft makers to progress the manufacture of their work. For this kind of production, detailed specification drawings or prototypes are given to the craft makers for their reference and a good quality of craft is expected from these instructions.

Although Educators were found to be involved in selling or commissioning, they also play a role as a craft consultants whereby they were invited to assess and give comments about company products to enable them to reach the standard of quality demanded by certain marketing agencies, before it is acceptable for display on their shelves. At the time of the interviews, no endorsement was being made by the Malaysian government to certify the quality of the craft products that were on sale.

Q.5 How many types of craft artefacts have you produced or designed since you became established?

The design and type of artefacts produced by craft practitioners were found to mainly depend on the nature of the market need and sometimes were based on the design expression of the practitioners themselves. A filing or recording system of craft artefacts being produced or designed has been found to be kept in the form of slides or photographs by the respondents. Gifts and souvenir items are the main craft products that are given priority by the craft practitioners. Their awareness of craft design trends and national events were gained from their contact with MHDC from which crafts are commissioned.

- **QUESTION 6-11 (PROCESS AND PERFORMANCE)**

Q.6 Do you have your own craft workshop? If yes, do you gain any financial support from any agency in running your crafts work.

The setting up of working spaces or workshops by craft practitioners are funded from two sources:

- Self-funded
- Support by a government agency

Educators and craft makers resources are mostly self-funded but some of the craft makers gained support from government agencies and private banks in the form of machinery for their craft production. The supply of this machinery depends on the space of the workshop that is available and the nature of the craft practice involved.

For the designers working with craft agencies run by the government e.g the MHDC, their craft production entirely depends on the workshop built by the agency for craft training purposes or from their contact with local craft makers.

Q.7 What are the main materials used in your craft artefacts? Do you combine materials? Is there any difficulty in getting the materials supplied?

The utilization of materials in craft making mostly depends on indigenous and imported materials, but it was found that the craft practitioners have made full use of the natural resources that are available in the country. Imported materials such as fabric in batik and white clay in ceramic were imported from China.

Some of the craft practitioners didn't restrict themselves to one material in their craft production for example in ceramics, which combine silver in their design. Another good example is dyed pandanus leaves with highly polished brass. Rattan, was also being used with fabric because of its natural colour and elasticity.

The availability of many types of clay in the northern and southern part of Malaysia has resulted in varieties of production of ceramic artefacts with different types of natural colours. In brassware making, there was a decrease in the number of craft practitioners, which might jeopardize this industry in the future. This is due to the current increase of prices in the supply of raw materials. Craft makers in this area have urged the government to consider this case so that this craft can still survive. Another problem that has been identified is the lack of interest of the younger generation to venture into this craft, although the MHDC have created a number of apprenticeships in their craft-training program.

Q.8 The history of metalworking crafts shows that they were made from brass and silver. In your experience, have you heard or seen any crafts produced using aluminium?

Most of the respondents were aware of the existence of aluminium in architectural applications and household items. Some considered aluminium as a modern material, which should be researched and should be given an opportunity to demonstrate its potential for the next generation of craft practitioners. Also aluminium has not been seen as a craft material as opposed to brass, silver and pewter. There was also a suggestion that in the future aluminium should integrate with existing metal crafts or other craft media.

Aluminium has also been seen to be used in the making of decorative gates for the Royal Palace on the east coast. It is understood from the respondents that these were made by sand casting techniques.

One of the Designers also pointed out in his statements:

"...when I said Malaysian crafts from aluminium, it does not include the category of Malay traditional crafts."(Yussuf Ahmad, See Appendix 4 Qualitative Interview Transcript p.249)

In response to this statement the researcher believed that this view was due to a lack of awareness on the part of the respondent to the decorative potential of aluminium.

The Educators who responded to this question, requested that research should be done to explore the use of aluminium as a craft material.

Q.9 What is your opinion regarding the use of aluminium as a craft material?

Regarding the potential of aluminium as a craft material, most respondents stated that there is a need for this material to be researched in terms of its technical properties and limitations and its potential decorative value for craft products. Because of its latest potential, aluminium should also have its own identity to represent Malaysian craft values. There was also a suggestion that in creating a future for aluminium this should be decorative in nature, as it was said by one of the respondents:

“...if we use aluminium alone as a craft without decoration on it, I think it’s not interesting”.

Q.10 In your production or designing, what types of decorative elements do you use that support the aesthetical value of your craft? Do you use cultural or contemporary motifs in your present craft?

Most of the respondents have maintained cultural elements in their craft making. The choice of decorative elements in the design or production of craft artefacts results from feedback from the crafts marketing agency, trends or individual needs. It was also found that there are approaches as made by respondents in mixing traditional elements with contemporary designs. Floral styles of motifs are often used to display decorative effects on craft artefacts.

Q.11 What techniques do you use to apply those elements or themes to your craft artefacts?

Malaysian craft practitioners still maintain traditional methods of production. For example brassware making, which utilizes lost wax casting using padi husk, clay and wax. Also jewellery making e.g: rings using a traditional style of casting where the

craftsmen use recycle materials such as cuttlefish bone, which is in abundance along the Malaysian beaches on the east coast.

As it was found that the craft practitioners appear to be accustomed to traditional techniques of craft making, for instance they still prefer using the old hand painted methods of producing crafts like batik, although computerized batik painting was introduced in the market. The slow response to taking up this technology is most probably because of the high expense of the equipment and the lack of interest in information technology by the craft practitioners, especially the older generation.

- **QUESTION 12 (COMPANY CULTURE)**

Q.12 What is your role in craft production? Do you give responsibility to others to handle this stage?

It was found that respondents have their role in craft production. Educators are more responsible for giving training to students so that they can use craft knowledge gained in the college for their craft activities in the future. Students were also given a sense of responsibility in their craft project. Beside their teaching career, Educators also committed themselves to craft making within their own specialization. As they work full-time as a teacher, they tend to employ their talented graduates to deliver commissioned work either on a full-time or part-time basis.

The process of making crafts is not a trade secret to the craft practitioners. As their employees are important assets to the company, they are willing to share their knowledge, which has become part of their responsibility.

Another responsibility that has been identified is that the role of the designer is not only restricted to the design of craft products but is also committed to sales and marketing. Craft Designers stated that this is a good experience for them because it gave them an opportunity to understand the real needs of local and global markets in terms of craft products.

- **QUESTION 13-14 (PEOPLE)**

Q.13 In organizing your daily activities, how would you describe the type of organization that your company is? Example: hierarchical, flat, open management, team based or individualistic.

The Malay style of working is as the old proverb says:

... "*Bersatu teguh bercerai roboh*" which means that working as a team is strong but without unity will lead to a downfall of the organization.

Working as a team is the preferred approach of all of the respondents, as they believe that the crafts can't survive without team unity, in order to produce good quality products. To achieve this all levels of departments must participate and become involved to make sure that the crafts that are produced have a high quality and are able to be displayed on showroom shelves.

Q.14 Which craft artefacts do you consider to be successful products from you or your team?

Most of the respondents have experience themselves in the making of craft artefacts. They have received a craft order from various sources. Some of them receive compliments from their clients due to the quality of work that they have produced as well as meeting the deadlines of specific projects.

4.6 Summary and Conclusion

The findings show that the Malaysian craft artefacts that are produced are generally decorative in nature, which maintains Malaysian traditional elements that come from different sources. Those elements are images that are developed from practitioner observations, experiences as well as their cultural awareness and religious beliefs.

The combined findings from the literature, survey and qualitative interviews within the identified areas of craft practice have showed that the decorative artefacts

produced display various styles of decoration including: geometric form, plants, animal species or a combination of these.

A significant conclusion from the findings of the qualitative interview shows that the majority of Malaysian craft makers are highly motivated to cater for customer needs. It is thought that this finding might have significant implications for the way in which new materials and processes might be introduced to the Malaysian craft making community, particularly if they are seen to increase the flexibility and capacity of craft makers to respond to customer needs.

CHAPTER 5

EXPERIMENTAL PROCESS

The purpose of this chapter is to explain the experimental processes, which were designed to provide evidence from craft practitioners. The processes involved a

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CHAPTER FIVE: EXPERIMENTAL PROCESS

The purpose of this chapter is to explain the experimental processes, which were designed to provide evidence from craft practitioners. The processes involved a review of case studies of craft practice that describes the nature of the experiments and type of dyes used in section 5.1 of introduction. Section 5.2 discusses the availability of aluminium in Malaysia, which relates to the choice of aluminium specification for experimentation. Selections of appropriate methods for experiment are discussed in section 5.3, in terms of potential industrial applications and from the perspective of practising artists using anodised aluminium in relation to the basic Sulphuric acid anodising process in section 5.3.1. Section 5.4, describes the method of recording the experimental process by using a logbook. Section 5.4.1 explains the detailed layout of the logbook specifications. Section 5.5, describes the experimental procedures that outline the selection of dyes used in 5.5.1. The type of aluminium used in section 5.5.2. Section 5.5.3 describes the preparation required in setting up the experimental working section that explains the studio arrangement in section 5.5.3.1, the anodising set up in section 5.5.3.2 explains a diagrammatic preparation of the anodising tank and chemical preparation. The dye bath set up contains the illustrated procedure of preparing dye mixtures in section 5.5.3.3, the sealing set up in section 5.5.3.4 explains the sealing process and preparation and finally the anodising process in section 5.5.3.5, explains with illustrations the different sequences of the process. In Section 5.6 Experimental procedures, that was carried out involved two work-studies, which were described in section 5.6.1 as Experiment 1. These explain the integration of batik dyes and aluminium to produce a single colour specimen. While Section 5.6.2 describes Experiment 11, which explores the potential of decorative pattern that can be applied with reference to Experiment 1. Findings from both experiments are discussed in section 5.7. A summary is drawn and conclusions made in section 5.8.

CHAPTER FIVE: EXPERIMENTAL PROCESS

5.1 Introduction

The purpose of the Experimental process is to produce a compendium of decorative colour experimental samples, based on the interaction of batik dyes and anodised aluminium as a technique for decorative application. The samples will provide experimental evidence and a point of reference for craft practitioners involved in the succeeding research case studies of craft practice. The building up of this evidence will give the opportunity for the researcher to develop a systematic procedure of anodised aluminium decorative application, which can be used as guided reference material for craft practice.

The selection of colours is based on the data collected in Phase 1, which are often used by the batik makers in Malaysia. Ten colours were selected for this experimental work. These were acquired from the main supplier on the East Coast of Malaysia, who supplies Batik craft practitioners. Three grades of dyestuff were identified which are imported from Switzerland, Germany and India. Out of these three grades, batik makers select dyes to produce different types and qualities of batik products. According to batik craft practitioners, the dyestuff from Switzerland produces a good quality batik colour, which prompted the researcher to explore its potential with the specified grade of aluminium.

5.2 Designation System-Wrought Aluminium Alloys

In this phase also, the selection of aluminium for the experiments relied on the availability of aluminium resources in Malaysia. According to LaPlantz (1988) and the Aluminium Association, aluminium and its alloys are divided into two categories. They are formed either as wrought or cast aluminium. As this experimental phase is concerned with the application of wrought aluminium, the forms of this category have been specified as sheet and plate, extrusions, foil, wire, bar and rod, drawn or extruded tubing. As aluminium is graded depending on its alloy contents, batches of

it have been designed to serve various purposes in its global production of supply (Table 5.1). They can be summarised as below:

NO	ALLOY SERIES	MAJOR ALLOYING ELEMENT
1	1XXX	99% minimum aluminium
2	2XXX	Aluminium-copper alloys
3	3XXX	Aluminium-Manganese
4	4XXX	Aluminium-Silicon
5	5XXX	Aluminium-Magnesium
6	6XXX	Aluminium-Magnesium and silicon
7	7XXX	Aluminium-Zinc
8	8XXX	Miscellaneous alloys
9	9XXX	Unused series

Source:LaPlantz

Table 5.1

5.2.1 Daily Used Items Made of Aluminium

A literature review confirmed that the day to day use of aluminium alloys serve different purposes. Its mechanical, physical and chemical properties have led this metal to be widely used across many different products and industrial sectors. Examples of the variation in products are given in Appendix 5 (Table 5.2):

Analysis of the recent development of aluminium consumption in the global markets (<http://uk.cars.com>), shows that it has extended its functional application to the production of car engines especially in luxurious cars such as Jaguars, BMW’s etc. Audi has taken a step further engaging full car bodywork with aluminium in its latest car production. Dr. Manfred Sindel, Leader, Aluminium Technology Group, Audi AG in his presentation paper (October 2001), “*Aluminium Applications in Car Body Structures at Audi*” at the Aluminium Federation Seminar “Innovations in Aluminium”, NEC, Birmingham, revealed that aluminium car body concepts for Audi started as early as 1913, with the latest release of A4 and A2 models which combine various technologies such as vacuum die-casting, hydro-formed extrusions and sheet components. Aluminium is also widely used in other transport applications such as shipping and aeroplane bodywork where weight reductions mean savings in energy and reduced emissions.

The uses of aluminium in architectural structures makes buildings lighter and provide easier maintenance due to its natural capability to resist corrosion. The metallic appearances of aluminium also provides an aesthetic value to the architecture for example the Petronas Twin Towers (KLCC), one of the major tourist spots in Malaysia.

5.2.2 Aluminium in Malaysian Market

Through secondary sources from Phase 1, various grades of aluminium have been gathered and identified from the products currently produced for the Malaysian market place. These are summarised below (Table 5.3):

Table 5.3 Aluminium in Malaysian Market

NO	ALUMINIUM ALLOY	TECHNICAL SPECIFICATIONS	APPLICATION & USAGE
1.	AA 1100	6.0mm-1.8mm, 6.0mm-0.2mm, 6.0mm-1.5mm maximum width : 1525mm, 1450mm, 1525 maximum length : 5000mm, 4000mm	wall cladding, bus body, constructions and stamping parts, tread plate
2.	AA 3105	6.0mm-1.5mm, 6.0mm-0.9mm, 8.0mm-0.3mm, 0.21mm-1.0mm maximum width :1525mm, 1450mm, 888mm maximum length :	wall cladding, tread plate
3.	AA 3003	maximum width : maximum length :	wall cladding, bus body, constructions and stamping parts, industrial profiles(for roof & wall)
4.	AA 5005	maximum width : maximum length :	wall cladding, tread plate
5.	BS 3103	maximum width : maximum length :	wall cladding, bus body, constructions and stamping parts,
6.	AA 8011	1.0 & as per required specification maximum width : 1400mm maximum length : as required	kitchen sink

Sources:
Aluminium Industries Sdn. Bhd
Alcom

5.3 Experimental Methodology

5.3.1 Overview of Experimental Method

The term “*anodised aluminium*”, which has been explained in Chapter 1, involved the use of chemicals and electricity to generate the process of aluminium colouring. In global application, a very wide range of chemical solutions have been used or proposed as anodising electrolytes in the engineering industry for commercial productions. In general there are different types of anodising that are used commercially. They are:

- Sulphuric Acid Anodising
- Integral Colour Anodising
- Chromic Acid Anodising
- Hard Anodising

Brace’s and Sheasby (1979) literature on “*The Technology of Anodising Aluminium*”, which has been the major reference amongst authors concerning aluminium application, regarded basic sulphuric acid process as being the most popular technique that has been carried out amongst those anodising in the aluminium industry.

Henley (1982) in his view, the use of sulphuric acid is considered to be a process and method for hard coating, which gives a ‘bright anodising’ finish depending on the selection of alloys. Surface finishes of the aluminium also have some consequences to the quality of the colour achieved within this process and it’s widely employed amongst the engineering industry due to the capability of the process to withstand corrosion yet provide a decorative application.

Kissin (1963) and Varley (1970) shared a similar view on the uses of sulphuric acid as an electrolyte for the anodising process and declared this as the most general application for applying many decorative and protective finishes. The practicality of the basic anodising process using sulphuric acid in craft practice has been the most influential technique in the 19th century because of its simplicity as a process to

anodise colour. As a result of this, many artists have ventured into this technique, particularly in metalwork, which demonstrates the ability of the process for decorative purposes. A key point of reference for such craft practice has been adopted from the experimental and writing of the anodising artist (LaPlantz 1988). His literature also has been a global reference to the aluminium finishing industry and interested craft practitioners.

5.3.2 Anodised Aluminium-Sulphuric Acid Process as a Key Technique To Experimentation

With reference to the process point in the original research programme for the project, the objective of this phase is:

- to produce a compendium of experimental process and results concerning the interaction of batik dyes and aluminium anodising.

The literature of the batik making process by Wells suggested some criteria about the importance of experimental process to the craft practitioners:

“It is often difficult to obtain pattern books from the dye manufacturers. If this is the case it is important to keep records of your own dyeing experiments and colouring pastes you use. This can be done simply by filing a piece of the fabric you have coloured together with any relevant information. This should include the name, the shade of the dye used and the dying time, the volume and temperature of the water in which you dye the fabric, and the recipe of any print paste and patterning method used. This information will be invaluable if you wish to repeat this colour or effect. It is also useful to carry out a sample dyeing of any colour you buy. This enables you to build up your own sample books. These records are ultimately one of the most important points of reference for successful dyeing and patterning.” (Wells 1997 p.41)

The literature on Anodising by LaPlantz also suggested that practitioners should explore the possibility of fabric dyes with aluminium. He mentioned:

“Further information on dyeing techniques can be found in fabric dyeing books, but perhaps the most creative thing you can do is learn on your own. Without knowing the limitations of fabric dyeing, you may discover new things that can be done with the dyes and the aluminium.” (LaPlantz 1988 p.114)

The natures of these two literature statements above were combined. They were used to substantiate the Researcher’s objective of producing a compendium of experimental samples from the integration of the batik dyes and anodised aluminium process. In order to investigate the relation between these interactions, the author has identified several criteria that have to be included in a manual process of the experimental procedure. They are; the name of material, type of dye used, dying time, volume and temperature of the water, print paste and patterning method. These criteria will be discussed in detail in the next section.

5.4 Experimental Log-Book

5.4.1 Layout of the Experimental Log-Book

The purpose of the experimental log-book is to produce a systematic record of colour experimental procedure for colour decoration, which is applicable to the two experiments proposed in the second phase of research project.

- **Experiment I: Single Colour Exploration of Batik Dyes**

Experiment on the application of Malaysian batik reactive dyes using them as colours in the process of anodising types of aluminium.

- **Experiment II: Exploration of Decorative Pattern**

Experiment on the decorative application of Malaysian batik reactive dyes using the knowledge from Experiment 1 with reference to the specification and formulation of the print paste in relation to the patterning method.

The layout for the log-book has considered the criteria thought to be pertinent from the literature review of Kates Well and David LaPlantz. They are:

- **Type of material**

This section requires the researcher to indicate what type of aluminium is being used for the experimentation.

- **Dye used**

Colour code specification for the colouring process.

- **Dying time**

There are four interval times for the colouring process which will produce a different gradation effect on each aluminium coupon.

- **Volume and Temperature of the water**

This refers to the amount of water needed depending on the nature of the container used in the dying process. The temperature of the water indicates the current heat generated during mixing the water with powder dye.

- **Print paste and Patterning Method**

To create a Malaysian style decorative pattern using different media, which will result in design varieties of multiple colours of anodised aluminium.

In addition to those criteria, from the anodising industrial perspective, Kissin (1963) also suggested some dependent variables that need to be considered when doing anodising; for example concentration of the dyes and electrolyte, electric current density and voltage.

The key factors above led the author to design a log-book to record the information from the experiment as suggested by Wood and Martin (1974 p.5), concerning the interaction of batik dyes and aluminium anodising. As a result of this layout, the experimental record procedure has been designed to contain information as shown in Appendix 5:

- name of the researcher
- date of experiment
- current stage of the research project
- log book title
- colour sequence and interval time
- four colour sequence coupon size 4cm x 11cm
- 15 minute interval bar line indicator
- detailed descriptions of the process
- aluminium type
- colour/dyes
- dying time
- volume of water
- temperature of the water
- PH reading
- remark

5.5 Experimental Procedures

5.5.1 Selection of Dyes

Literature on dyes for the anodising process reveals three types of dyes used for aluminium, LaPlantz (1988 p.73):

- a. Dyes specifically designed for aluminium
- b. Household dyes
- c. Fibre reactive dyes

The selections of dyes for the experiment are based on the colours often used by the Malaysian batik craft makers (Fibre reactive dyes). These were gathered from the fieldwork in Phase 1. There were nine colours of first grade dyes, which originate from Switzerland. These are available through the main supplier located on the east coast of Malaysia. The selection of these dyes is also derived from the quality of the batik artefacts that have been produced for overseas markets. These dyes were also recommended for use in the experimental process by the chemical supplier. The

listed dyes are (Table 5.4):

COLOUR TYPE	QUANTITY
1. Black Den	100g
2. Blue R special	100g
3. Turquoise Blue G	100g
4. Brill Red KAG	100g
5. Yellow FG	100g
6. Violet 5R	100g
7. Orange 3R	100g
8. Brilliant Orange	100g
9. Golden Yellow GL	100g

Sources: Hussein Yacob Trading

Table 5.4

5.5.2 Selection of Aluminium

“In general, the alloys magnesium, magnesium and silicon, and pure aluminium, anodise the best, i.e., 1000, 5000 and 6000 series alloys” (Jensen 1986 p.33). From this statement, the availability of aluminium in the Malaysian market, as identified by the author in the survey, concluded that only the series of 1000 and 5000 were available. Between these two grades, the author has decided to select 1000 series of aluminium alloy in conducting the experiments due to its ability to give a brighter colour and because it contains a higher percentage of pure aluminium.

With the assistance from Centre for Design Research (CFDR), two aluminium sheets of 1000 series were purchased from the local supplier in the United Kingdom for the experiment.

5.5.3 The Preparation of Setting up Anodised Aluminium Bath

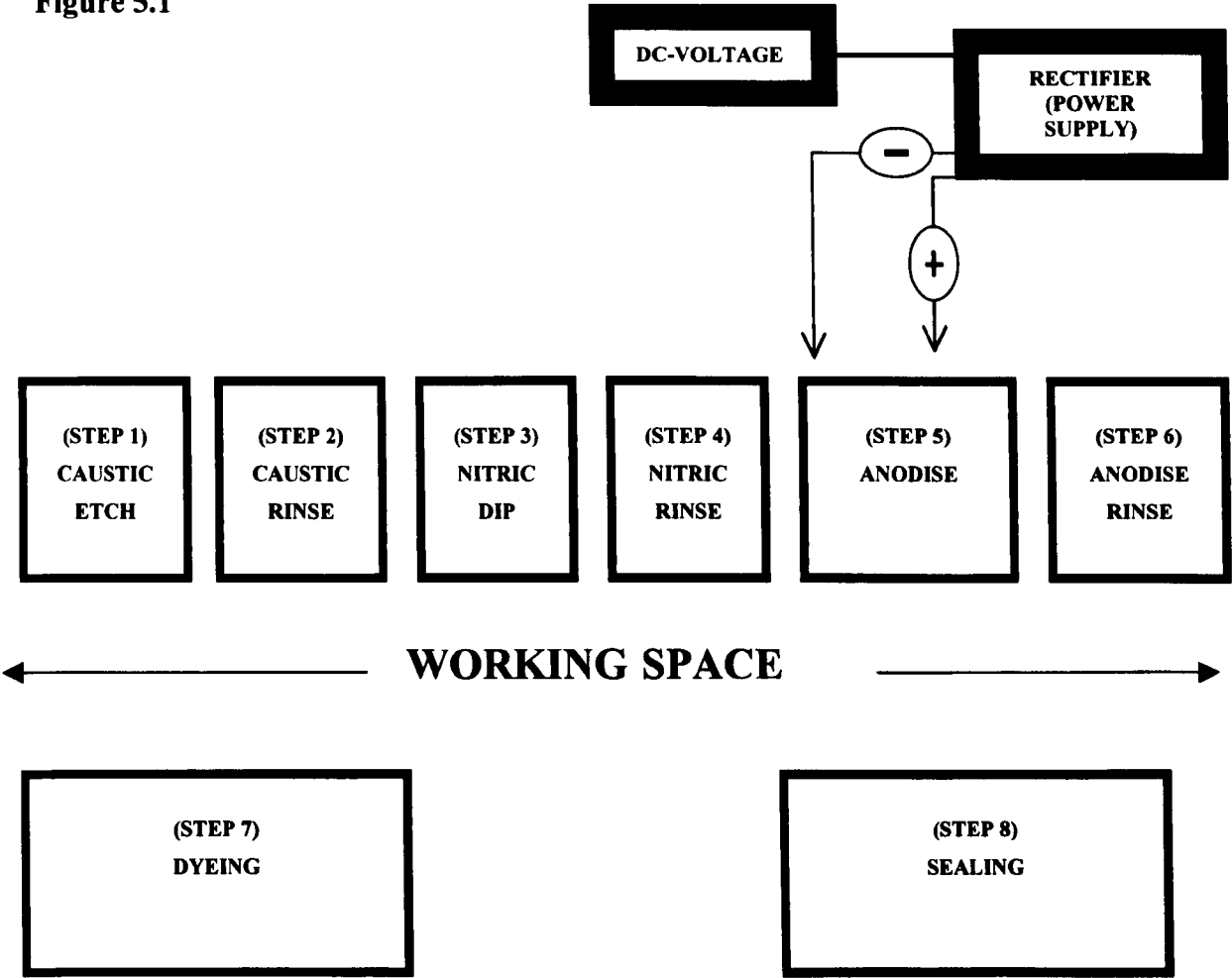
The laboratory space proposed by the supervision team in the 3D Design Department, School of Design, meets the criteria as suggested in the literature by LaPlantz (ibid) concerning craft based applications of anodised aluminium. Also the criteria for larger scale industrial applications as described by Brace (1979 p.131), the experimental laboratory should have a proper ventilation system and safety procedure as a priority requirement in dealing with chemical activity. Besides these

specifications, the workshop was also equipped with proper electrical outlets, lighting, a water source and drainage system to comply with the criteria for an appropriate anodising studio space.

5.5.3.1 Studio Arrangement

The anodising, dyeing and sealing is a multi-stepped process, which needs a consideration of working space that allows the author to move laterally during the experimental process. **Figure 5.1** below shows the studio that has been proposed:

Figure 5.1



LAYOUT OF ANODISED ALUMINIUM STUDIO ARRANGEMENT
3D Design Department, Lipman Building
School of Design, University of Northumbria
at Newcastle, U.K

Equipment needed for the anodising process:

- Container for the Anodising solution- polyethylene, -size depending on desired capacity.
- Rectifier or Battery charger- current control unit
- Cathode lead sheet or aluminium sheet- approximately equal in surface area to the pieces to be anodised
- Thermometer for measuring the temperature in the anodising bath and dyes
- Jig for racking up pieces to be anodised. Aluminium wire is good, only aluminium or titanium may be used in the bath with experimental coupons.
- Hotplate for sealing, either in boiling water or steam, and heating dyes
- Containers for dyes, acids and rinse - polyethylene buckets and Pyrex beaker for heating dyes.
- Dye - Batik dyes
- Chemicals - Caustic Soda, Nitric acid, and Sulphuric acid
- Container for sealing - Stainless steel pot with lid.
- Aluminium - 1000 series

5.5.3.2 Anodising Set-up

This section of the process required the preparation of the anodising tank. In this stage the author used a round bucket shape of plastic container made from polyethylene, which can accommodate 18 litres of water with a mixture of electrolyte sulphuric acid. The container has to be cut (see illustration **Figure 5.2**) to give room for the placement of a bus bar. The instructions for preparing this set-up are as follows:

ANODISING SET-UP PREPARATION 1

Illustration-Preparing Anodising Tank:

Bus Bar

The dotted line represents the centre of the tank in which the bus bar should be located

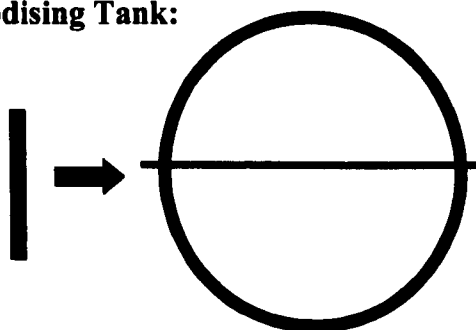
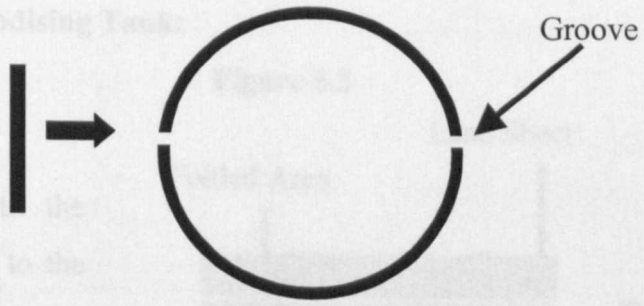


Figure 5.2

ANODISING SET-UP Top view of the anodising tank

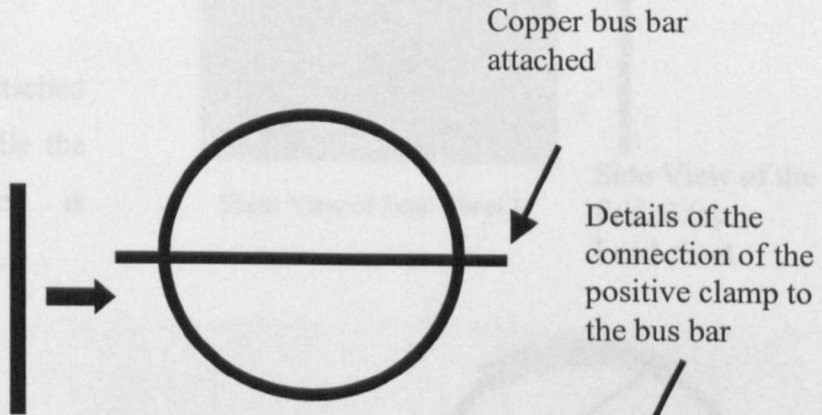
Step 2

Two rectangular slots that have been cut into the tank to form a groove.

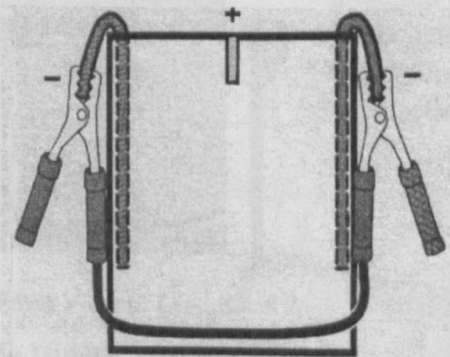
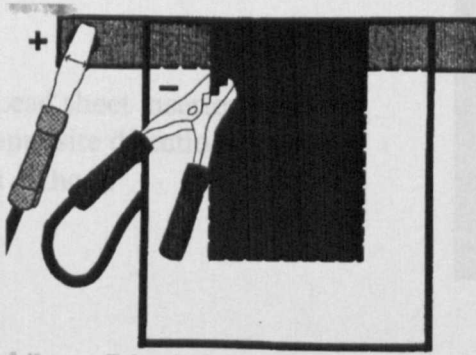


Step 3

The placement of the copper bus bar showing the extra length of the bus bar to hold by the red positive clamps from the power supply.



Details of the bus bar connection



Source: LaPlantz

ANODISING SET-UP PREPARATION 2A

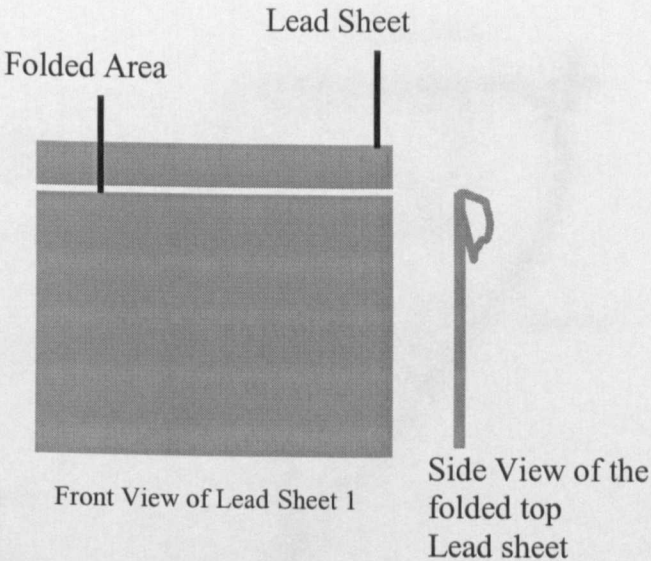
Illustration-Preparing Anodising Tank:

Lead Cathode

The two lead sheets with the folded area are connected to the copper wire and place vertically opposite each other in the anodising bath.

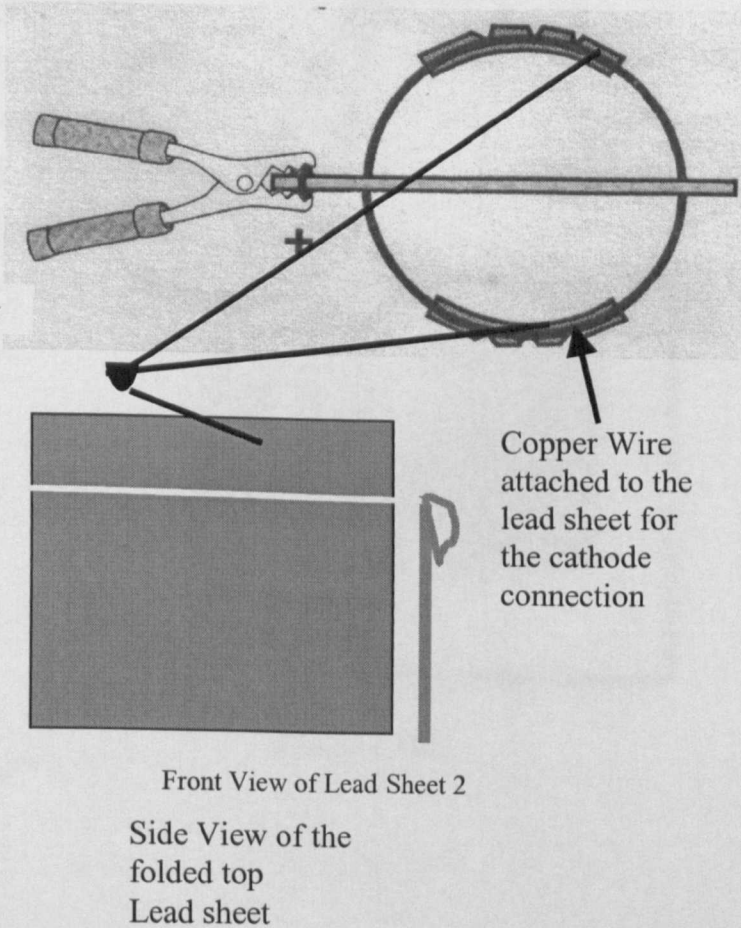
Positive clip (anode) is attached to the copper bus bar while the Negative clip (cathode) is attached to the copper wire.

Figure 5.3



Top View of the Anodising Tank

Source: LaPlantz



Lead sheet inserted in the opposite direction to form a cathode

ANODISING SET-UP PREPARATION 2B

Illustration- A Complete Anodising Tank with Wires and Clamps (Anode and Cathode) Connected to the Rectifier

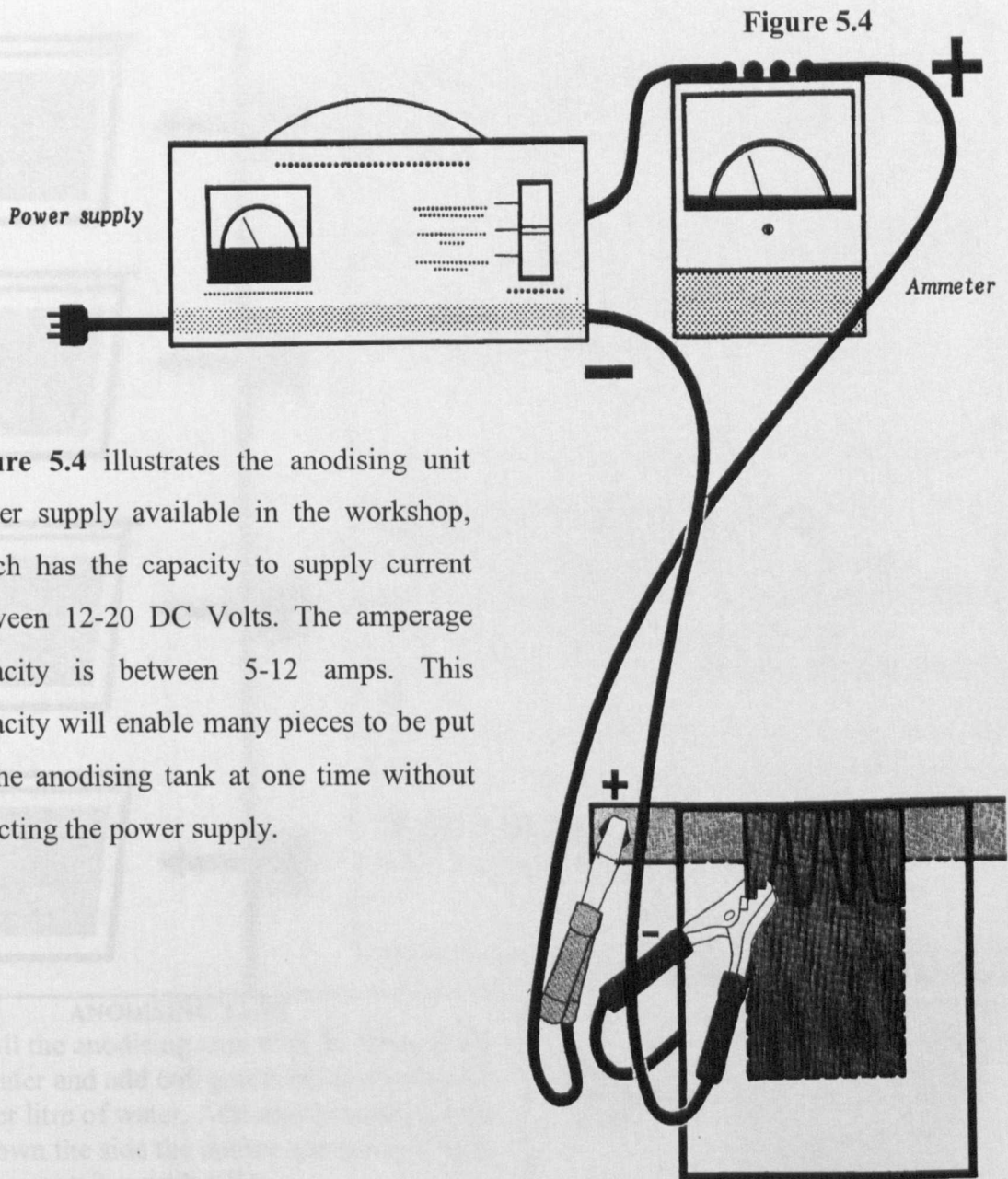
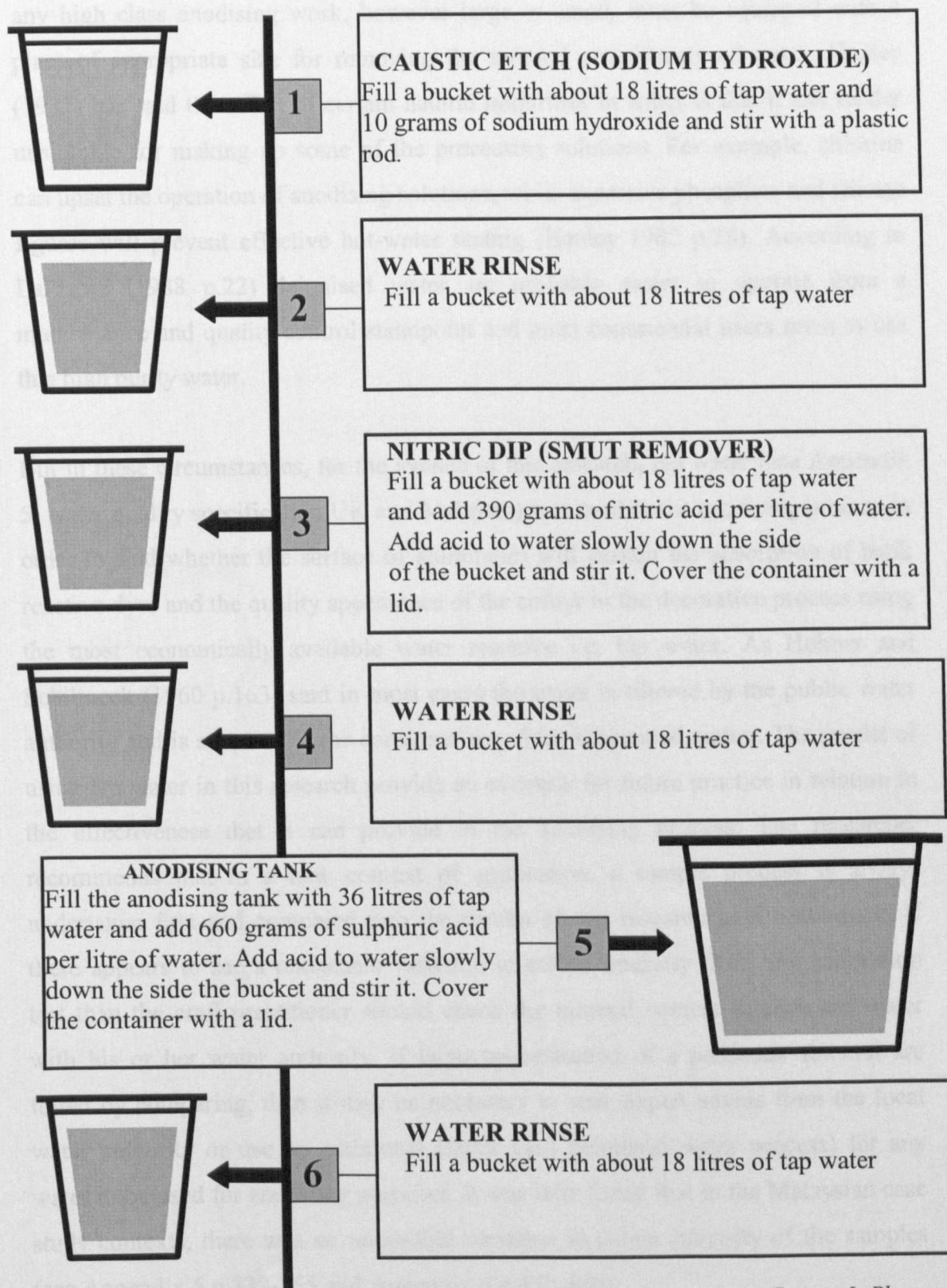


Figure 5.4 illustrates the anodising unit power supply available in the workshop, which has the capacity to supply current between 12-20 DC Volts. The amperage capacity is between 5-12 amps. This capacity will enable many pieces to be put in the anodising tank at one time without affecting the power supply.

Source: LaPlantz

ANODISING SET-UP PREPARATION 3

Illustration (Figure 5.5)-Flow Diagram of Chemical Preparation for Anodising Process



Source: LaPlantz

Regarding water purification for anodising purposes, the literature from the point of industrial anodising application such as Hubner and Schiltneck (1960 p.163) emphasizes the necessity for having water free from mineral salts. This implies that any high class anodising work, however large or small, must be equipped with a plant of appropriate size for removing the mineral constituents of water. Henley (1982) has said the effect of certain natural impurities in water is that it can render unsuitable for making up some of the processing solutions. For example, chlorine can upset the operation of anodising solutions, while excessive phosphate and silicate figures will prevent effective hot-water sealing (Henley 1982 p.38). According to LaPlantz (1988 p.22) deionised water are probably easier to operate from a maintenance and quality control standpoint and most commercial users seem to use this high purity water.

But in these circumstances, for the avenue of this research, tap water (see Appendix 5, water quality specification UK and Malaysia) was used in the anodising process in order to find whether the surface of aluminium will sustain the absorption of batik reactive dyes and the quality appearance of the colour in the decorative process using the most economically available water resource i.e: tap water. As Hubner and Schiltneck (1960 p.163) said in most cases the water is filtered by the public water authority and is supplied to the consumer free from suspended matter. The results of using tap water in this research provide an example for future practice in relation to the effectiveness that it can provide in the anodising process. The researcher recommends that in a new context of application, a sample process is always undertaken first and compared into the results of this research as a benchmark. If there appears to see a noticeable variation in colour intensity from this calibration test than the craft practitioner should check the mineral content of their tap water with his or her water authority. If large concentration of a particular mineral are found by comparing, then it may be necessary to seek expert advise from the local water authority or use an additional (latter used deionised water process) for any water to be used for anodising purposes. It was later found that in the Malaysian case study contexts, there was no noticeable variation in colour intensity of the samples (see Appendix 5 p.338-355 and Appendix 6 p.472-480).

5.5.3.3 Dye Bath Set-up

This set up required plastic containers preferably with a very tight lid to store dyes. Other requirements for preparation are:

- electric hot plate
- dye samples
- stirrer
- triple beam balance
- stainless steel beaker

DYE BATH SET-UP PREPARATION

Illustration (Figure 5.6)-Flow Diagram of Dye Bath Preparation

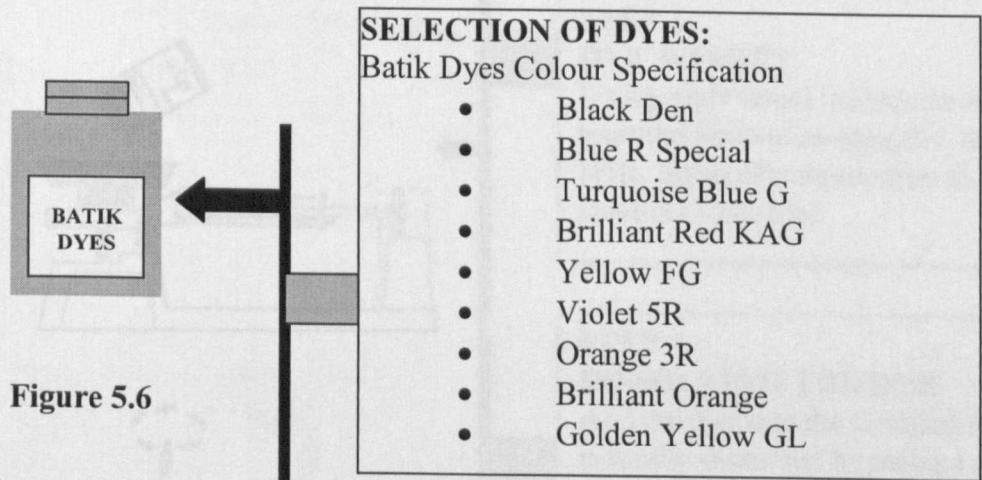


Figure 5.6

Source: Saidin

CONCENTRATION OF DYE MIXTURE:

Concentration of the dye bath varies with the colour of the dyes used. The table shows below the variation used in the experimentation:

Colour	Concentration (gram/litre)
Black Den	10 grams/litre
Blue R Special	2 grams/litre
Turquoise Blue G	5 grams/litre
Brilliant Red KAG	5 grams/litre
Yellow FG	2 grams/litre
Violet 5R	2 grams/litre
Orange 3R	2 grams/litre
Brilliant Orange	2 grams/litre
Golden Yellow GL	2 grams/litre *

DYE BATH PREPARATION

Illustration (Figure 5.7)-Flow Diagram of Dye Bath Mixture

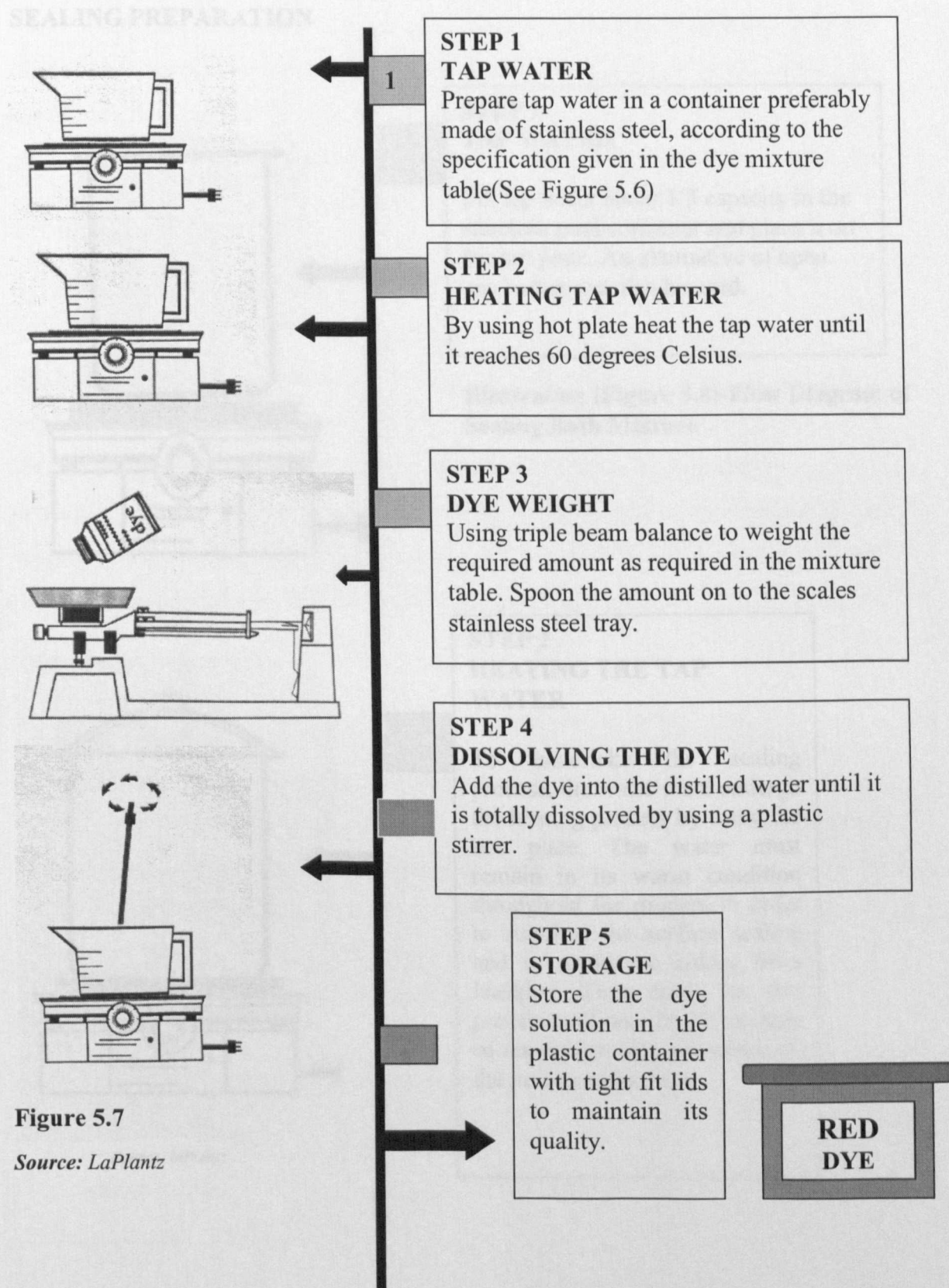
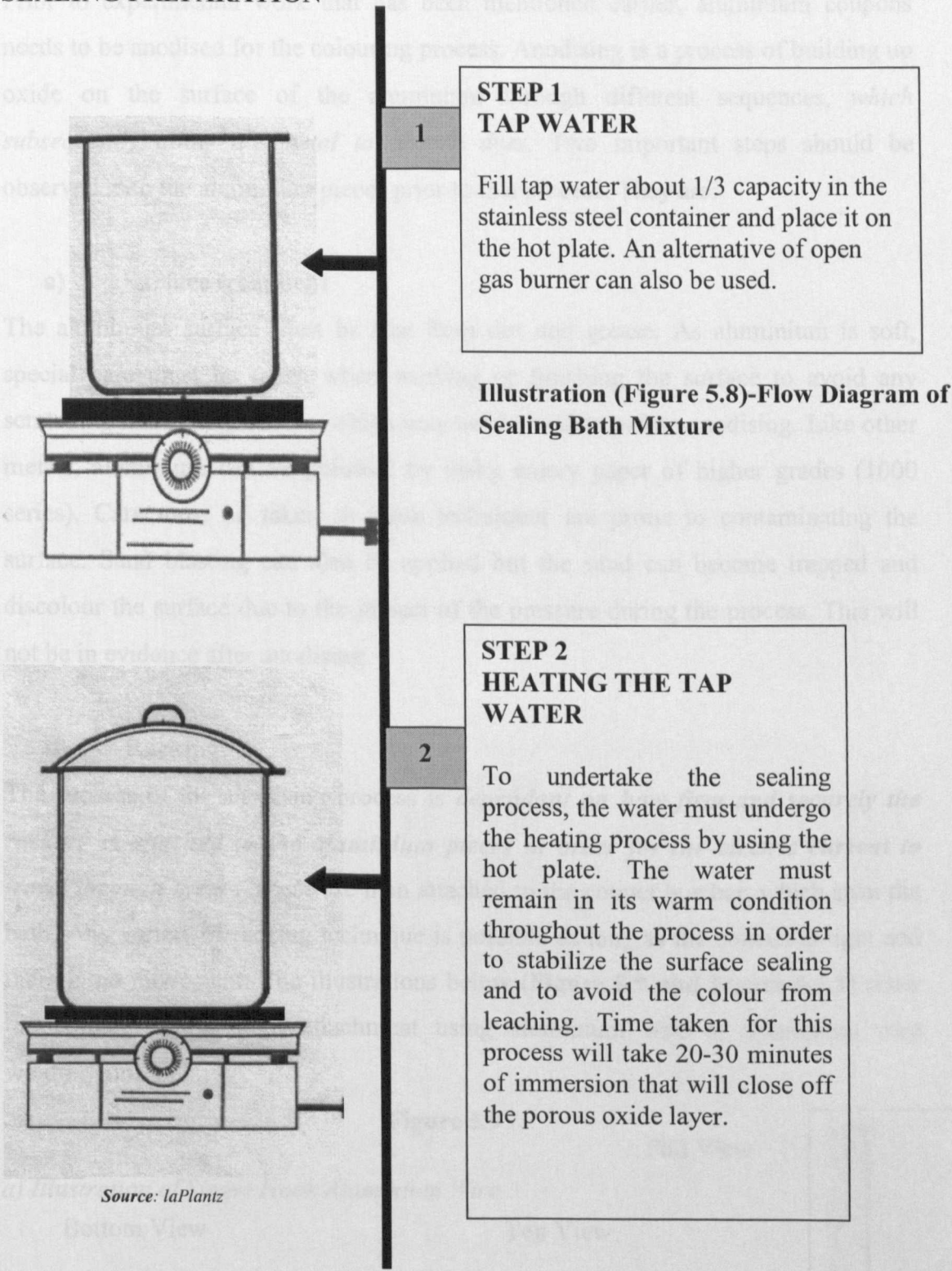


Figure 5.7

Source: LaPlantz

SEALING PREPARATION



5.5.3.5 Anodising Process

Prior to experimental work that has been mentioned earlier, aluminium coupons needs to be anodised for the colouring process. Anodising is a process of building up oxide on the surface of the aluminium through different sequences, *which subsequently allow the metal to absorb dyes*. Two important steps should be observed with the aluminium pieces prior to this process. They are:

a) Surface treatment

The aluminium surface must be free from dirt and grease. As aluminium is soft, special care must be taken when working or finishing the surface to avoid any scratching marks or particles, which may not be visible before anodising. Like other metals, aluminium can be polished by using emery paper of higher grades (1000 series). Care must be taken as these techniques are prone to contaminating the surface. Sand blasting can also be applied but the sand can become trapped and discolour the surface due to the impact of the pressure during the process. This will not be in evidence after anodising.

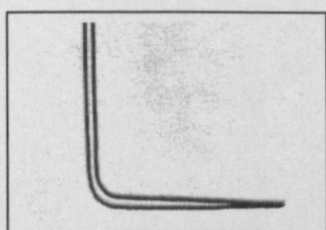
b) Racking

The success of the anodising process is *dependant on how firm and securely the racking is attached to the aluminium pieces in order for the electric current to travel through them*. These are then attached to the copper bus bar, which span the bath. Any variety of racking technique is possible as long as the contact is tight and there is no movement. The illustrations below (**Figure 5.9** and **Figure 5.1.1**) show the correct technique of attachment using aluminium wire or aluminium wire welding rod.

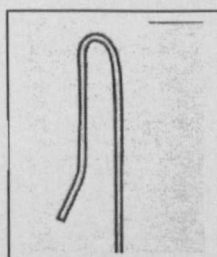
Figure 5.9

a) *Illustration of Single Hook Aluminium Wire*

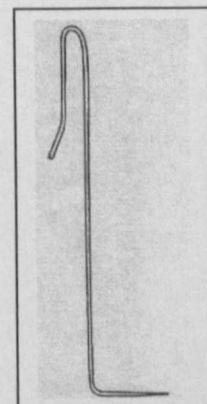
Bottom View



Top View

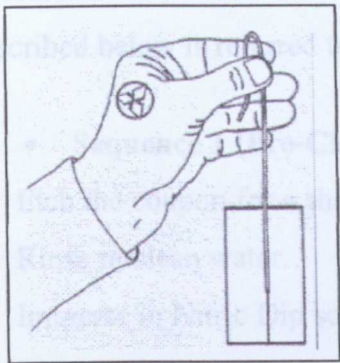


Full View

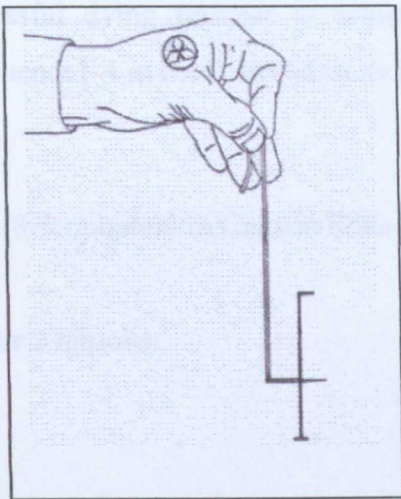


Source: LaPlantz

b) Illustration of detail attachment of Single Hook Wire to the Pre-Anodised coupon



Front View attachment

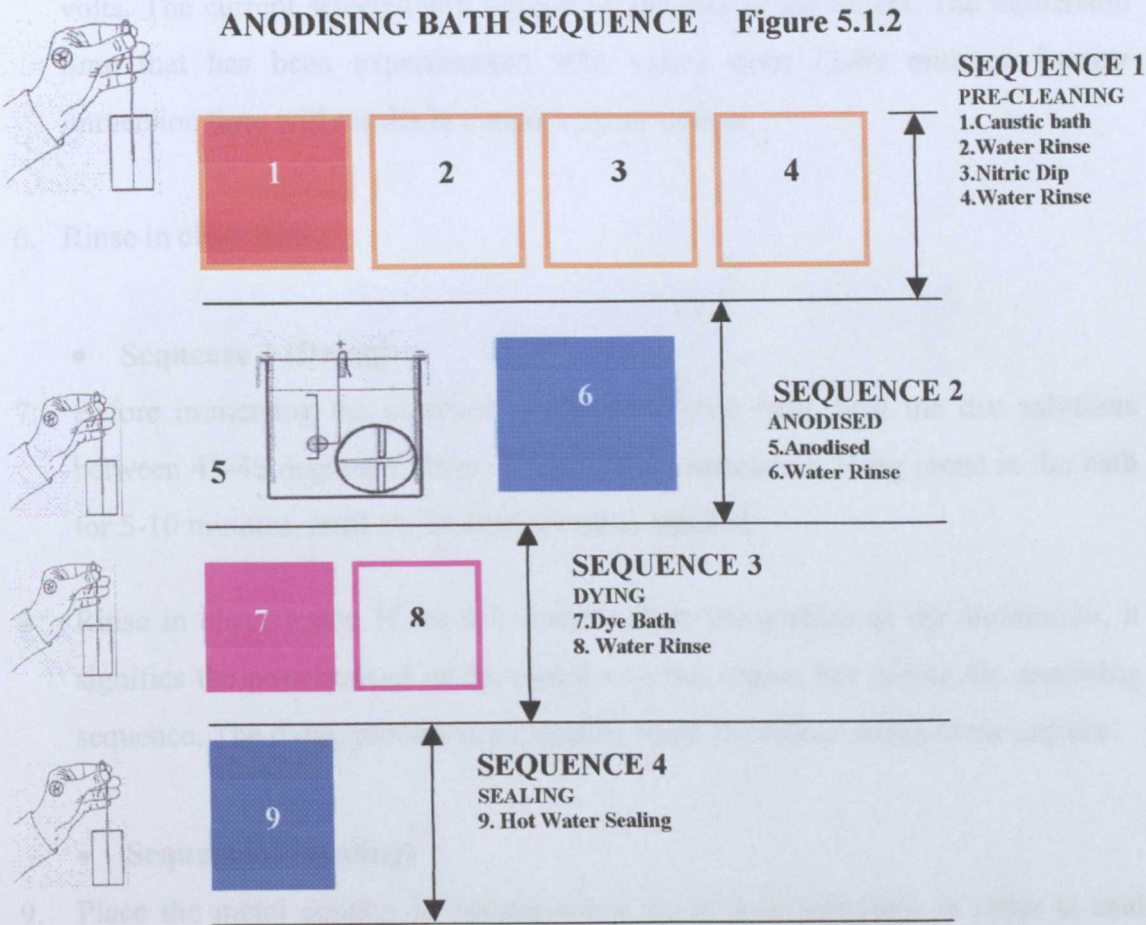


Side View attachment

Figure 5.1.1

Source: LaPlantz

c) Illustration of Anodising Bath sequence



The above diagram (Figure 5.1.2) illustrates the anodising bath sequence used by the Researcher to ensure that a successful dying process is achieved. The process described below is referred to in Sequence1-4 in the illustration as follows:

- **Sequence 1 (Pre-Cleaning)**

1. Etch the coupon for a short time (3-5 minutes) in Caustic Soda solution.
2. Rinse in clean water.
3. Immerse in Nitric Dip solution for 2 minutes.
4. Rinse in clean water.

- **Sequence 2 (Anodising)**

5. The ready made racking as illustrated in (Figure 14a and 14 b, **Section 5.5.3.5**) is hooked to the copper bus bar of the anodising bath. The voltage is set at about 12 volts. The current selected will depend on the size of the object. The immersion time that has been experimented with varies from 15-60 minutes. Longer immersion time will results in a more intense colour.
6. Rinse in clean water

- **Sequence 3 (Dying)**

7. Before immersing the anodised piece in a dying bath, heat the dye solutions between 43-48 degrees Celsius for maximum saturation. Hang metal in the bath for 5-10 minutes, until the desired colour is reached.
8. Rinse in clean water. If the dye leaches from the surface of the aluminium, it signifies the poor contact of the samples to the copper bar during the anodising sequence. The dying process is successful when the colour sticks to the surface.

- **Sequence 4 (Sealing)**

9. Place the metal coupon in boiling water for at least one hour in order to seal the colour. Rinse the metal thoroughly and pat dry with a soft, clean cloth.

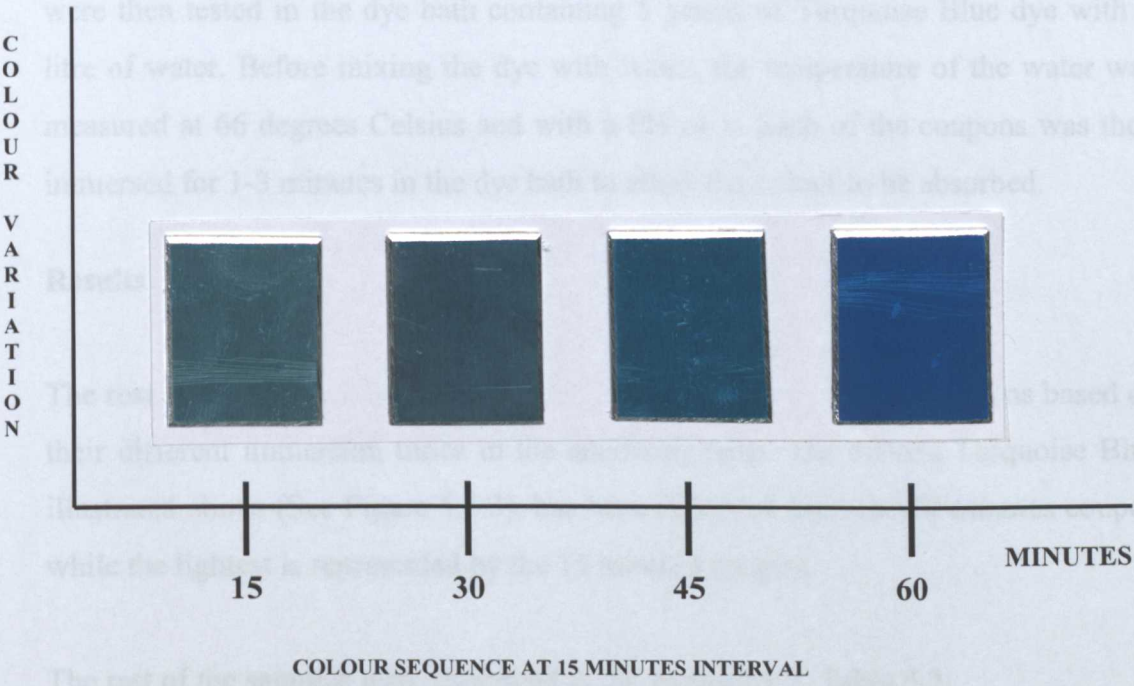
5.6 Experimental Works

5.6.1 Experiment I: Single Colour Exploration of Batik Dyes

In this stage, all the colours that have been mentioned in the previous section were tested according to the procedure that has been prepared in the logbook. The researcher prepared an anodised piece, which followed the illustration of the anodising sequence. There are four coupons for each single colour that were cut into standard sizes of 4 x 11cm. Each coupon represents 15, 30, 45 and 60 minutes samples. An example of a colour that was tested is illustrated below (Figure 5.1.3):

SINGLE COLOUR EXPLORATION OF BATIK DYES

Figure 5.1.3 COLOUR: *TURQUOISE BLUE*



Introduction

Table 5.5 above shows a sequence of colour samples from Turquoise Blue.

Experimental Procedure

TABLE DESCRIPTIONS	
ALUMINUM TYPE	1100 SERIES
COLOR CODE	TURQUOISE BLUE
WEIGHT	5 GRAMS
DYING TIME SEQUENCE (IN MINUTE)	15,30,45,60
VOLUME OF WATER	1 LITRE
WATER TEMPERATURE	66 DEGREES C
PH	5

Table 5.5

The four coupons (4x 11 cm) of aluminium series 100 were used in this colour variation test. Each coupon has a different interval time in the anodising bath resulting in four coupons of 15,30,45 and 60 minute of intervals. These coupons were then tested in the dye bath containing 5 grams of Turquoise Blue dye with 1 litre of water. Before mixing the dye with water, the temperature of the water was measured at 66 degrees Celsius and with a PH of 5. Each of the coupons was then immersed for 1-3 minutes in the dye bath to allow the colour to be absorbed.

Results

The results show a variation of Turquoise Blue achieved from the coupons based on their different immersion times in the anodising bath. The darkest Turquoise Blue illustrated above (See Figure 5.1.3), has been achieved from the 60 minutes coupon while the lightest is represented by the 15 minutes coupon.

The rest of the samples were explained in the Appendix 5, Table 5.2.

5.6.2 Experiment II: Multi-Colour Exploration of Batik Dyes with Decorative Pattern

This stage explored the capability of batik dyes to create multi-colour overlapping to form a decorative pattern. This stage also explored various media as a resist to form patterns, such as fast drying paint (Dunlop tyre paint-oil based paint with a white spirit solvent), permanent markers, stencils and rubber stamps. The exploration of multi-colour pattern was experimented with to the maximum of four colours. An example of multi-colour decoration is illustrated below:

ANODISED DECORATIVE SAMPLES-DS 2

BASE COLOUR: BRILLIANT RED
OVERLAPPING COLOUR: BRILLIANT VIOLET
BLACK

Figure 5.1.4



Introduction

The experiment was carried out to explore the application of batik dyes using anodised aluminium series 1000. Three colours were applied with Brilliant Red as a base colour. The overlapping colours are Brilliant Violet and Black. The application of these colours is to provide contrasting variations of shading effect between light and dark colours created using abstract patterns, which are typical of those commonly found in Malaysian batik designs.

Experimental Procedure of DS 2 Samples

Anodised aluminium samples of a size 4 x 11cm were used for the experiment. Bright Red dye was applied by immersing the coupon in the dye bath as a base colour. Fast drying paint (tyre paint) was then used to apply a decorative abstract pattern, using a brush. Secondary colours of Bright Violet were then immersed to create additional colour. Fast drying paint was then applied again as a resist on top of the second colour. After the paint had dried, the coupon was immersed in the final dye bath containing the black colour. The colour absorbed by the surfaces that are not protected by the resist paint, resulted in another colour i.e dark violet.

Some of the other forms of patterns were then applied by using a hand-engraving machine. The contour lines of the engraved pattern exposed the aluminium as a base material.

Results

The anodised coupon has the ability to absorb three colours, which generate decorative affects on the surface. Additional embellishment from hand engraving helps in detailing the pattern and enhancing the functional use of aluminium as a base material in craft practice.

The rest of the samples were explained in the Appendix 5, Table 5.3.

5.7 Findings of the Experimental Work

The Basic Sulphuric acid process, which has been derived from the literature of LaPlantz was tested and produced significant results for the experimental process. The anodising baths, which were set-up can accommodate five samples at a time and are potentially viable for the production of small craft artefacts.

All of the samples that were created are reusable for single and multi-colour patterning, if in case there are failures during the anodising process. The researcher made some modification in the sequence (Sequence 2) after the anodising process, to skip the neutralising step as practiced by anodising artists. This was done to determine the effectiveness of the anodising piece in relation to the end quality of the colouring samples.

The experiments with the use of batik dyes shows that eight colours were successfully integrated with aluminium series of 1000. Only one colour (Golden Yellow GL) failed this test although it was conducted several times to ascertain the result. The researcher noticed during immersion of the anodised coupon, that the dye leach from the surface, which shows that some oily stain was present in the chemical. This might associate it with the chemical composition of the dye. The result of the experiments within the interval time of 15, 30, 45 and 60 minutes, showed that each colour can be categorised as a pale and dark shade. This is due to the variations achieved within each interval. Each interval colour variation also has value as a decorative means in multi-colour anodising. The experimental process successfully calibrated the intervals, colour variations and decorative effects so that they can be replicated by others using a similar equipment specification (See Appendix 4-Experiment I).

The exploration of different application media, such as fast drying paint, brush, stencil, hand-engraving etc, as a tools to provide a decorative affect, show some potential to produce both traditional and contemporary looks. The use of hand engraving as a means to outline the details of decorative patterns, proved to be a practical and effective technique. This technique not only highlights the base

material, aluminium, but also draws a significant relationship to the hand painted drawing of Batik illustration (See Appendix 4-Experiment II).

5.8 Summary and Conclusions From Both Experiments

5.8.1 Summary

Both Experiment I (**Single Colour Exploration of Batik Dyes**) and Experiment II (**Exploration of Decorative Patterns**) have tested the ability of anodised aluminium interaction with selected Malaysian Batik dyes with reference to the set-up from literature of LaPlantz concerning the basic Sulphuric acid anodising process. The Experimental work has produced various samples that can be categorized into two groups. These are:

- a. Single Colour experimentation of batik dyes that consist of four coupons with a variation of colours due to different times of immersion in the anodising bath.
- b. Multi-Colour decorative applications using different media such as fast drying paint, brushes, markers etc. This generates decorative effects with the combination of multi-layer colours applied to the surface of anodised aluminium.

From the Single Colour Experiments, the researcher produced a colour chart based on eight colours. Each sample contains four colour variations as a result of different times of immersion in the anodising bath, starting with 15,30,45 and 60 minutes. These colours are then arranged in the sequence of time in the log-book as a reference for use by artists and Malaysian craft practitioners in the case studies planned for the succeeding stages of the research programme.

Multi-Colour decorative application experiments produced twenty samples with the combination of two to four colours. Malaysian decorative elements were applied to understand the capability of the process to represent traditional patterns. The researcher also managed to design some abstract patterns to provide contemporary

examples for the craft practitioners to consider, also with the purpose of building the researcher's knowledge in terms of the decorative application of anodised aluminium.

5.8.2 Conclusion

Both experiments show the potential of using the Sulphuric acid anodising process and the interaction of Malaysian batik dyes on aluminium series 1000, to produce decorative affects in craft practice. The use of tap water, as opposed to the industrial anodising process using deionised water, in this experiment has shown the ability of the anodised piece to absorb dyes and sustain the colour from leaching in the decorative process. This offers great potential for easy, economic experimental application by craft practitioners in sympathy with the traditional process where rinsing is carried out using river and tap water (Arney 1987 p.67) but for future commercialisation on a larger scale batch production basis it would be advisable to use deionised water as suggested (Henley 1982 p.38) in the industrial application of the anodising process. The successful results from this experiment provides a basic process that can be used for other ad-hoc experimentation with other types of dye, although the quality would need to be determined in terms of colour absorption based on the suitability of the dyes and using normal tap water.

The potential of the decorative medium to be further developed using surface resist materials for more complex colour combinations has been demonstrated such as fast drying paint (Dunlop tyre paint). Similarly, permanent markers also have a value in the decorative design process, although it is irremovable after being applied to the surface. A hand engraving technique, which is often used in jewellery making, has been found to enhance the richness of the decorative motif. This technique also emphasizes the importance of aluminium as a base material as the engraving effect highlights the metallic quality and it is sympathetic to the traditional process of Batik Tulis when applying highlight lines using the Tjanting tool (see Chapter 2 p.44).

CHAPTER 6

CASE STUDIES OF MALAYSIAN CRAFT PRACTICE

The purpose of this chapter is to explain the succeeding case studies that were carried

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Section 6.6.2 explains how the semantic differential scores were used to compare the Malay Malacca Formel. Section 6.7 explains the peer review process which was conducted and analysed using qualitative interview study criteria. Finally, the summary of the findings and conclusions is given in section 6.8.

CHAPTER SIX: CASE STUDIES OF MALAYSIAN CRAFT PRACTICE

The purpose of this chapter is to explain the succeeding case studies that were carried out, on the application of anodised aluminium using batik reactive dyes as a decorative process for aspects of craft practice. Section 6.1 explains the process of selection and engagement of groups of Malaysian Craft practitioners (Designers, Educators, and Craft Makers). Section 6.1.1 explains the preparation of the case studies for the receptivity test. Section 6.2, describes the methodology that has been used to conduct the case studies in respect to practice-based research and action research. Section 6.3, describes the apparatus of the case studies and the materials used in the Experimental process. Section 6.3.1 and 6.3.2 illustrate the Visual evidence that relates to anodising aluminium. Section 6.4, describes the development of the case study questionnaire. Section 6.4.1 describes the design of the questionnaire using Semantic Differential Scores. Section 6.4.2, explains the construction of the questionnaire using various concepts in relation to craft practice that measures participant directional attitude. The layout of the questionnaire is explained in detail and the types of questions used, giving reasons behind the question that were proposed in section 6.4.3. Section 6.4.4, explains the pilot testing of the questionnaire that was carried out in the U.K. Section 6.4.5, explains the selection of craft practitioners for the case studies and section 6.4.6 explains the process and duration of the interviews using a tape recorder as a mode of recording. Section 6.5 describes the Quantitative Analysis process of the receptivity test (Directional Attitude) from the questionnaire of visual presentation. Section 6.5.1 explains the analysis, which compared the data by groups of craft practitioners and by regions of Kelantan and Terengganu in Malaysia. Section 6.5.3 explains the final comparison between the types of craft practitioners. Section 6.6 and Section 6.6.1 describes the Qualitative Analysis involving transcription of the receptivity test interviews, gathered from hands-on experience of the selected craft practitioners. Section 6.6.2, explains how the individual transcription materials were put into a Meta-Matrices Format. Section 6.7 explains the peer review analysis, which was transcribed and analysed using qualitative interviews within selected organisations. A summary is drawn and conclusions made in section 6.8.

CHAPTER SIX

MALAYSIAN CASE STUDIES OF CRAFT PRACTICE (RECEPTIVITY TEST)

6.1 Introduction

The Malaysian case studies of craft practice are an extension from the second phase of the research work of the Experimental process. The data collected from the second phase was based on the *reflective practice* of the researcher (Schon 1987) and was used as both evidence and a tool, to test and validate the integrated process of anodised aluminium and batik reactive dye. One of the key components in designing case studies mentioned by Yin (1994) is the study's question of "how" and "why" and it is the first task for the researcher to answer these questions. The purpose of the case studies was to determine the craft practitioner's receptivity to the decorative application technique. The technique was presented through visual evidence, by reference to experimental artefacts and by encouraging the participation of a selection of craft of craft practitioners in craft workshops. This involved the participation of craft practitioner's from various craft disciplines, initiated by the researcher with the support from the Malaysian Handicraft Development Corporation (MHDC) and Universiti Teknologi Mara (UiTM). The fieldwork also engaged with other supportive organisations such as SIRIM and ALCOM to ascertain the commercial and educational value of the decorative procedure to Malaysian craft artefacts and practices.

6.1.1 Malaysian Case Studies of Craft practice

The case studies of craft practice were organised by the researcher with the assistance of UiTM and MHDC, and were scheduled from 7th.April to 7th.May 2002. The case studies involved a range of the associated craft practice including Educators, Designers and Craft Makers originally established during Phase 2. As the Educators and Designers main activities of craft practice are centralised in or within the range of the capital city, Kuala Lumpur, the decision was made by both parties that the case study event would be held within their premises. Due to geographical

locations, for the Craft Makers, these events were proposed separately as decided by the MHDC branch Director. Craft Makers that participated came from various areas of craft practice, including: silverwork, brassware, batik, wood as identified in Phase 1 (See Table 3.1, Chapter Three) of the research investigation.

6.2 Methodology

A preliminary explanation of Action Research as a methodological approach has been presented in Chapter 1, thus an extended discussion on the application of the case study for this phase of the research work is described below. Mckernan described the character of the case study in action research as:

“...the case study is suited to rendering an account of all pertinent aspects of an event, thing or situation, employing as the unit of study an individual, thing or situation or community or any group as a unit. The case consists of some phases of the life history of the unit, or the entire life process whether the unit be a person, family or social group.” (Mckernan 1997 p.77)

He also said a case study refers to intensive inquiry into a system or unit. The system or unit referred to within the context of this research is the engagement of the researcher with craft practitioners. Social inquiry from the case studies of craft practice is a form of *Reflection on Practice* activity (Schon 1987) based on the responses of the craft practitioners within the receptivity test. *Reflection* is defined by Reid (1993) as a process of reviewing experience of practice in order to describe, analyse, evaluate and so inform learning about practice.

Central to the practice of action research is the notion that there is a cycle of planning, action, and learning which leads into the next cycle of similar activity. Action planning for the case studies of Malaysian craft practice, was derived from the key question of the action planning process by Lomax (1996 p.38): ***what kind of evidence can you produce to show what is happening?*** This question relates to the current work of the researcher where the focus of the study is to examine the possibility of producing craft artefacts using anodised aluminium as a decorative

application process, based on batik reactive dyes. As the case study involved participation by craft practitioners, research evidence from the reflective practice of the researcher within the Experimental Process of anodised aluminium (See Chapter Two) is very crucial and it needs to be defined clearly to the participants. Visual and material evidence was presented for this case study.

Before the researcher's departure to Malaysia for the fieldwork, a draft plan of action research practice was designed to assist data gathering for the case studies from the triangulation of inquiry continuity within the four stages. **Figure 6.1** below illustrates the sequence of the fieldwork activity.

6.2.1 Research Design of the Case Studies

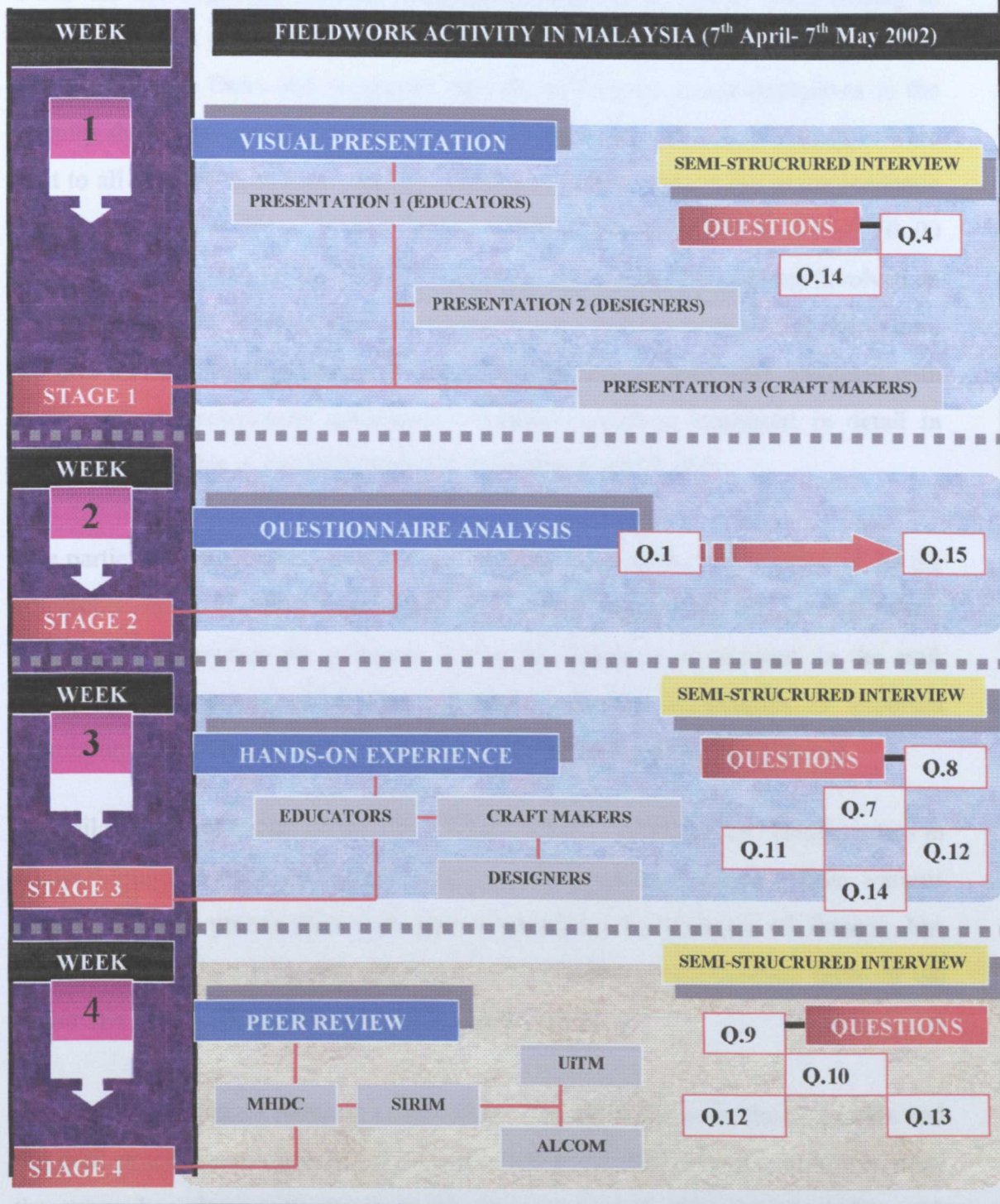
The layout of the action research practice was divided into four sections. Stages 1, 2 and 3 explain the background activity of the Researcher with the craft practitioners, while Stage 4, explains the background activity of the Researcher with the Peer review committee. An explanation of the details of each stage is set out below:

a. Stage 1- Visual Presentation (Activity with Craft Practitioners)

These sections explain the activity for the first week of the fieldwork. The arrangement for the visual presentation was made in a meeting between the researcher and the head of department within the organization involved such as the MHDC and the UiTM. The discussion of the meetings focused on the:

- content of the presentation,
- venue and date of the presentation,
- number of participants and criteria.

Research Design of the Case Studies



KEY
BACKGROUND

BACKGROUND ACTIVITY WITH CRAFT PRACTITIONERS

BACKGROUND ACTIVITY WITH PEER REVIEW COMMITTEE

Figure 6.1

From the meetings, the Faculty of Art and Design from UiTM, were willing to organise the first presentation by the researcher. These were scheduled on the 10th of April 2002. The Dean also suggested that all staff from various disciplines in the Faculty should be encouraged to attend the presentation. Letters of invitation were sent to all the staff members. The first visual presentation was given to the academic members of the Faculty of Art and Design, UiTM on the 10th April 2002 from 10: 00 am to 12: 00 pm. The layout of the presentation given to the participants involved an introduction of the abstract from the research work relating to anodised aluminium. To give a clear understanding to the research work, participants were presented with a PowerPoint presentation containing 16 slides, which is explained in detail in *Section 6.3.2*. (This is also to be found in Appendix 6 p.459-462)

The participants were also given a twenty-minute video presentation prepared by the researcher on the decorative application of anodised aluminium. This provided them with basic information for reference during the ‘hands-on experience’ in the craft workshop. The presentations also included a display of samples of anodised aluminium decorative application produced during the Experimental process.

A similar layout of visual presentation was conducted in the MHDC Headquarters in Kuala Lumpur on the 12th April 2002, which involved Designers from various disciplines. The presentation was also attended by the Director of Design, Mr. Shahrudin Md.Nor who was responsible for organising the meeting between the researcher and the designers for the case study activity.

All visual presentation sessions ended with a discussion between the researcher and the craft practitioners regarding the materials that had been presented. At this stage the researcher also conducted Semi-Structured Interview (Oppenheim 1992) with selected respondents. The selections of the respondents were picked from various disciplines e.g Textile, Industrial Design etc. and their willingness to be interviewed in order to provide different points of view, for qualitative analysis purposes. The researcher posed two questions selected from the visual presentation questionnaire. The interviews were recorded on tape.

Stage 2 4-Questionnaire Analysis

Stage 2 involved the analysis of the questionnaire using a Semantic Differential Score (Osgood 1957), that was distributed after the visual presentation. The questionnaire consisted of 15 questions. The detail of which is explained in **Section 6.4**. This stage required the researcher to filter the questionnaire responses by the craft practitioner, to disqualify any incomplete information for analysis. The questionnaire was then arranged according to the disciplines of the group of craft practitioners (See Appendix 6- Questionnaire Samples)

Stage 3-Hands-on Experience

The hands-on experience of the Anodised aluminium decorative process involved craft practitioners (Designers, Educators and Craft Makers). These were organised with the help of the MHDC, who provided equipment and space for this event. The first hands-on experience of the anodised aluminium decorative process was held at the Sutra Beach Resort, Kuala Terengganu. It was a two day event which started on the 29th -30th April 2002 with the official opening and presentation of certificate to denote their participation, by the Director of MHDC's branch in Terengganu. It was also agreed by the Director of MHDC branch in Kelantan, that a similar event would followed after that with the Terengganu craft practitioners. The date was confirmed for the anodised aluminium workshop in Kelantan, which was scheduled on the 2nd of May 2002 at MHDC branch. Both events were attended by craft practitioners from various disciplines.

The visual presentation and material evidence provided the craft practitioners with an insight into the decorative technique using anodised aluminium. These workshops allowed them to use and experience the anodising aluminium process, which led them to each make decorative samples from aluminium. There were no restrictions given to the use of decorative motifs by the craft practitioners in the workshop. Feedback from the craft practitioners to the questionnaire of visual evidence, showed that there is a need for the researcher to produce guidance material concerning the anodising process to facilitate their understanding of the process (See Appendix 6-

Experiment I and Experiment II). During the event, a five-page instruction booklet concerning the anodising experimental procedure was distributed to the participants. The content of the experimental procedure explained the step by step process of the technique followed by the process of chemical preparation. The manual also explained chemical preparation for the dyeing process using Batik reactive dyes. The end of the manual described the finishing touch of the anodising process using the process of sealing and lacquering (See Appendix 6- Anodising manual p.454).

Prior to their engagement with the anodising process, the Researcher provided a demonstration explaining:

- safety precautions for the handling of chemicals and workshop procedures
- the layout of the anodising unit and the sequence of the anodising process
- the racking technique
- chemical preparation for the anodising bath
- chemical preparation for the dying bath
- colour sealing and set-up
- resist application techniques
- decorative application technique using multi-coloured patterns

The information delivered above was based on the Experimental Process guided materials in Chapter 5 and this was presented in an instructional form (Jensen 1986). The craft practitioners were each given a coupon of aluminium with a different surface effect e.g matt and polished surfaces. As a result of this, variations in the decorative effect were achieved. These have provided craft practitioner's with some understanding of the choice of decorative technique that will help them to produce varieties of craft artefacts with different surface effects.

During their engagement with the experimental process, questions were asked by the researcher following his observation of the craft practitioners handling of the anodising process. The craft workshop sessions ended with semi-structured interview from the selected craft practitioners involved in the case studies. Craft practitioners

from different craft backgrounds were selected for the interviews, and helped to validate the research work.

Stage 4-Activity with the Peer Review Committee

The Action research practice of the third person inquiry (See Figure 6.1, Peer Review) attempts to create conditions which awaken and support the inquiring quality of first and second person (See Figure 6.1, Visual Presentation and Hands-on experience) research practice in a wider community, thus empowering participants to create their own knowing –in-action in collaboration with others (Reason 2001).

In this stage, the peer review committee, was carefully selected by the researcher relate to the nature of the research work. For example a representative from the Aluminium Company (ALCOM), the company which is responsible for supplying aluminium to various production companies in Malaysia, was selected to represent views from the materials supply sector. SIRIM, another semi-government agency, which is responsible for the standardisation and quality of Malaysian products, was selected to represent views on the issue of colour effectiveness within the anodised decorative process. Other agencies such as the UiTM and the MHDC were also part of the peer review validation to represent the views of education governmental suggest for the crafts on the potential of anodised aluminium in craft practice.

The purpose of the peer review was to validate the current research work containing craft decorative samples produced by the researcher and craft practitioners involved in the case study. This was to produce feedback from the committee regarding their views on the decorative process, as to whether it can establish a commercial and educational value for Malaysian Craft.

The peer review session involved a presentation of current research work containing anodised aluminium decorative samples from the researcher and craft practitioners hands-on experience that were carried out in Stage 3 of this fieldwork. Four questions were asked of the Peer Review committee, which were extracted from the

question design in the visual presentation questionnaire. The interview used semi-structured interviews and a tape recorder to record the conversations.

6.3 Case Study Materials

6.3.1 Visual Evidence

Visual evidence was presented to the case study participants as a series of slides concerning the use of batik dyes in the decorative application of anodised aluminium (See Appendix 6-Visual Presentation). Theoretical information on the anodising process was also included to provide initial information on the process related to the second part of the video presentation (See Appendix 6-Anodising Manual). The participants were then given an opportunity to view a twenty minute video presentation in which the researcher demonstrated the step by step process of the anodising technique from preparation to finishing. This was to give a better understanding of the process before engaging them in the craft workshop. The video of the anodising process was prepared in the 3D Design workshop, University of Northumbria, Newcastle, U.K.

6.3.1.1 Detail contents of the PowerPoint Presentation

The presentation to craft practitioners in the regions of Kelantan and Terengganu, Malaysia, involved visual evidence in the form of the PowerPoint and video presentation (See Appendix 6-Visual Presentation). The researcher began by briefing participants on the contents of the workshop that had been agreed by the MHDC Director in both regions. The researcher also reminded the participants about the questionnaire that they needed to fill in at the end of the visual presentation.

The introductions to the presentation began with an explanation of the topic; *“The use of batik dyes in the decorative application of anodised aluminium”*. The explanation extracted three key words, ‘batik dyes’ and ‘decorative application’ and ‘anodised aluminium’. Two of these key terms are familiar and already associated with craft practitioners except ‘anodised aluminium’, which needed clarification.

The researcher explained the finding derived from the survey in Phase 2 in relation to decorative application. In Malaysian crafts, motifs play a significant role in representing craft artefacts. The survey proved that this have been used widely as a subject matter in surface decoration. Examples of decorative motif were presented using slides, which emphasized the elements used in batik. They depicted examples using flowers and the traditional kite. Stylised floral motifs are the favourite elements used by craft practitioners in batik making, besides a combination of geometric patterns. Following the slides, the researcher stressed that traditional kites are not only used as a decorative element in craft artefacts, but also symbolise the logo of the Malaysian airline industry (MAS) to promote their identity to the global world. The researcher explained that the decorative application is not only important in Malaysian craft but also to other global craft communities by showing examples of slides of decorative artefacts from other countries such as India, etc. The slide chosen displayed the elements of decorative motif in the artefacts and this gave some insight to the participants on the value of it in craftwor (See Appendix 6).

In batik making, as the practitioners in the workshop well knew, dyes can originate from a wide variety of countries. The presentation included an example of dyes that were used in the Experimental Process. It also explained the type of dyes that are available to the batik making industry from sources that were determined by the survey of the suppliers in Malaysia. The explanation focused on the type of dyes from Switzerland that were utilised and integrated with the anodising process. The reasons behind the choice of this dye were explained, that it relates to the current production of batik and the type of dye used by the export market in Malaysia for Batik artefacts. The purpose of this dye to the researcher's work was explained, i.e.: is to test the appropriateness and applicability of the integrated process of batik and anodised aluminium: Will it offer decorative potential for artefacts and new product opportunities to Malay craft practices? The answer to this question, as the researcher suggested, was very much dependent on their experiences in the craft workshops. Other examples of dye were also mentioned from Germany and India. The results of the experiments were presented, from the successful colours achieved and the failure of one of the dyes to be absorbed.

The anodising unit was then presented in the next slide of the presentation, giving the craft practitioners an insight into what the unit look like. Very simple illustrations of the anodising unit were used consisting of the basic equipment used by the researcher. The key features of the illustration displayed the anodising tank that contains sulphuric acid, the copper bus bar that channelled the current to the positive and negative pole. The illustration also showed the type of power supply used in the process. In presenting this slide, the researcher also mentioned the history of the anodising process, that craft practitioners in the U.K, U.S.A and Australia have used the type of apparatus, which is named as the “basic sulphuric process”, widely since 1980. The researcher also acknowledge, the literature of LaPlantz, as a source of technical reference concerning anodised aluminium, that has been used globally by certain craft practitioners. Information on anodising settings in industrial applications was also explained and the contrastive nature of its space utilisation due to the nature of mass production. The experience of the researcher during the research program in setting up the workshops was also explained, pointing out and that this unit only required a small space and that anyone can do it at home. The reason for this explanation was to show the cost effectiveness of the process to the craft practitioners (See Chapter 5, Figure 5.1- Pg 127).

The eight sequences of the anodising process were then explained to the participants, using a table illustration showing the procedure format step by step. The table was based on the researcher’s Experimental Process. The procedure explained the pre-cleaning process for aluminium step by step, which begins with the immersion of aluminium in the caustic etch solution for 2-3 minutes. The reason for this immersion is to clean the surface of the aluminium from grease or oil as the caustic soda reaction etches the surface indicated by white bubbles rising to the surface. The reaction also gives a smooth effect to the aluminium when cleaning it in a second immersion of normal water. The cleaning process ends with the immersion of aluminium in a Nitric acid dip, which is then rinsed in clean water to remove traces of acid. The aluminium is then ready to be anodised using self-made racking, by immersing it in the anodising bath containing sulphuric acid (See Section 5.5.3.5, Chapter 5). The researcher explained that the variations of immersion at this stage depend on the individual’s needs. The Experimental Process showed that the

variations of colour from batik dyes absorbed into aluminium resulting from 15, 30, 45 and 60 minutes of immersion. After anodising the surface, the aluminium will allow absorption and retention of dyes. The success at this stage very much depends on attaching the aluminium correctly to the positive and negative poles of the anodising equipment. During the process, a successful contact can be seen through the reaction of aluminium as it releases tiny bubbles from its surface (positive pole). There is a similar response from the lead sheet, which serves as the negative pole in the process. After the anodising process, agitating the aluminium in a water container cleans all traces of the sulphuric acid. The result of this process, is a change of surface appearance of the aluminium showing a very smooth etching effect. This can be seen by using a hair dryer to speed up the drying process.

Sequence 7 (See Section 5.5.3.1, Chapter 5) in the table of the slide presentation is the dying process. The researcher explained the preparation of the dye using cold or hot water with reference to the mixing procedure derived in the Experimental Process. The sample is prepared using a set time of immersion in the anodising bath and is then ready for dying. The researcher explained that once the sample is immersed in the dyeing bath, the reaction of the selected dye with the anodising pieces will lead to the spontaneous absorption of the dye onto the surface of the aluminium. At this stage, the practitioner was advised to agitate the aluminium in order to achieve an even colour distribution of the dye. The experimental process produced a series of colour charts of the anodising process for reference by practitioners. This series constitutes a comprehensive calibration of single colour variation of batik dyes using the anodised aluminium technique and provides for the design selection of a base colour for future decorative applications.

After explaining the anodising process, the presentation showed slides on the historical background of materials in Malaysian craft practice, focussing on the craft of metal work. The slides showed metal craftwork made from silver, brass and pewter, with which the craft practitioners familiar (See Appendix 6-Visual Presentation Slides). The researcher then made the practitioners to realise the potential of aluminium as a material in Malaysian craft. To emphasize this point, the researcher also related these to other current research work by showing examples

from the *Kensington collection*, which utilises aluminium as a main material for their company promotion (Ockner and Pina 1992). The researcher also pointed out the difficulties faced by brass makers in Malaysia due to the increase in price of the materials. A result of this is a slow demand for this craft in local and global markets because of the unaffordable selling price (Karyaneka 1999). Besides that, the influx of brass crafts from India and Thailand, which are sold at a competitive price, contributes to the jeopardy of the Malaysian brassware crafts industry in the future. This factor has resulted in a decrease in the number of craft practitioners in the brass craft industry. Only ten craftsmen managed to survive, out of a hundred in the early days. As the craft practitioners pointed out during the interview in Phase 1 (Wan Ismail 2001), *“this will be a lost to our country if no measures are taken by the MHDC”*.

The researcher suggested the use of alternative materials should be considered by the metal crafts industry, to aid their survival, and to consider extending their creativity through the choice of material as is being done in other craft products. For example, ceramic craft artefacts produced using a variation of approach by applying a batik technique from the traditional way of carving in the early stage of ceramic craft artefacts production. Slides then presented the aluminium industry in Malaysia, displaying the use of aluminium in architecture and varieties of aluminium product that are available from manufacturers. The researchers showed why aluminium was used in global production, where some products made from steel have been replaced by aluminium due to their lightweight. The global example given, was the making of automotive products by major companies like Jaguar and Audi etc, who have shifted some of their component production over to aluminium. The advantage of this move is that it has led to consumer benefit due to the reduction in consumption of petrol in automotive transportation. In the Malaysian context, a reason for concern is the availability of aluminium in Malaysia since 1960 and the price differences between aluminium and existing products made from silver, copper, brass and pewter. In terms of physical characteristics, the researcher explained the advantage of its lightweight in making craft products and the potential of it in decorative application.

Examples of the decorative application of anodised aluminium were shown using the work of Jane Adam, which has been described in the Introduction, Purpose and Approach (Chapter 1, Section 1.2). The presentation showed slides depicting the use of single colour technique with a combination of silver wire to give a contrasting appearance to the jewellery (See Appendix 6-Visual Presentation Slides). Another example of her work is the folding technique applied to aluminium, which produces a 3-dimensional look. There was also a contrast in the surface treatment between the two examples given of anodised aluminium jewellery. The final slides of Jane Adam's work provided participants with a good example of the decorative potential of anodised aluminium. The motifs bear some relation to the researcher's own work of decorative application, although her work was derived from the study of Indian culture.

In the concluding slide, the researcher presented a statement from Jacques Bougie urging the importance of the role of the aluminium industry to promote this metal in the 21st century global economy. The purpose of this statement was to make the participants aware how aluminium can be utilised meaningfully in craft products as it has potential for exploration as a decorative application. This has been proven in the researcher's Experimental Process in the present study and in the examples of work done by International artists, particularly Jane Adam.

6.3.1.2 Detailed contents of the Video presentation

The first section of the video introduced the apparatus used in the anodising process, and the type of dyes used in the experimental process. It displayed nine colours of the imported dyes from Switzerland. The researcher also clarified the status of the dyes, as a first grade quality, popular dyes used by the craft makers in making batik for the export market. The video also provides information on the procedure of mixing the dye (minimum mixture of 2 gram/litre) and the type of containers that are needed for storage in order to preserve the quality of the dyes. The types of chemical used, such as sodium hydroxide caustic soda), sulphuric acid and nitric acid were presented in the form of commercial packaging. The practitioner was also informed

about the availability of this chemical in the Malaysian market (See Appendix 6-Video Presentation Images).

The video presentation began with the process of preparing the aluminium plate for anodising. The type of aluminium selected; series of 1000 was also explained as it has a particular quality, which serves different purposes in the aluminium industry. The selection of this grade is due to its high aluminium content, which produces better results during anodising as it delivers a brighter colour. The researcher then present an example of two types of hand-made racking used for the experiments, the L and C shape (See Figure 5.9, Chapter 5). This wire is made from aluminium welding rod, which is normally used in the tig welding of aluminium. The length of the wire very much depends on the size of the anodising bath. For the present study the measurement is eight inches long. The L shape type of the bottom end has a very sharp-pointed edge to secure the contact of the aluminium plate. The top part forms a clip by bending it using round nose pliers. The C shape type needs a groove on top and bottom part of the shape applied using a triangular file (See Figure 5.9, Chapter 5). This produces a strong hold on the aluminium plate as it rests on the wire. The researcher also suggested that for this type of racking, the size of the C shape should be smaller than the aluminium plate. This type of rack has a similar clip at the top to secure a good contact for successful anodising. The function of this clip is to hold the sample, which is attached to the copper bar of the positive pole in the anodising bath. For this process the container used is made from polyethylene plastic so that it can withstand chemical reactions. The video presentation showed a sample of the type of plastic container that is required, which has a lid that conforms to the safety procedure.

Six containers were presented in the video to demonstrate a pre-cleaning process before anodising. These consists of: caustic etch (a mixture of caustic soda and water); caustic rinse (de-ionised plain water), Nitric acid and water; Nitric rinse (de-ionised plain water); anodising bath (a mixture of sulphuric acid and water) and anodised rinse (de-ionised plain water).This section of the presentation provided a close-up of the anodising bath, focussing on the attachment of the racking to the copper bus bar. As it is an electrical process, the details of the connections were also

viewed on the positive and negative clip. The source of the power supply used was also presented. After the anodising apparatus was shown, the explanation moved on to the ready-made dye that had been prepared. The final sequence of the presentation previewed the apparatus used in the sealing process, which contains the twin hot plate, which was used to warm the water in a stainless steel pot. The sequence of presentation of the apparatus in the video was based on the PowerPoint presentation concerning the anodising process.

The demonstrations of the anodising process began with the immersion of aluminium samples, using L shaped racking in the caustic etch solution. The immersion time was explained for each sequence, which takes about 2-3 minutes in the pre-cleaning process. The samples, which are ready to anodise are then hooked on to the copper bus bar. For the experimental process of this study, the size of the anodising bath could only accommodate four samples at a time. The time of immersion in the anodising bath depends on the individual selection of the practitioner, which can vary from 15, 30, 45 to 60 minutes. After the desired immersion time the samples are then cleaned with plain water in the anodised rinse container. The anodised samples are then ready to absorb colour.

The next video clip of the presentation showed the craft practitioners a series of experimental tools used as a surface barrier in the decorative application of anodised aluminium. This included items such as permanent marker, paper stencil, rubber stamp, gum masking and fast drying tyre paint. In addition, thinners was also used as a solution to remove the surface barrier. The final coat of the decorative samples was illustrated with the use of spray lacquer. This produces a lustre and prevents scratches whilst enhancing the colour intensity (See Appendix 6-Surface Barrier Tools).

The practical demonstration of the decorative application began with the immersion of aluminium in the lighter shade of dye to produce a single variation colour for 2-3 minutes. The samples were then immersed in clean water to remove the excess dye. The success of the dying process is indicated by the ability of the anodised samples to hold dye. A video clip was used to demonstrate a fast drying technique using a

normal hair dryer. The same samples were then partially immersed into the second colour, to give a variation of colour before the decorative motif was applied to the surface. The result of the experiment displayed a variation of single colour samples with different immersion times that were produced from flat anodised pieces to aluminium extrusions.

Decorative application by surface barrier tools was demonstrated using a permanent marker. The researcher demonstrated the use of floral elements drawn on the surface of the base colour blue of anodised aluminium. This was then immersed in yellow dye, which changes the appearance of the surface to green. It was then cleaned with water and dried using a hair dryer. In this experiment, the researcher explained that when originally trying to remove the marker with spirit, it was assumed that it would disappear revealing the first colour. However, the marker unexpectedly remained on the surface, which meant that it could be utilised as a decorative medium.

The second technique, to act as a surface barrier was the application of fast drying tyre paint. Using a brush, the researcher demonstrated how to produce a variation of line thickness. The lines were carefully applied to give the appearance of an abstract design using a yellow shade of anodised aluminium. This was dried and partially immersed in brilliant red to produce a second colour. A third colour was then achieved from the immersion of the samples in Turquoise Blue. The result was a four-colour variation design on a single piece.

The third technique of surface barrier tools, demonstrated the use of a rubber stamp to apply pattern with tyre paint. The paint was applied to the surface of the rubber stamp and pressure from the stamping produces a pattern onto the anodising plate. The paint is then dried with a hair dryer and is ready for immersion into a second colour.

The fourth technique was applied to a different base, i.e: using an aluminium extrusion. To demonstrate the application of decorative pattern, fast drying paint was used as a surface barrier with a brush to create a design. Similar procedures apply to the drying process by using a hair dryer. The second colour is then produced, by

immersing it into a second colour. To view the effect of overlapping pattern and colour, wash the entire surface with spirit using a brush. The transfer of pattern onto the anodised aluminium extrusion was also demonstrated using masking tape, which acts as a surface barrier. The pattern is then created by using a caustic etch solution, used in the pre-cleaning process demonstrated earlier. The exposed area shows of the base metal, and forms a decorative pattern.

The use of a paper stencil was also demonstrated to produce pattern. Fast drying paint and a brush were used to create a ready-made pattern. After drying the paint with a hair dryer, the sample is then immersed in a dye bath of a second colour. The detail of the pattern and overlapping of colour appeared as it is washed out with spirit.

Following the principle of hand-drawn batik making where the outline from wax provides a detail design on the fabric, a similar approach was applied to the decorative pattern of anodised aluminium. The video demonstrated the use of an electrical hand engraver as a tool in detailing the decorative pattern. The technique has added an aesthetic value to the groove pattern, thus enriching the natural appearance of the base metal aluminium. This technique once again reinforces the association of the decorative anodising process with existing Malay decorative craft practices.

The final part of the presentation video, demonstrated the sealing process and the protective coating using a spray lacquer technique.

6.3.2 Experimental Evidence

Experimental evidence consists of a series of anodised aluminium decorative samples produced by the researcher in the Experimental Process (See Appendix 5). The purpose of the samples was to provide a tangible insight for the craft participants on the materials that have been presented in the visual presentation. The decorative samples display all of the work demonstrated in the video presentation. Beside this, the tools used in the decorative process were also exhibited.

The decorative samples of anodised aluminium utilised all of the colours in the experimentation Phase 3 successfully. They displayed various floral elements, geometrical and abstract designs with reference to the findings from the literature review and the survey in Phase 2 of the present study. The presentation provided evidence of the interaction of batik dyes and the anodising process. Eight samples were displayed on the single colour variations chart, which shows the four colours achieved from the intervals of 15, 30, 45 and 60 minutes (See Appendix 5-Anodised Single-Colour samples). Sixteen samples of the decorative application were also displayed to provide the potential evidence of batik dyes and surface barrier tools (See Appendix 5-Anodised Decorative samples). It is hoped that the evidence provided would help craft practitioners to understand the decorative process before their engagement in the craft workshop.

6.4 Development of Questionnaire

The purpose of the questionnaire is to find at the level of receptivity of craft practitioners to the decorative process through a visual presentation and hands-on experience of anodised aluminium craft practice. In order to gauge this receptivity in the case study, a questionnaire was developed and designed based on the 'attitude of measurement' method of (Osgood et al 1957 p.192) using Semantic Differential scores. A report made by Garland in the Marketing Bulletin titles, "*A Comparison of Three Forms of the Semantic Differential*" discussed the use of rating scales in the measurement of attitudes in consumer research:

"Rating scales are used by researchers to measure people's attitudes to a variety of stimuli, yet little time is spent examining respondents' reactions to the form of the scales used for this purpose. Three forms of the semantic differential were tested to determine whether labelling the scale points affects the way that the scales are used, and to determine which form respondents to use. The scale points were either unlabelled, labelled, or numbered." (Garland 1990 p.1)

His finding was that consumers preferred to use the labelled form. It is suggested that this is the best form of semantic differential that can be used when surveying a

diverse audience. The other forms tested may be more suitable for a *specialist audience*. For this case study the intention was to address the specialist audience comprising craft practitioners of various professional disciplines.

A paper by Polzella et al (1998 p.2) at the 10th Annual Convention of the American Psychological Society titled, *“Images of Mary: Effects of Style and Content on Reactions to Marian Art”* look at the use of rating scales and Semantic Differential (SD) scores, based on the reactions of college students to works of Art. The procedure gathered the responses of student using *seven-point semantic differential scales* that measured such dimensions as; complexity, clarity, power, beauty etc. The study accorded to the principle of SD methodology in using numerical scales with adjective bipolar (Osgood *ibid*).

Polzella also posed two questions to future researchers regarding the use of Semantic Differentials in other fields of artwork:

- Will the findings apply to another group of artwork? and
- How can the findings be explained?

In this study, a similar approach was explored and applied in terms of using rating scales to measure the craft practitioner’s attitude and understanding of the integrated process.

6.4.1 Questionnaire Design using Semantic Differential Score

In designing the questionnaire, the theoretical concept of the Semantic Differential was adapted from Osgood et al (1957) in relation to the task of the research work. Referring to Kidder cited in the History Index, the author in his literature overview on Semantic Differential technique prescribes a form of guideline procedure in designing the questionnaire:

“The Semantic differential...is a method for measuring the meaning of an object to an individual. It may also be thought of as a series of attitude scales. The

subject is asked to rate a given concept on a series of seven-point bipolar rating scales. Any concept-whether it is a political issue, a person, an institution, a work of art-can be rated...Subgroups of the scales can be summed up to yield scores or that are interpreted as indicating the individual's position on three underlying dimensions of attitude toward the object being rated. These dimensions have been identified by using factor-analytic procedures (factor analysis is a [statistical] method of finding the common element or elements that underlie a set of measures) in examining the responses of many individuals concerning many concepts or objects. It has been found that.... three subgroups measure the following three dimensions of attitude: (1) the individual's evaluation of the object or concept being rated, corresponding to the favourable-unfavourable dimension in more traditional attitude scales;(2) the individual's perception of potency or power of the object or concept; and (3) the individual's perception of the activity of the object or concept."

(Kidder 1981 p.4)

The three dimensions of attitude known as EPA (Evaluation, Potency and Activity) indicated above are presented in a three-dimensional illustration below to verify their position being explained (**Figure 6.2**):

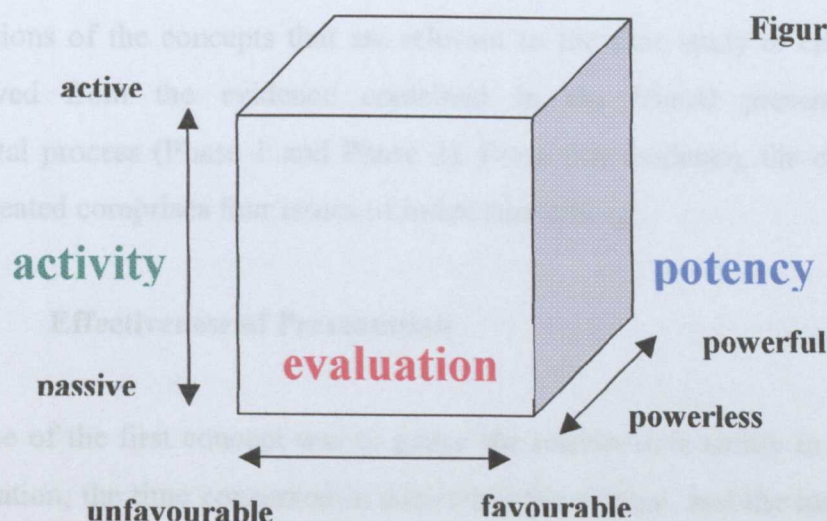


Figure 6.2

Semantic Differential (Meaning)
Three-Dimensional Construct

Source: Trochim

Cited by Oskamp (1977 p.4) in the History of Index regarding the three dimensions of semantic space, Evaluation proved to be the most important. Evaluation is also

known as the “connotative” or “affective dimension the term used by psychologists related to the emotion associated with an idea or set of ideas. Oskamp also stressed that *Evaluation is one of the most heavily weighted in people’s judgements and reveals Osgood’s recommendation using this affective dimension as a prime indicator of attitude toward the object* (Oskamp 1977 p.4).

6.4.2 Construction of Direction Attitude Questionnaire

To summarize the procedure using the Semantic Differential technique described in *Section 6.4.1*, the following criteria have been included in constructing the direction attitude questionnaire in the case study of crafts practice:

- a. Selection of concepts relevant to the issue being studied.
- b. Selection of bipolar adjective with proposed rating scales
- c. Administration of the case study and conduct of the analysis

a. Selection of concepts relevant to the issue being studied.

The definitions of the concepts that are relevant to the case study of craft practice were derived from the evidence contained in the Visual presentation and Experimental process (Phase 1 and Phase 2). From this evidence, the concept that has been created comprises four issues of index concerning:

Index 1: Effectiveness of Presentation

The purpose of the first concept was to gauge the researcher’s ability in conducting the presentation, the time consumed in delivering the content, and the interest of the respondents towards the topic.

Index 2: Understanding the process of anodising aluminium

The second concept concerned the level of understanding gained by the respondents of the material presented. This defined their ability to familiarise themselves with the

technical process through reference to the visual presentation. The purpose of these concepts also explored participant awareness of the aesthetic aspect provided by the experimental samples, resulting from the integrated process of anodised aluminium. As the process is relatively new to Malaysian craft practice, as was identified in the finding of the Qualitative interviews (Phase 2), their level of understanding of the experimental procedure was also measured.

Index 3: Cultural Value

The third concept refers to the future of the process related to Malaysian cultural value. As the survey identified that the current craft artefacts produced by craft practitioners are decorative in nature, this concept explored their prediction of the potential of the decorative process in terms of its value in extending the rich iconography of Malaysian craft artefacts. The other purpose of this concept was to find to what extent this process was capable of delivering the type of work of craft makers as either traditional or contemporary artefacts.

Index 4: Market Potential

The final concept concerns Market Potential. It will provide data on the perception of craft practitioners to the potential of utilising the decorative process to create a marketable craft product, including their views about the economic standing of the process, with reference to their visual experience gained from the demonstration of the decorative process in the video presentation. The concept also seeks to understand craft practitioner views regarding the opportunity of the integrated process to contribute to the curriculum of craft education. This concept also discovered their level of interest in applying the process to their current craft practice.

b. Selection of bipolar adjective with proposed rating scales

Osgood, the originator of the scale for Semantic Differential technique, found that the adjective pairs fall into clusters of meaning. The most commonly used clusters or

factors are *evaluative* (e.g new-old), *potency* (deep-shallow), and *activity* (e.g dynamic-static) though it is possible to use only one cluster or even more than these three. The score for an individual's or group's is usually reported as an average or mean for each of the cluster employed (Osgood et al 1957) .

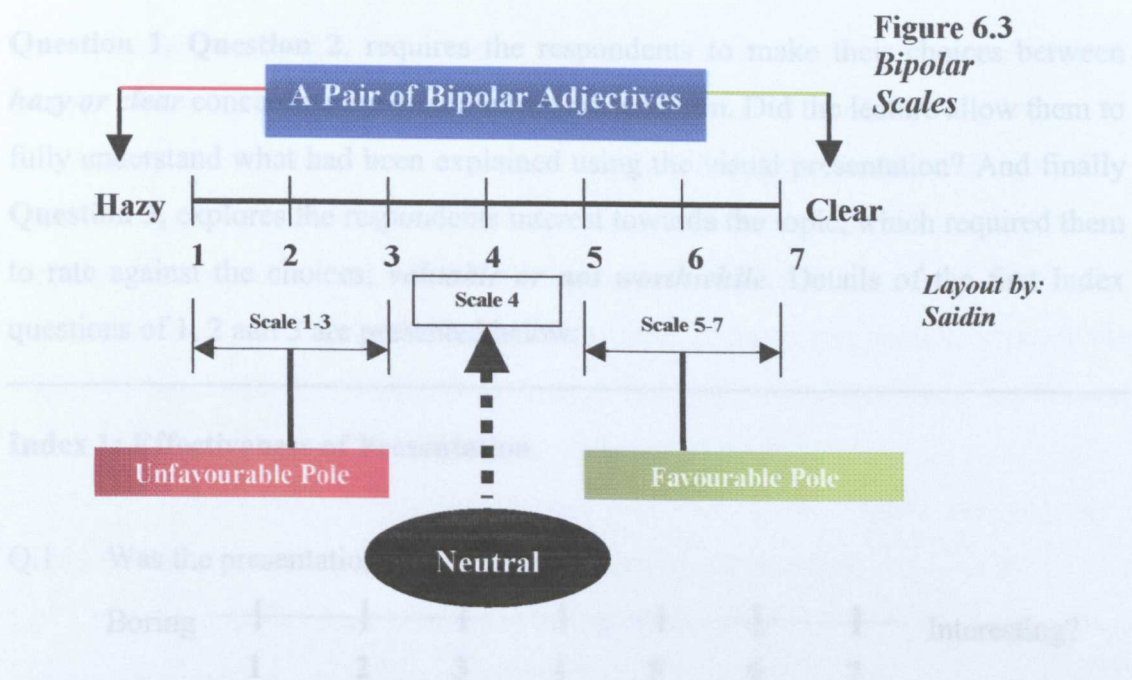
Semantic Differential scales require rating scales to be scored in order to reduce and analyse the assembled data. Osgood (1957) described his scoring technique as follows:

“For the purpose of scoring consistency, we have uniformly assigned the unfavourable poles of evaluative scales (e.g bad, unfair, worthless, etc) the score ‘1’ and the favourable poles (good, fair, valuable) the score ‘7’—this is regardless of the presentation of the scales to subjects in the graphic differential, where they should be randomised in direction. We then merely sum over all evaluative ratings to obtain the attitude score....’

Osgood (1957)

For this present study, the researcher proposed a questionnaire using semantic differentials with assigned numerical scale values of one through to seven (1-7) with paired adjectives to provide evaluative results of favourable, neutral and unfavourable. Examples of the scales described above are illustrated in Figure 6.3.

Osgood et al (1957 p. 192) also says on the “direction of attitude, favourable and unfavourable, is simply indicated by the selections of polar terms by the subject; if the score falls more toward the favourable pole, then the attitude is taken to be favourable, and vice versa. A score that falls at the origin, defined by “4” on the scales, is taken as an index of neutrality of attitude”.



Base on these principles, the semantic differential questionnaire design for this study included *Evaluative, Potency and Activity factors*. This questionnaire was developed in English and then translated to ‘**Malay**’. Each index of the concept mentioned in *Section 6.4.2* comprises three to five questions related to the purpose of the finding. Each set of questions that were constructed, contain bipolar adjectives in which the positive answer was positioned on the right while the negative answer was on the left accompanied by the choice of rating scales 1 to 7 in the middle. Each concept developed was represented as an Index 1, 2, 3 and 4. These four Indices represent the EPA (Evaluative, Potency and Activity) factors. The representations are described below:

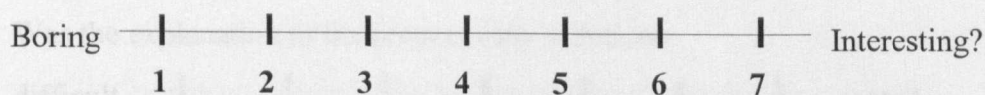
- a. **Index 1** (Evaluative factor) with a concept of *Effectiveness of Presentation*
- b. **Index 2 and 3** (Potency factor) represented by a concept of *Understanding the Process of Anodised Aluminium and Cultural Value* and,
- c. **Index 4** (Activity factor) consist of a concept, *Market potential*

The first Index, *Effectiveness of Presentation* of Direction Attitude scale comprises of 3 questions, which inquired into the view of the craft practitioner to the nature of the presentation that had been given. These were concerned with their reaction to the whole content of the materials presented by the researcher in terms of how **boring or interesting**, it was thought to be in terms of the time it took, and is reflected on in

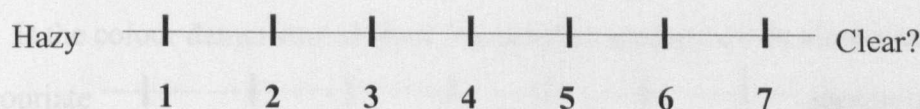
Question 1. Question 2, requires the respondents to make their choices between *hazy or clear* concerning the clarity of the presentation. Did the lecture allow them to fully understand what had been explained using the visual presentation? And finally **Question 3**, explores the respondents interest towards the topic, which required them to rate against the choices; *valuable or not worthwhile*. Details of the first Index questions of 1, 2 and 3 are presented below:

Index 1: Effectiveness of Presentation

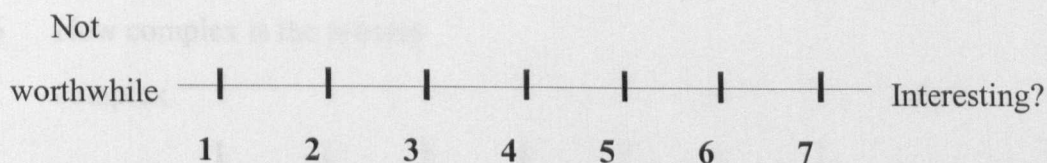
Q.1 Was the presentation-



Q.2 Was the presentation-



Q.3 Was the presentation-

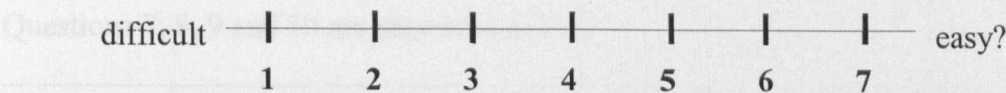


The second Index, *Understanding the Process of Anodising Aluminium* consists of 3 questions. These focus on the detailed understanding of the anodising process with the craft practitioners involved. **Question 4**, posed the question about the explanation of the process, whether the combined presentation of audio visual material provided them with a clear understanding of the decorative technique. These questions required the respondents to gauge their answer within the bipolar adjective scale of *easy or difficult*. **Question 5**, gave the opportunity for the craft practitioner to view two categories of decorative process resulting from the Experimental work. This led them to consider the answer for this question related to the colour that has been achieved from the integrated process of batik and anodised aluminium. The choice of

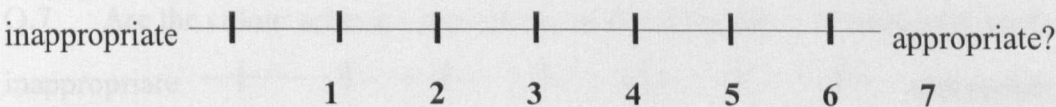
answer given was based on whether the practitioner felt the decorative colour samples presented were *appropriate or inappropriate* to the decorative application of aluminium. Finally **Question 6**, sought to find the craft practitioner’s level of understanding in terms of the step by step process of the decorative procedure, which includes the sequence of the anodising process and the nature of decorative application demonstrated in the video. This allowed the participants to answer the choice of how *easy or complex* from their visual experience. Details of the Second Index questions of 4, 5 and 6 are presented below:

Index 2: Understanding the Process of Anodising Aluminium

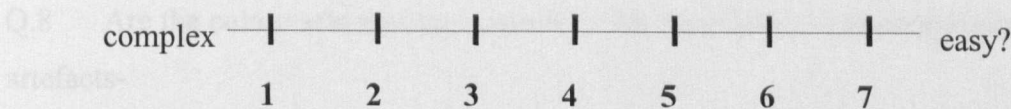
Q.4 Was the explanation of the process easy to follow-



Q.5 Is the colour demonstrated from the samples appropriate on aluminium-



Q.6 How complex is the process

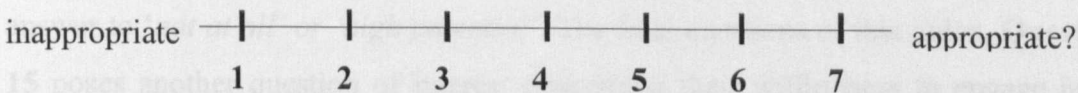


The third Index, *Cultural Value* comprises four questions related to the effectiveness of the samples of the Experimental decorative process using batik dye and anodised aluminium. The four questions continue with **Question 7, 8, 9 and 10**. **Question 7** required the craft practitioner to consider the colour schemes that had been displayed from the samples whether they were *appropriate or inappropriate* to be used as a decorative medium for traditional artefacts. Craft products can be produced in respect of traditional artefacts as well as contemporary design. So **Question 8**, relates to the craft practitioners experience in dealing with decorative artefacts, whether the samples are *appropriate or inappropriate* to be considered for decorative application as contemporary style artefacts. Whereas **Question 9** was

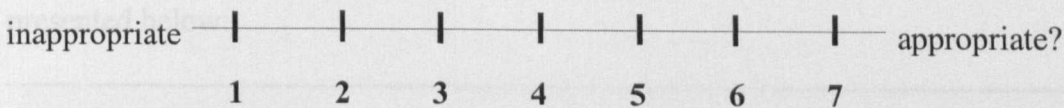
concerned with traditional artefacts and focuses on the colour schemes of the decorative process and whether they can reflect traditional cultural values. This led the respondents to indicate whether they have a negative reaction to Malaysian traditional cultural values with the ‘*not at all*’ selection towards the bipolar scales or on the positive scale with a response towards the ‘*highly reflect*’ end for this question. Finally **Question 10**, was also concerned with Malaysian cultural values and tried to gauge from the respondents whether the colour schemes have a potential to reflect the contemporary side of the issue raised. Similarly **Question 9**, asked the respondents to provide a rating within the category of ‘*highly reflect*’ or ‘*not at all*’. The response from the craft practitioners to these four questions constituted the findings of the index on cultural values. Details of the Third Index representing Questions 7, 8, 9 and 10 are presented below:

Index 3: Cultural Value

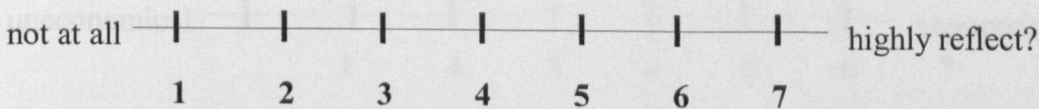
Q.7 Are the colour schemes appropriate to the decoration of traditional artefacts-



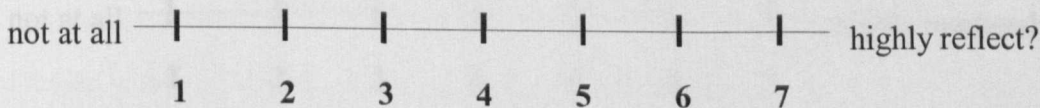
Q.8 Are the colour schemes appropriate to the decoration of contemporary artefacts-



Q.9 Do the colour schemes reflect traditional Malaysian cultural values-



Q.10 Do the colour schemes reflect contemporary Malaysian cultural values-



The fourth Index, *Market Potential* consists of five questions related to the potential and value of the decorative process as a craft product in the future. The five questions in this Index, continue with **Questions 11, 12, 13, 14, and 15**. **Question 11**, measured the decorative process technique in terms of the production methods that were demonstrated in the video presentation. The craft practitioners were required to judge from their experience in craft making, whether this technique is an *economic or uneconomic* type of production. The potential market value of the decorative process as represented by the colour samples that were displayed was the subject of **Question 12**. This required the respondents to provide the answer to ‘*not at all*’ or ‘*highly marketable*’ on a bipolar scale. The next question posed about the potential of the decorative process was whether it provides an opportunity to craft education, besides craft practice. In answering **Question 13** the craft practitioner also needed to judge the relevance of the decorative technique to the craft curriculum through their choice of ‘*not at all*’ or ‘*high potential*’ on the semantic space. **Question 14** posed the question; whether the decorative process will be of interest to their area of craft practice. The individual’s interests will be known from their answer to ‘*not at all*’ or ‘*high potential*’. The final questions of this index, **Question 15** poses another question of interest concerning their willingness to engage in an experiment with the decorative process in their area of craft practice. Responses will be rated in terms of their reply to the semantic scale ‘*interested*’ or ‘*uninterested*’. Details of the Fourth Index representing Questions 11, 12, 13, 14 and 15 are presented below:

Index 4: Market Value

Q.11 Is the decorative process time consuming
uneconomical —|—|—|—|—|—|—| economical?
1 2 3 4 5 6 7

Q.12 Do the samples produced have market potential-
not at all —|—|—|—|—|—|—| highly marketable?
1 2 3 4 5 6 7

Q.13 Does the decorative process offer potential for use in craft education-
not at all —|—|—|—|—|—|—| high potential?
1 2 3 4 5 6 7

Q.14 Does the decorative process offer potential for use in your area of Malaysian
practice-
not at all —|—|—|—|—|—|—| high potential?
1 2 3 4 5 6 7

Q.15 Would you be interested in experimenting with this decorative technique
through your own practice-
uninterested —|—|—|—|—|—|—| interested?
1 2 3 4 5 6 7

Questionnaire Answering Guidelines

The last question, requested a response to an open-ended question, and allowed respondents to give a description of how interesting the decorative process is to them? This provoked various views or comments from individuals concerning the issue.

6.4.3 Layout of Directional Attitude Questionnaire

After the construction of the questions, the questionnaire was arranged in order from Question 1 to Question 15 with semantic differential scales and then one open-ended question. The questionnaire consists of three pages. The first page gives guidelines with which to explain the procedure of answering the questions using the rating scales. The layout considered the advice of Osgood (1957) on the administration of the questionnaire, which required an instruction in order for the respondents to be able to use the semantic scales. An example of the descriptive instruction in Page 1 of the questionnaire is given in Figure 6.4. This was used in the pilot study conducted in the United Kingdom with a group of professionals at the Centre for Design Research, University of Northumbria at Newcastle:

6.4.4 Pilot Testing

Two pilot tests of the questionnaire, using the Semantic Differential score, were conducted at the Centre for Design Research, University of Northumbria at Newcastle in March 2002 and April 2002. The first pilot test was conducted in order to find the reaction of respondents to the form of rating scales designed for the questionnaire. During the test, the respondents were presented with a PowerPoint Presentation and Video on the decorative application of anodised aluminium using batik dyes. The questionnaire was distributed after the presentation. The contents of the questionnaire comprised fifteen questions related to the research work as explained in Section 6.4.2.

Semantic Differential Questionnaire Instruction

Figure 6.4

Questionnaire Answering Guidelines

INSTRUCTIONS

The purpose of this study questionnaire is to measure your personal views and judgements by asking you to indicate these against a series of descriptive scales. On each page of the questionnaire you will find a different concept to be judge and beneath it a set of scales. You are to rate a concept against each of these rating scales in the order they are set out.

Here is an example of how you are to use these rating scales:

If you feel that your judgement of a concept is very closely related to one end of a rating scale, you should place your check-mark as follows:

dangerous

1

2

3

4

5

6

7

safe

or

dangerous

1

2

3

4

5

6

7

safe

If you feel that the concept is quite closely related to one or other end of the scale (but not extremely), you should place your check-mark as follows:

dangerous

1

2

3

4

5

6

7

safe

or

dangerous

1

2

3

4

5

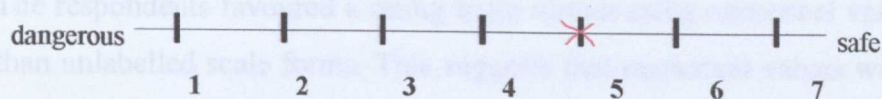
6

7

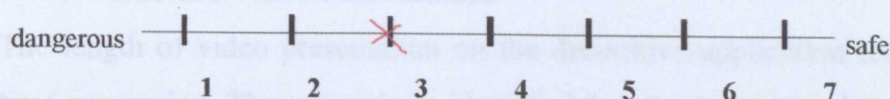
safe

169

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), the you should place your check-mark as follows:

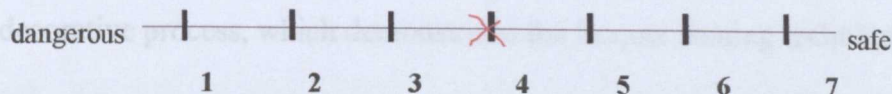


or



The direction towards which you place your check-mark, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you're judging.

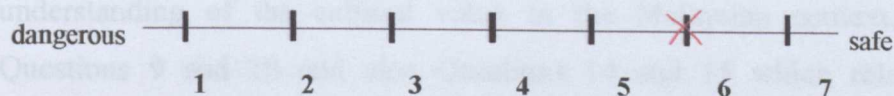
If you consider your judgements to be neutral on the scale, both sides of the scale equally associated with the concept, you should place your check-mark in the middle space:



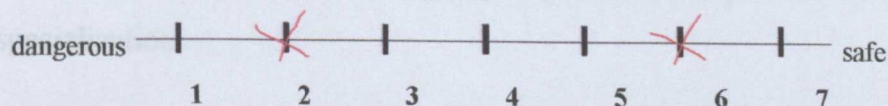
IMPORTANT! :

- (1) Place your check-mark in the middle of rating line, not on the top or bottom:

this



not this



- (2) Be sure you check every scale for every concept-do not omit any.

- (3) Never put more than one-check-mark on a single scale

Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so *do not look back and forth* through the items. Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgment. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first impression, the immediate feelings about the items, that the researcher wants. On the other hand, please do not be careless, because the researcher wants your true impressions.

From the tests carried out on the questionnaire with respondents of different professional backgrounds, the following comments were summarized:

a. Rating Scales

The respondents favoured a rating scale format using numerical values rather than unlabelled scale forms. This suggests that numerical values will provide a better choice of rating the answer and reduce the response time to the questions.

b. PowerPoint and Video Presentation

The length of video presentation on the decorative application technique is time consuming. The respondents identified that the decorative demonstration should be shortened. A suggestion was also made about the introduction of various techniques of the decorative process that need to be demonstrated. There was also a suggestion to include coverage on the final finishing of the decorative process, which demonstrates the lacquer coating technique.

c. Questionnaire

Respondents were uncertain about some of the questions due to a lack of understanding of the cultural value in the Malaysian context, e.g. for Questions 9 and 10 and also Questions 14 and 15 which relate to the readiness of respondents to explore the decorative process in their craft specialization.

The final draft of the questionnaires was then piloted again in April 2002 at the Centre for Design Research, with a modification of the unlabelled rating scales to numerical values. Changes were also made on the contents of the video presentation, which added some suggestions from the first pilot study related to the decorative process. Results from the second pilot study, suggested that the final draft questionnaire and visual presentation seem relevant for application to the Malaysian craft practitioners involved in the case studies.

6.4.5 Selection of Respondents for the Case Studies Interview

During the engagement of craft practitioners in the visual presentation and hands-on experience of the anodised aluminium workshops, two semi-structured interviews were conducted with the respondents. The Visual presentations that were organised for craft practitioners from the field of *Education, Design and Craft Making*. The selection of individuals for interview representing each group was firstly dependent on their willingness to be interviewed and expressed during the Question & Answer session after the events. Individuals were also selected from different disciplines of craft practice. The selection of individuals for interview from Hands-on experience crafts workshop was based on their strong interest. The number of questions put to the respondents differed at both events. These originated from the questionnaire of Semantic Differential scores used in the Visual presentation. The selection of questions was illustrated in Section 6.2.1, Layout of Research Design of the Case Studies.

The visual presentation posed two questions to the respondents for the semi-structured interview. The questions extracted are from **Question 4** and **Question 14**. An example of the questions are describe below:

Q.4 Was the explanation of the process easy to follow?

Q.14 Does the decorative process offer potential for use in your area of Malaysian craft practice?

Although these two questions had been answered through the Semantic Differential questionnaire, collecting respondents views to these questions increased the level of understanding for the researcher concerning their attitude and understanding of the decorative process.

Five questions were posed to the selected respondents following their Hands-on experience of the decorative process in their craft workshop. These questions also originated from the SD questionnaire and utilised **Questions 7, 8, 11, 12 and 14**. The details of these questions are shown below:

- Q.7 Are the colour schemes appropriate to the decoration of traditional artefacts?**
- Q.8 Are the colour schemes appropriate to the decoration of contemporary artefacts?**
- Q.11 Is the decorative process time consuming?**
- Q.12 Do the samples produced have market potential?**
- Q.14 Do the decorative process offer for use in your area of Malaysian craft practice?**

Although there was a repetition of **Question 14** for both interviews, it provoked a different reaction from the respondents in terms of their experience of the decorative process from both events. However, both interviews provided a valid generalisation and comparative dimension of qualitative data on their attitudes of respondents concerning their understanding of the decorative process.

6.4.6 Duration of Interview

The semi-structured interview was conducted after each event, which lasted about 10-30 minutes. From the previous study by (Ibrahim 1999) concerning the duration of interviews, there was a suggestion that shorter interviews are more effective than longer ones. The Researcher believes that the shorter period of interview promotes a fresh reaction to the respondents experience of events.

6.5 Receptivity Test Analysis From Questionnaire (Semantic Differential) of Visual Presentation

The visual presentation that was carried out, was attended by craft practitioners comprising: Educators, Designers and Craft makers (Figure 6.5). There were four presentations conducted for this event and at the end of the session the respondents were asked to answer 15 questions and 1 open-ended question. The questionnaire was then analysed using a Semantic Differential scale, which consisted of numerical values from 1-7 where the respondents have to rate against two bipolar adjectives at

the ends of each scale. For the purpose of the study, the result was analysed within three categories of respondents as shown below:

- a. Comparing by Groups
- b. Comparing by Regions
- c. Comparing by Craft Types

The total score for each category of craft practitioner was taken from the choice of rating scales from the individual responses. If the responses to the rating scales lay at the positive polar i.e. 5, 6, and 7, then this indicated a favourable answer. While rating scales 1, 2 and 3 indicated an unfavourable answer and a rating scale at 4 was considered neutral.



Figure 6.5

Participants examining the questionnaire

6.5.1 Comparing by Groups Analysis

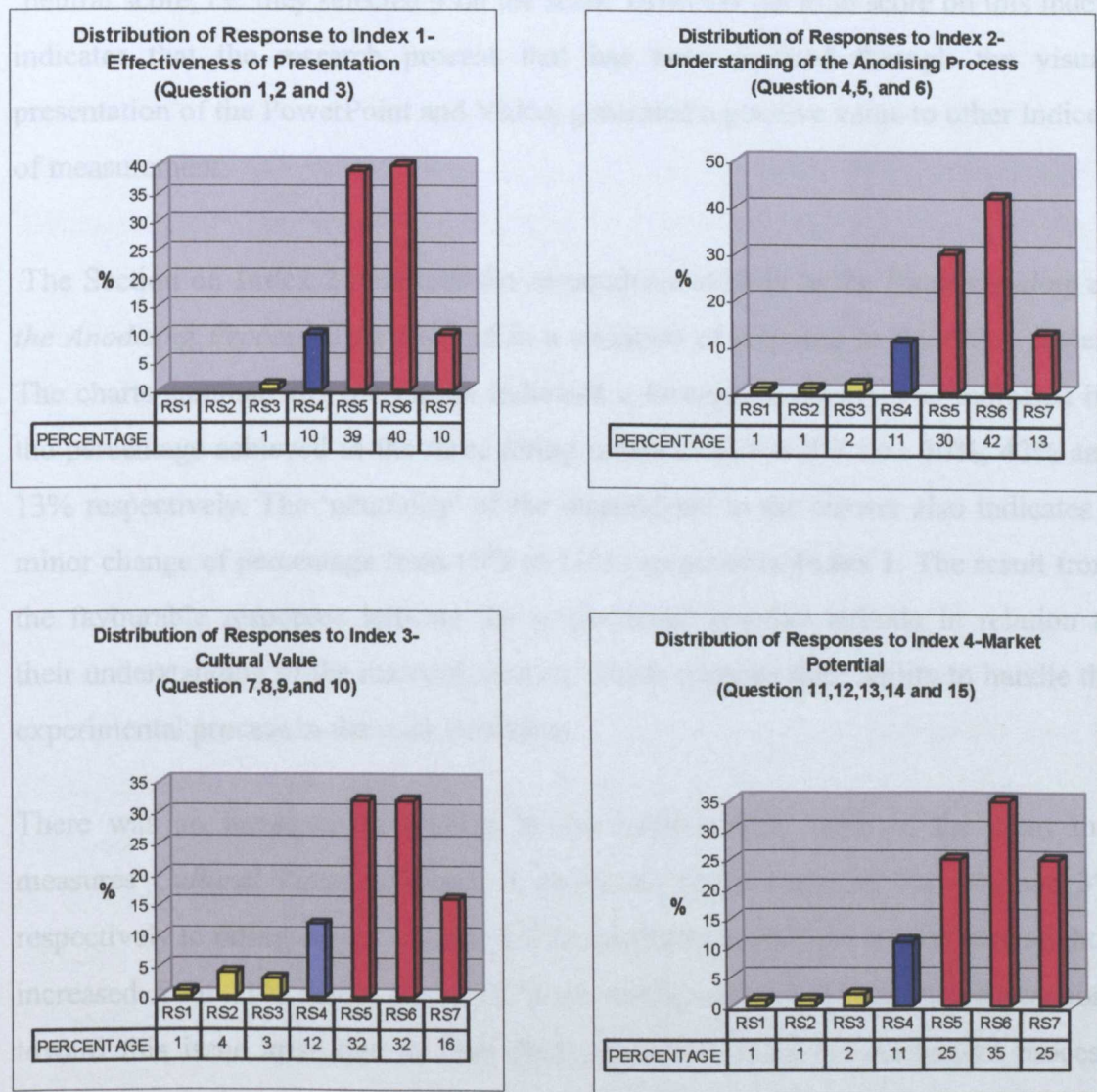
This sections analyses the response to the questionnaire represented by the ‘Designer’ group, where most of the respondents are attached to the MHDC Design Department, based in the capital city of Kuala Lumpur. There were a total of 12 Designers of different craft disciplines participating in answering the questionnaire after the Visual Presentation. The second, group of ‘Educators’ represented academics from various craft backgrounds in the Faculty of Art and Design, Shah Alam, Selangor. There was a total number of 14 respondents representing this group. The final group, ‘Craft Makers’ which had the highest total number of respondents (48) due to the combination of two regions, Terengganu and Kelantan on the East

Coast of Malaysia. Although there was a great contrast to the number of respondents between the other two groups, this did not jeopardise the results because the researcher was interested in determining to which rating pole they belonged i.e: whether it is unfavourable, favourable or neutral.

The results are discussed in terms of the 4 themes Indices (refer to Section 6.4.2), in the questionnaire design as follow (Figure 6.6):

Grand Average Percentage Distribution of Responses to Index 1,2,3 and 4 by Group (Educator, Designer and Craft Maker) from Question 1 to 15.

Figure 6.6



Key:
RS-Rating
Scale

The above bar charts illustrate the Grand Average Percentage result from a Group of Malaysian Craft practice (Educators, Designers and Craft makers). A total number of 72 questionnaires from the respondents were gathered and analysed within their cumulative rating scales within each Index theme and then converted to a percentage to provide their 'Direction of Attitude' toward the research work.

From the bar charts of **Index 1** measuring their attitude toward the *Effectiveness of Presentation* saw a response of 39% and 40% to the rating scales 5 and 6. Although only 10% of the respondents made '7' their choice on the rating scale, all of these scores indicate a favourable response. This suggested that they had a positive level of interest and understanding of the topic presented. 10% of the respondents also gave a 'neutral score, i.e. they selected 4 on the scale. However the total score on this index indicates that the research process that has been planned through the visual presentation of the PowerPoint and Video, generated a positive value to other Indices of measurement.

The Section on **Index 2** measures the respondents attitude to the *Understanding of the Anodising Process*. This resulted in a variation of response to the rating scales. The charts summarising the results indicated a favourable response as indicated by the percentage achieved in the three rating scales of 5, 6 and 7 i.e : 30%, 42% and 13% respectively. The 'neutrality' of the respondents to the answer also indicates a minor change of percentage from 10% to 11% compared to **Index 1**. The result from the favourable responses indicate the respondents' positive attitude in relation to their understanding of the material content, which suggests their ability to handle the experimental process in the craft workshop.

There was an increased percentage in the 'unfavourable' pole of the chart that measures *Cultural Value* in **Index 3**, indicated by the score of 1%, 4% and 3% respectively to rating scales 1, 2 and 3. The neutrality toward the answer also slightly increased from 11% (Index 2) to 12 % on rating scales 4. These mixed reactions toward this issue arise due to their first exposure toward the decorative process. However, the decorative samples have generated favourable results as seen from three scores of 32%, 32% and 16%, on the positive rating scales of 5,6 and 7.

Results from Index 4 measures respondent's attitudes toward *Market Potential*, and indicates a favourable judgement through the score of 25%, 35% and 25% representing rating scales 5,6 and 7. These scores show that the decorative process could provide market opportunities for them to explore.

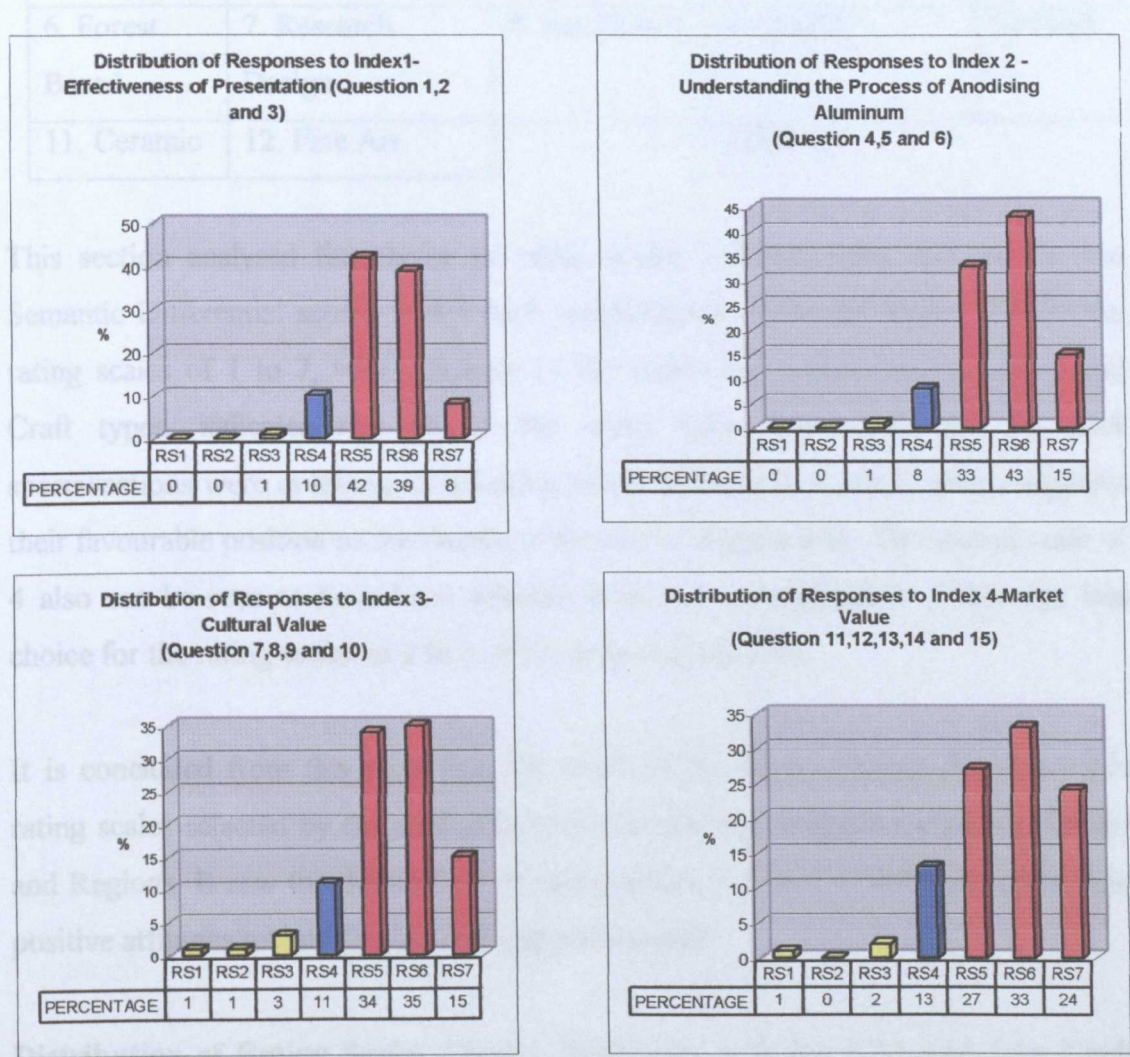
6.5.2 Comparing by Regions

The comparison by Regions (Figure 6.7) analysed the results from the state of Terengganu and Kelantan and the total number of 48 respondents from various disciplines of craft practice such as brassware, silverwork, batik makers, glass etc. Most of them were experienced craftsmen involved in daily craft production.

Initial results from all the **Indices** from this section, shared a similar pattern, which endorsed a favourable attitude toward all Index themes. The greater percentage of responses falls to the rating scales of 5, 6 and 7. An extract from **Index 1** of the illustration chart, depicts responses of 42% and 39% to rating 5 and 6 which reflect their awareness to the importance of the issue presented. **Index 2** seems to express their capability to understand the Anodising process following the visual presentation. It appears that 4% selected a rating of 4, indicating a neutral response to understand the process. The researcher considers this as normal in the learning process due to differences of individual ability to receive information. As these two regions are well aware of the cultural aspect in craft making, 11% of the respondents selected a neutral response to the rating scales 4. The unfavourable attitude option received a 3% response from the rating scale 3 and 1% each for rating scales 1 and 2. But the entire result for **Index 3**, towards the decorative process favourable in terms of its capability to extend Malaysian cultural value, i.e as greater percentage of favourable score 34% and 35% to score 5 and 6 respectively. This is further endorsed by the score of 15% to rating scale 7. **Index 4** saw an endorsement of favourable attitudes toward the potential of the decorative process in terms of its Market Value. Although all scales were utilised, the favourable responses dominate the score with percentages of 27%, 33% and 24% spread across the scales of 5, 6 and 7 respectively. There was also an increase of percentage to the neutral scale as it holds 13%, the highest among neutral scale score compared to Index 1, 2 and 3.

Grand Average Percentage Distribution of Responses to Index 1,2,3 and 4 by Regions (Terengganu and Kelantan) from Question 1 to 15.

Figure 6.7



6.5.3 Comparing by Craft Types

The comparison by Craft Types has identified various types of background specialization for the craft makers involved in the Case studies. These are listed in the table below (Table 6.1):

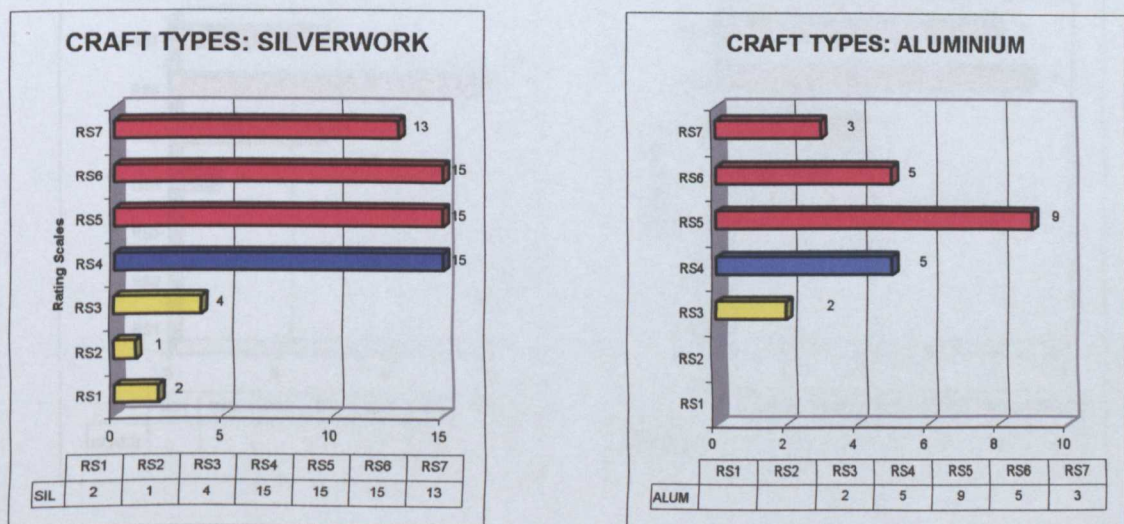
CRAFT TYPES				
1.Silverwork	2. Brassware	3. Aluminium	4. Industrial Design	5. Glass
6. Forest Based	7. Research Design	8. Art History	9. Graphic	10.Batik
11. Ceramic	12. Fine Art	Table 6.1		

This section analysed the choice of rating scales that had been selected for the Semantic Differential scores within each specialisation mentioned above. Within the rating scales of 1 to 7, with reference to the scores for comparison by Group and Craft types, indicates that all of the scales have been used. All the craft specialisations were in favour of selecting rating scales of 5, 6 and 7, which suggests their favourable position to the themes of the Index (**Figure 6.8**). The neutral scale of 4 also can be seen to have been selected from each specialisation. There was less choice for the rating scales of 1 to 3 of the unfavourable pole.

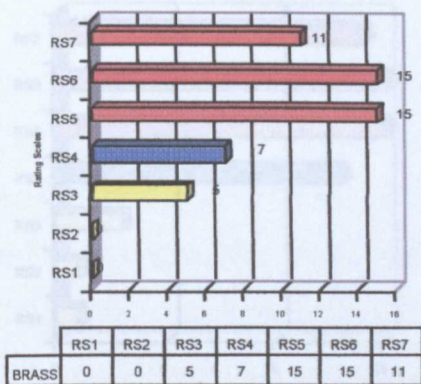
It is concluded from this table that the result of the score matches the favourable rating scales selected by the craft makers in the previous analysis comparing Groups and Regions. It saw the domination of rating scales 5, 6 and 7, which suggests their positive attitudes toward the issues being put forward.

Distribution of Rating Scales Choice- Responses to Index 1,2,3 and 4 by Craft Types from Question 1 to 15

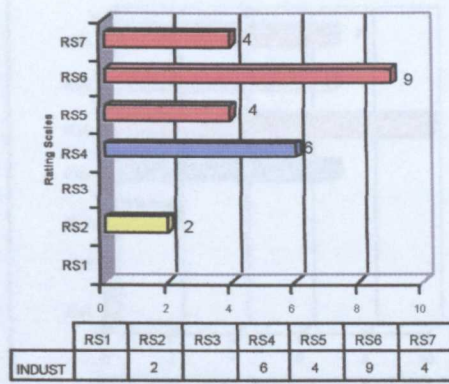
Figure 6.8



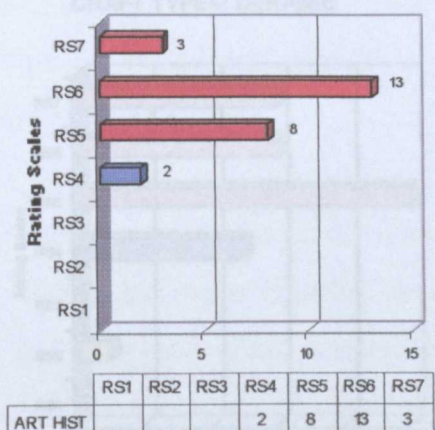
CRAFT TYPES: BRASS



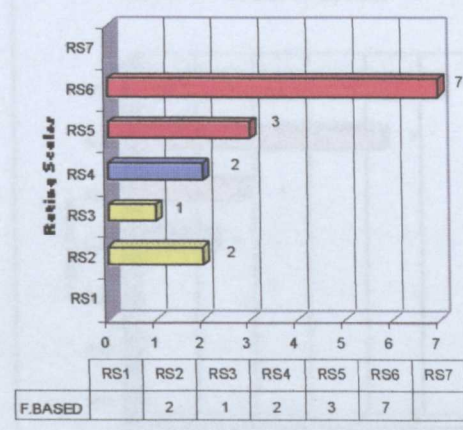
CRAFT TYPES: INDUSTRIAL DESIGN



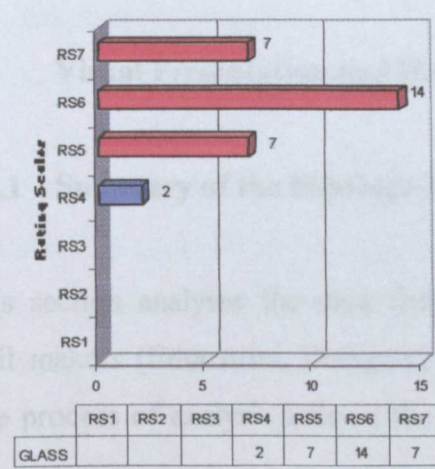
CRAFT TYPES: ART HISTORY



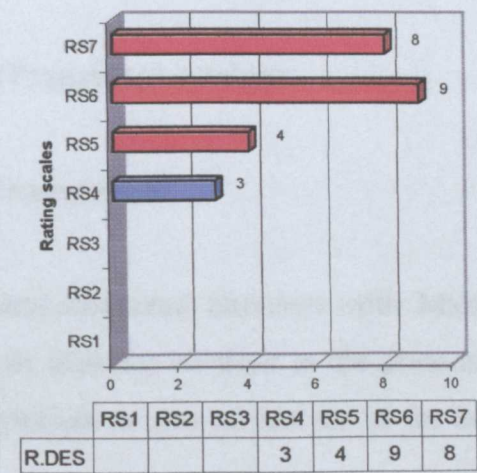
CRAFT TYPES: FOREST BASED

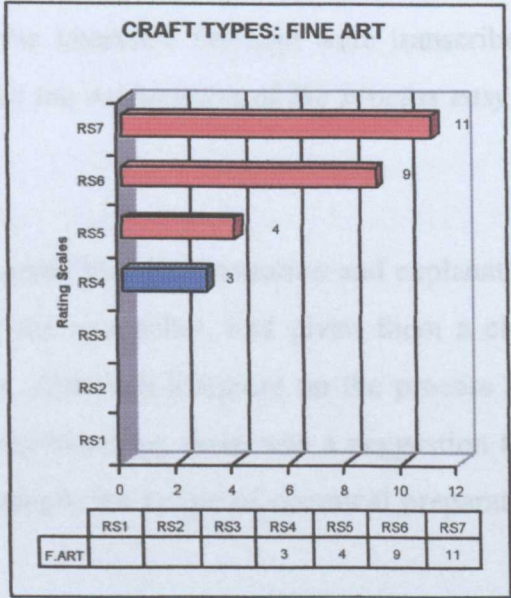
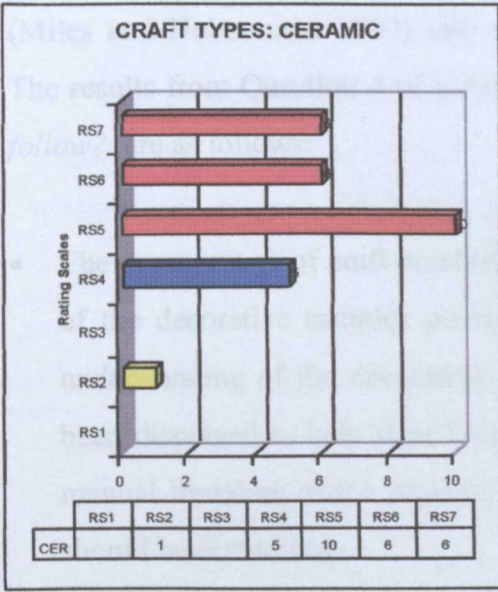
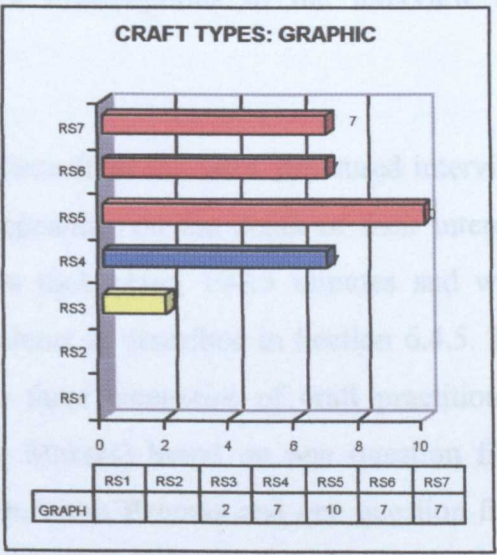
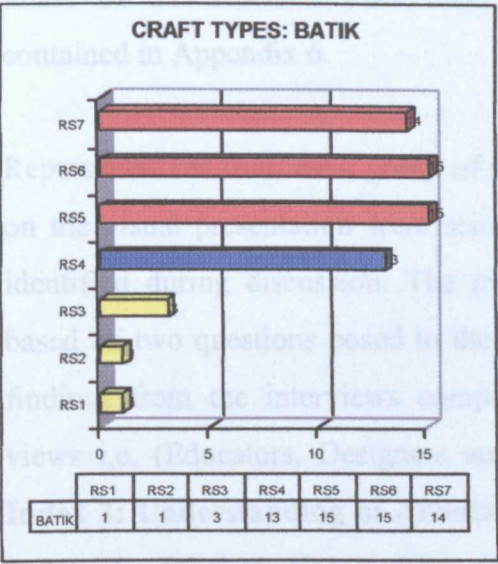


CRAFT TYPES: GLASS



CRAFT TYPES: RESEARCH DESIGN





6.6 Visual Presentation and Hands-on Experience Analysis

6.6.1 Summary of the Findings-Visual Presentation

This section analyses the data from the semi-structured interview with Malaysian craft makers (Educators, Designers and Craft Makers) involved in the presentation. The process of analysis follows the same principle as was carried out in the Second

Phase of this research work. The detailed transcriptions of the interview are contained in Appendix 6.

Representatives from each group of respondents from the semi-structured interview on the visual presentation were selected, depending on the depth of their interest, identified during discussion. The interviews took about 10-15 minutes and were based on two questions posed to the respondents as described in Section 6.4.5. The findings from the interviews compiled the three categories of craft practitioners views i.e. (Educators, Designers and Craft Makers) based on one question from **Index 2: Understanding of Anodised Aluminium Process** and one question from **Index 4: Market Value**. The analysis of the findings was based on their commonality and comparison identified and gathered from the meta-matrices format (Miles and Hubermann 1997) into which the interview findings were transcribed. The results from Question 4 of Index 2, *Was the explanation of the process easy to follow?* are as follows:

- The three groups of craft practitioners agreed that demonstration and explanation of the decorative samples provided by the researcher, had given them a clear understanding of the decorative process. Although literature on the process has been displayed to help their level of understanding, there was a suggestion that manual literature of the process, for example the recipe of chemical preparation should be distributed.
- Respondents said that the explanation of the process had provided new craft knowledge and the opportunity to develop the process in their own craft practice.

Index 4 : Market Value posed **Question 14**, *Does the decorative process offer potential in your area of craft practice?* This question concerned the opportunity for development of the decorative process within the respondent's own craft practice. Similar responses were recorded from the three groups of Malaysian craft practitioners. The findings from the interviews are described below:

- There was a deep interest amongst the respondents to combine the decorative process of anodised aluminium as an additional medium in their own craft designs and products. For example batik makers had some ideas to apply the batik decorative technique on aluminium for gifts and souvenirs. Other areas of craft work such as glass and wood makers saw the potential of the decorative process as an ‘added value’ to their craft.
- In metalwork crafts, aluminium was thought to provide additional opportunity besides brass, silver and pewter for commercial development of craft products. Aluminium also has the potential to serve as a mixed medium material to assist the decorative element of the metal craft industry.
- As the existing crafts business in metalworking survived through a process of family heritage, it was suggested that the decorative process of anodised aluminium should be targeted to the younger generation. This suggestion was also applicable to existing young craft entrepreneurs who wish to diversify their craft making.
- Respondents noted that there are similarities between the process of aluminium decorative application with the batik industry, which suggests the opportunity to combine it with fabric.

The analysis of the hands-on experience findings collected views from representatives of metalwork, batik and wood making crafts. These crafts were selected due to the interest of craft practitioners in their fields in the decorative process, as the majority of them expressed a favourable reaction to the process. Similarly, the MHDC also expressed a favourable reaction, which they communicated to the craft practitioners in a letter of support. Two questions posed for the semi-structured interview concerned aspects of Cultural Value - Index 3:

- Are the colour schemes appropriate to the decoration of traditional artefact?* and
- Are the colour schemes appropriate to the decoration of contemporary artefact?*

Compilation of responses from the interviews reveals a variety of replies to these two questions, which are described below, based on their hands-on experience of the decorative process:

- The decorative application could portray traditional and contemporary types of artefact as a results of its potential to create a surface pattern with the use of single or multiple colours
- Consideration should also focus on the 'form' of craft artefacts in the future production of aluminium craft. The process is not just applicable to 2-Dimensional surfaces, but is also applicable to 3-Dimensional artefacts. A good example suggested was the current production of aluminium household products for local and global markets.
- The Designer should play a role in exploring the colour schemes and patterns and adapt traditional motifs due to the similarities of the decorative application of anodised aluminium with batik making.

Index 4 on *Market Value* also posed two questions to the categories of craft practitioner mentioned earlier. The questions posed are:

Is the decorative process time consuming? And

Does the decorative process offer for use in your area of Malaysian craft practice?

The findings from the interviews related to these questions are listed below:

- The decorative application process was not time consuming when properly implemented. It was also considered economical in terms of aluminium prices in the Malaysian market compared to silver, brass and silver.
- The experience of the craft practitioners with the decorative application process in the workshop, led them to suggest that this is a high volume technique.

- Due to the flexibility of the technique to produce colour a specific time by reference to the log-book provided by the researcher, production can be economically controlled to suit a range of economical price brands.
- As the process has potential to be marketed, the suggestion was that the initial selling price is within RM5-RM10 for gifts and souvenirs, where the priority should be given to the durability and quality of the products. Market testing needs to be carried out with the assistance of the Karyaneka, MHDC marketing agency.

Questionnaires also analysed and summarised the views of participating craft practitioners, through open-ended questions. The question posed was:

What is most interesting about the decorative process?

The results from the compilation of findings for this question are summarised below:

- I consider the decorative process of anodised aluminium as a new technique in the Malaysian craft industry. The evidence from the exploration of the decorative samples has demonstrated a relationship between batik and anodised aluminium because the same colours and types of patination can be created in each case.
- The decorative process is most suited to the development of metal craft work in Malaysia, giving additional diversity to the use of aluminium for craft production, besides the long tradition of use of silver and brass. It was suggested that the Malaysian East Coast regions of Kelantan and Terengganu should be given priority to popularise this decorative technique, as both regions are commercially active in the batik industry.
- The decorative process has market potential, probably initial exploration of anodised aluminium production should concentrate on smaller gifts and souvenirs for the local and global markets.

- It is required to widen the knowledge of this technique to the younger generation, especially in craft education i.e Art and Design Institutions and to young craft entrepreneurs in order to maintain Malaysian cultural heritage.

Besides positive input from the craft practitioners, one respondent expressed a feeling of uneasiness towards their existing craft making especially brass work. His view of this question is that if anodised aluminium decorative application becomes a popular craft in the future, then it will jeopardised the current metalwork industry (brass & silver) that has been long being established. But he also had a positive view that this decorative technique will provide a diversification for craft products.

6.7 Peer Review Analysis of Craft Practice

A Peer Review meeting was conducted after the event of hands-on experience of the anodised aluminium craft workshop (Figure 6.9). The Peer reviews included stakeholders such as the MHDC, ALCOM, SIRIM and UiTM. The meeting has taken place in UiTM on the 5th May 2002, attended by key people from each organisation. (Lomax)



Figure 6.9
Peer Review
Session

In the meeting they were given a visual presentation concerning the nature of the research work related to the decorative application of anodised aluminium. The contents of the visual presentations remained the same as was presented in the case study of craft practitioners. The committee was also presented with the experimental work from the decorative samples of the researcher and of the Malaysian craft practitioners participating in the workshops (Appendix 6).

The representatives were interviewed to determine their recommendations and to ascertain the commercial and educational value of the decorative process to Malaysian craft artefacts and practice. Using semi-structured interviews, two questions were posed from **Index 3: Cultural Value** and finally two questions from **Index 4: Market Value**.

The findings from both Indices led to suggestions and recommendations on the issue that has been posed. These are described below:

- Malaysian traditional elements should be preserved in both approach either as traditional or contemporary types of artefacts.
- The decorative samples produced by the researcher and from the hands-on experience of craft practitioners consist of a workable range of colours that need to be classified as guided materials for designers such as batik makers and designers of the MHDC.
- The decorative process represents a balance of using traditional elements and the right colour schemes. In relation to the production of contemporary types of artefacts with appeal to global craft market trends, it is suggested that the potential of the decorative process to reflect contemporary cultural value is best achieved with the use of a single colours and minimal traditional patterns.
- Aluminium is considered an appropriate material to be adopted for utilisation as a new material in craft products. This would extend its application in architectural and household products. Therefore the potential exists to explore various forms of aluminium usage in craft products with the technical assistance from ALCOM.
- There is a need to do further research with MHDC to explore the diversity of craft products produced by the decorative process of anodised aluminium through craft workshop.

- It is important to determine the standards and quality of the decorative process with SIRIM prior to launching products into the market place.
- A craft manual on the decorative process should be designed to extend the craft knowledge to the Malaysian community especially to the younger generation such as Art and Design students e.g at UiTM, MIA etc. as well MHDC 'incubator schemes'.

6.8 Summary and Conclusion

This chapter has explained and discussed the case studies of Malaysian craft practice comprising Educators, Designers and Craft makers. The respondents were organised for the study with the assistance of the Malaysian Handicraft Development Corporation (MHDC) and the University Teknologi Mara (UiTM). In the study a visual presentation of the anodised aluminium decorative process, derived from the researcher's previous experimental work to provide 'evidence' (Chapter 5), was presented. This was used as the basis to elicit suggestions and recommendations related to the appropriateness and viability of the decorative process to Malaysian craft practice.

Besides the visual presentation, selections of craft practitioners were also exposed to the decorative application technique through craft workshops. This hands-on experience provided an opportunity for the craft practitioners to explore the technique through guided materials that had been developed by the researcher. In order to elicit information on their experience of the presentation, the respondents were required to respond to a questionnaire using Semantic Differential scores. Seven rating scales were used designed with bipolar adjectives on each end of the scales. This measured their attitude towards the range of questions, which determined their receptivity to the decorative process of anodised aluminium. Semi-structured interviews were also conducted with representatives of the respondents from each group of craft practitioners, to elaborate responses to the questions in the Semantic Differential score questionnaire. The question was then analysed within the themes Index forwarded in the interview (Section 6.6).

Semi-structured interviews were also conducted with related organisations representing stakeholders to the Malaysian crafts community in the Peer Review session. Results of both interviews form the findings of the case study of craft practice, which were identified using a Meta-matrices format from the data transcribed from the interviews.

The findings of this chapter form the guidelines and future recommendations described in Chapter 7, to enable the researcher to proceed in extending the decorative process to the Malaysian community. This also correlates these findings with the previous Phases of this study.

CHAPTER 7

GENERAL CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

The main purpose of this final chapter is to summarise the findings of the research and to provide recommendations for future research.

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CHAPTER SEVEN: GENERAL CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

The main purpose of this final chapter is to summarise and draw conclusions from the findings of the research. As well as this, some guidelines and recommendations arising from this study and possible future research suggestions are made. The contribution of knowledge of this research was also explained. These themes are discussed in Section 7.1, Section 7.2, Section 7.3, Section 7.4 and Section 7.5.

CHAPTER SEVEN

GENERAL CONCLUSIONS, RECOMMENDATIONS AND FUTURE RESEARCH

7.1 Introduction

The principal objective of this study was to provide ‘evidence’ on the appropriateness and applicability of developing an integrated process of batik and anodised aluminium, with the anticipation that it would offer decorative opportunities to Malay contemporary craft practice. This objective has been the focus of the researcher since he recognised that the process of batik and anodised aluminium shared similarities in terms of using dyes for decorative application. The craft of batik making is considered a ‘national symbol’ to Malaysia as it is extensively popular to local and global tourists for daily use or for gifts and souvenir product. The production of batik makes a major contribution to the Malaysian craft economy, while anodised aluminium constitutes a significant role in the industrial sector i.e. for architectural and household applications. Currently, the abundant source of materials for batik and aluminium has not been tapped for use in craft making as the two industries exist in different spheres of professional practice.

Research to generate ‘evidence’ on the appropriateness of the integrated process for Malaysian craft practice was conducted in three phases: a literature search and review, a survey and qualitative interviews (Section 1.6.1, 1.6.2 and 1.6.3), an experimental process (Section 1.6.4) and case studies of craft practice (Section 1.6.5). The study utilised an experimental, practice-led methodology based on a combination of Action Research and case studies with Malaysian craft practitioners and peer reviews of findings with stakeholders representing their organisations. This methodology was developed to determine the receptivity of the stakeholders to the findings of the integrated process. The literature search and review aimed to identify the historical and contemporary practices of the decorative application of batik and anodised aluminium. This encompassed their geographical distribution, the industrial and socio-economic context of resources and their usage. It was intended that this

review would form a basis for the literature critique and to facilitate in the construction of questionnaire.

A survey of Malaysian craft practice, which focuses on the material evidence of craft artefacts, was conducted at the MDHC showrooms. This has allowed the comparison of data derived from the compilation and categorization of both primary and secondary sources, concerning those craft artefacts with applied surface decoration. Initial case studies involved qualitative semi-structured interviews with people connected to craft practice, which utilised the concept of Business Process Analysis (BPA). The data was analysed using a meta-matrices format based on their commonality and comparative review. This process identified areas of craft practice that lend themselves to experimentation with surface decoration. The process also provided the potential range of collaborators for the experimental case studies.

Experiments were conducted on the application of batik reactive dyes as the colourant for anodising aluminium and in relation to a possible method of creating surface patterns. The aim of the experiments was to produce a methodology, applicable to the decorative process of anodising aluminium, which can be communicated from practitioner to practitioner and which employs a vocabulary that craft practitioners can understand. Evidence from the experiments was used to create reference materials for case studies of craft practice on the application of the integrated process.

The case studies involved presentations on the integrated process, which were given to the selected range of craft practitioners that agreed to take part. Semantic Differential scores were used to gauge their attitude and understanding to the process, their perception of its cultural value and market potential. The case studies then involved the craft practitioners in hands-on experience of the integrated process with reference to the guided materials derived from the earlier experiments. Semi-structured interviews were then conducted based on the questions posed in the Semantic Differential score questionnaire. This data revealed the general appreciation and recommendations of craft practitioners to the process.

A peer review meeting with the case study collaborators was conducted to determine their final recommendations and to ascertain the commercial and educational value of the decorative process to Malaysia craft artefact and practices. Through the correlation of the case studies, the literature search and survey, conclusions have been drawn concerning the appropriateness of the integrated craft practice as a translator of Malay craft aesthetic cultural value.

7.2 Summary of Research Findings

Much of the literature search and review (Phase 1) [See Chapter 2], that was carried out concerned the nature of craft practice of batik and aluminium resources in Malaysia. The value of craft to the Malaysian society is very important, as it is part of the legacy that contributes to the country's cultural heritage. Craft is also considered of economic importance to the country, an example being batik making which provides a lucrative revenue to its makers. With the intervention government agencies such as the Malaysian Handicraft Development Corporation, Karyaneka and Infokraf Malaysia, the craft industry that originated from a cottage industry has become a priority in the provision of commercial value. Training centres have been set-up by the MHDC, which provide craft training, and have encouraged the younger generation to develop their own craft interests. This initiative was taken to avoid the future shortage of manpower and to give a long life to certain areas of craft practice that would otherwise diminish, it has also helped to transformed to others areas.

The concept of transferring craft knowledge from family members has from the early years, enabled crafts like batik to survive until the present day. Batik's historical background was first developed on the East Coast of Malaysia, and this provides a reference to other craft practices in term of its decorative application. In metalwork, craft products made from brass, silver, gold and pewter are well known to both local and international tourists. Pewter has its own history originating from the encouragement of cultural migrants by the ruler of the country at that time. Silver crafts were nurtured by royal patronage with intricate decorative motifs, and are considered to be special souvenir items for guests during the reign of the Sultans. Brassware like batik, draws its influence from the Dong Son culture of Vietnam. It

has inherited the technology and decorative application of an industry, which has managed to survive and develop this craft activity across the Malaysian East Coast.

The availability of natural resources in Malaysia has provided a variety of craft products for the market for example; those made from rattan, wood, 'pandanus' etc. Minerals such as bauxite, which is used to produce aluminium, has encouraged the development of the Aluminium industry in Malaysia. Aluminium is often used in industrial applications for use in architectural building and household products. This industry, which is centred in the capital city of Kuala Lumpur, is involved in the production of sheet, aluminium extrusion, coil etc. The technology of 'anodised aluminium' has been used as a protective coating in the form of its natural colour aluminium or another decorative colour. Decoration applied in architectural interiors, concerned mostly aluminium extrusion with a limited range of production of anodised colours such as black, brown and gold. Anodised aluminium is also used in engineering components. The pioneer Aluminium Company of Malaysia, ALCOM generated the industry and has inspired other companies to mushroom, thus benefitting the aluminium industry.

A survey conducted at 'Karyaneka', the marketing arm of MHDC and at 'Infokraf' Malaysia has produced a compilation of current artefacts. These denote the variety of craft products made from different types of materials from all over the country. In the survey, it was found that the creative use of materials still needs to be explored. There is a tendency for experimentation by the craft practitioners identified in the study using a combination of materials, for example; the elements of batik with ceramic. In metalwork the combination of brass with weaving was also found. The techniques of craft making, still possess traditional methods of production for example, in brassware, the traditional method of using padi husk for casting. Currently, technology researched by SIRIM employs silica as the casting method. Decorative application using floral elements is the major theme used in surface decoration of craft works. This can be seen in the production of batik, the leading craft items that currently capture the market. This has been proved through the sales figure generated by 'Karyaneka'(1999). Some of the decoration applied was used as a means to reflect the craft identity of certain regions, for example the use of the kite

motif that represent traditional kite making on the East Coast of Malaysia. The use of the kite was not only portrayed in craft works but also symbolised the aviation industry particularly referred to by the Malaysian Airline System (MAS). The richness of batik, which was traditionally found in fabric, has currently appeared in other craft materials such as bamboo, coconut shell, wood and ceramic. It is concluded that these materials cannot sustain an aesthetic impact by themselves but have to be decorated with other means, materials or technique.

In summary the literature search and review supplied the researcher with a basis for research questions and provided vital background information related to batik and anodised aluminium. Information for these areas was identified and utilised in the design of the initial case study of qualitative interview questionnaire at the end of this phase.

Qualitative interviews with craft practitioners have provided a 'real world' interaction in gaining collective information on the nature of their craft practice. These interviews established which craft practitioners were concerned with surface decoration and determined the willingness of crafts people to act as collaborators in the succeeding experimental case studies. These involved craft practitioners representing Educators, Designers and Craft Makers who have notable experience and performance within their area of craft specialization. Fourteen open-ended questions were posed to the respondents during semi-structured interviews and were then analysed using the four factors of (Purpose, Process and Performance, Company Culture and People). Data from the interviews was transcribed and transferred into meta-matrices, which helped the researcher to filter information from the three categories of respondents based on aspects of their commonality and comparative views. Interpretation of the results gained from their view, based on the four factors mentioned earlier which are described below:

The First factor ***Purpose***, which traced the nature of the craft practitioner's background, specialization and their current craft activities, discovered that:

1. They possess their craft educational background through professional training in higher institutions at local universities or overseas. They also have attended short courses at craft training centres and inherited craft knowledge from their families members.
2. They used their craft knowledge and skill to design and make craft products.
3. They are committed to craft production on a full-time and part time basis i.e full-time for craft makers, and part-time for designers and educators.
4. They maintain their craft activities through local commissions from individuals, private and government sectors except in the batik industry where there is great demand from overseas orders and the tourist market.

The Second factor ***Process and Performance*** collected craft practitioners' views on the critical issues of their craft activities, and their experience as craft makers, designers or educators. These factors also determined their views about the nature of design and production of crafts. Their view on the use of new materials, particularly aluminium provided information about their awareness of its contribution to global industry and as a potential craft medium. A list of findings in relation to these factors is set out below:

1. They have their own craft workshops, which either come from their own funding sources or from loans or special grants from the government.
2. They operate at different levels of craft production, which depends on the nature of their craft making i.e: batch production or 'one-off' production.
3. They take the opportunity to utilize the natural resources of the country as craft materials. The only exception to this is textiles i.e. batik which has to import fabric.

4. They preserve and employ surface decoration applications based in their craft making, contemporary and traditional motifs such as geometrical patterns and floral elements.
5. They are aware of the aluminium industry's contribution to architectural applications and household products but are not aware of its potential as a craft material.

The Third factor ***Company Culture*** determined the craft practitioner's association with their craft specialization and their role in craft production. The key finding for this factor is listed below:

1. Craft practitioners have their own way of delegating work in the craft making process, which depends on the nature of the craft being produced and the responsibilities of craft makers in the organisation.

The Final factor '***People***' summarized the views on their type of organization, of individual craft workers in delivering their contribution to Malaysian craft practice. The summary of the findings for this factor are listed below:

1. They adopt a team-based type of organisation in craft making and generally have an open type of management that involves designs, sales, marketing and production.
2. They feel a sense of satisfaction in meeting customer needs when dealing with the craft production process.

The **Phase 1** data collection process, which comprised of the literature search and review, crafts survey and qualitative interviewing showed that the Malaysian craft artefacts produced, are generally decorative in nature. The artefacts maintain a strong hold on Malaysian traditional elements that come from different sources. These elements were found to be images that are developed from practitioner observations, experiences as well as cultural awareness and cultural belief. The decorative artefacts

produced display various styles of decoration including geometric form, plants, animal species or a combination of those. In the craft production process, the majority of the Malaysian craft makers are aware of customer needs. These finding provide a significant implication to the researcher's evidence for the introduction of new materials and processes to the Malaysian craft community.

The **Phase 2**, experimental process was conducted in the 3D workshop, School of Design, University of Northumbria at Newcastle. The outcome was a compendium of the Experimental Process and results concerning the interaction of batik dyes and aluminium anodising through two experiments using the basic sulphuric acid process of anodised aluminium. *Experiment 1*, demonstrated the capability of batik reactive dyes to be absorbed to the surface of anodised aluminium. The experiments with the use of batik dyes shows that eight colours were successfully integrated with aluminium. Only one colour failed the test (**Golden Yellow GL**) due to its oily composition of the dye, which resist the colour penetration. The anodising process produced different variations of single-colours, based on the time of immersion of the anodised coupon. *Experiment 2*, demonstrated the ability of the integrated process to be used as a decorative applicator to the surface of aluminium. Multi-colour decorative applications were achieved using different media such as fast drying paint, brushes, markers etc. This has generated decorative effects with the combination of multi-layers of colour applied to the surface of anodised aluminium (See **Appendix 5**). The use of a hand engraving technique as a means to outline the decorative pattern proved to be practical and effective as it highlighted the base aluminium. This technique was also found to have a significant relationship to the hand-painted drawing of Batik illustration. However, both experiments showed the potential of using the sulphuric anodising process and the interaction of batik dyes on aluminium series 1000, to produce decorative effects for craft practice.

Phase 3 summarized the findings from the participation of Malaysian craft practitioners (Educators, Designers and Craft Makers from various disciplines of craft practice) in the visual presentation and Hands-on experience workshop to test the application of the integrated batik and anodised aluminium process. The findings were then presented to a Peer Review audience of craft practitioners representing

stakeholders from MHDC, UiTM, SIRIM and ALCOM. The Semantic Differential score questionnaire posed to the craft practitioners in the visual presentation showed a favourable response to all the theme indices: *Effectiveness of Presentation*, *Understanding the process of Anodising Process*, *Cultural value and Market potential* (See Section 6.5.1). The summary of the findings was then taken through three comparison categories of respondents including; comparing by groups, comparing by regions and comparing by craft types. From the themes **Index 1: Effectiveness of Presentation**, the craft practitioners had a positive level of interest and understanding of the topic presented. Themes **Index 2: Understanding the Process of Anodising Aluminium**, the majority of them indicated a positive attitude in relation to their understanding of the contents. They have confidence in handling the experimental process in the craft workshop. From **Index 3: Cultural Value**, the majority of the respondents believed that the decorative application of anodised aluminium could enhance the cultural value of craft design from both traditional and contemporary approaches. **Index 4: Market Potential**, the craft practitioners also believed that the capability of the decorative process could provide market opportunities for them to explore.

In the semi-structured interviews with selected craft practitioners their views were summarized according to two indices being posed; **Index 2: Understanding of the Anodised Process** and **Index 4: Market Value**. The natures of responses to these themes have some similarities to those from the Semantic Differential scores (Section 6.6.1). The finding from Question 4 of **Index 2: Was the explanation of the process easy to follow?**, shows:

1. They believed that the demonstration and explanation of the decorative samples provided by the researcher had given them a clear understanding of the decorative process. Although the literature on the process had been displayed to help in their level of understanding, there was a suggestion that printed literature of the process, for example the recipe of chemical preparation should be distributed.

2. They felt that the explanation of the process had provided new craft knowledge and the opportunity to develop their own craft practice.

The finding from Question 14 of **Index 4: *Does the decorative process offer potential in your area of craft practice?*** has summarized the views from the respondents in the findings listed below:

1. They have a deep interest to combine the decorative process of anodised aluminium as an additional medium in their own craft designs and products. In batik making, they had some ideas to apply the decorative technique on aluminium for gifts and souvenirs. Other areas of craftwork such as glass and wood-workers saw the potential of the decorative process as an 'added value' to their craft.
2. They also thought that aluminium could provide additional opportunity especially in metalwork, for commercial development of craft products besides brass, silver and pewter. Aluminium was also considered as a mixed medium to assist the decorative element of the metalwork industry.
3. They suggested that the decorative process of anodised aluminium should be targeted to the younger generation as some existing craft businesses in metalworking have survived through the process of family heritage. This suggestion has also thought to be applicable to existing young craft entrepreneurs who wish to diversify their craft making.
4. They were aware from the craft workshop that the decorative application of anodised aluminium has some similarities with the batik industry which suggests the opportunity to combine it with fabric for example aluminium jewellery to be worn with batik scarves.

From their hands-on experience of the anodised aluminium decorative application workshop, the selected respondents expressed their views on the questions posed to them in relation to the theme indices in the Semantic Differential Score

questionnaire. The summary of the findings has gathered the views from representatives of metalwork, batik and wood making crafts. These crafts were selected due to the interest of craft practitioners in their fields of decorative process as the majority of them expressed their favourable reaction. Similarly, the MHDC also expressed a favourable reaction, which they communicated to craft practitioners in a letter of support. From the views of craft practitioners selected, the questions posed reveal findings based on two indices, Index 3: ***Cultural value*** and Index 4: ***Market value*** (See Section 6.6.1). These findings listed below were based on their response to Index 3: ***Cultural Value***:

1. They agreed from their experience of the anodised decorative application workshop, that this technique could portray traditional and contemporary types of artefact that have a potential to create surface patterns using single or multiple colours.
2. They suggest that the future production of aluminium crafts is not only applicable to 2-Dimensional surfaces, as presented by the Researcher, but also 3-Dimensional artefacts. The 3-D ‘forms’ they suggested for consideration were articles currently produced by the aluminium industry i.e household products for the global market place.
3. They prefer that the Craft Designer becomes the role model in exploring colour schemes and patterns and that traditional motifs are adopted due to the similarities of the decorative application of anodised aluminium with batik making.

The findings listed below were derived from craft practitioners responses to Index 4: ***Market Value*** concerning their views about the potential of anodised aluminium decorative application to impact on their craft practice:

1. They felt that if properly implemented the production technique was not time consuming. It was also considered economical in terms of the cost of

the material because aluminium is much cheaper compared to existing metal crafts made from brass, silver or copper in the Malaysian market.

2. They suggested that their experience of the workshop prompted them to suggest that the production process is most suited as a high volume method for commercial purposes.
3. They appreciated the flexibility of the technique, which can control colour and provide economical production to suit a range of price brands.
4. They also suggested that the selling price for newly launched aluminium crafts should be within the range of RM5 to RM10 for gifts and souvenirs, where the priority should be given to the durability and quality of the products. They also suggested that market testing should be carried out with the assistance of the *Karyaneka*, MHDC marketing agency.

One open-ended question was posed to determine the attitudes of the craft practitioners to the value of the integrated decorative process. The findings from their responses was based on their experience of the anodised decorative application craft workshop, show that:

1. They consider the decorative process of anodised aluminium as a new technique in the Malaysian craft industry. They recognised this during the explanation of the decorative samples by the researcher. The evidence of samples was acknowledged as proof of the successful relationship between batik and anodised aluminium.
2. They acknowledge that the decorative process offers diversity to Malaysian craft products alongside the traditional use of brass and silver. They also suggested that the Malaysian East Coast of Kelantan and Terengganu is an appropriate region to establish the commercialisation of the decorative technique, as both regions are active in the batik industry.

3. They were confident that the decorative process has market potential for making crafted gifts and souvenirs, exploiting the craft product in local and global markets.
4. They suggested that the decorative process has a knowledge value, which should be shared with the younger generation i.e. through Art & Design institutions and young craft entrepreneurs to extend the Malaysian cultural heritage.
5. They also felt that the decorative process could challenge the craft of silver and brass making in the future.

The findings from **Phase Three** summarise the Peer Review of stakeholders representing the Malaysian craft community. A similar approach was adopted, using semi-structured interviews based on a questionnaire (Lomax 1996). The two indices from the questionnaire were again Index 3: ***Cultural Value*** and Index 4: ***Market Value***. Two questions were used in each index to determine recommendations concerning the commercial and educational values of the decorative process to Malaysian craft artefacts and practice. The findings from the stakeholders are described below:

1. They suggested that Malaysian traditional elements should be preserved in both approach either as traditional or contemporary types of artefact.
2. They considered that the guided materials of the decorative process used in the craft workshop will be a useful reference in designing e.g. for designers of the MHDC and for craft making such as for batik makers.
3. They suggested that as the decorative process has potential for using traditional elements to produce contemporary artefacts; reference to global markets trends is crucial. They also suggested that it is appropriate to use single colour and minimise pattern to reflect contemporary cultural values.

4. They considered aluminium as an appropriate material for future use in craft making. This could extend its existing application beyond architectural and household products. Therefore it has the potential to be applied to other forms of craft product with the assistance from ALCOM.
5. They also felt that there is a need for the MHDC to sponsor further research to explore the diversity of craft products produced by the decorative process of anodised aluminium through proper layout of craft production units.
6. They viewed it important to determine the quality of the decorative process with SIRIM prior to launching products.
7. They suggested that the craft knowledge of this decorative process of anodised aluminium should be extended to the younger generation of the Malaysian community especially to Art & Design students e.g at UiTM, KCLA, MIA etc as well as MHDC craft incubator schemes.

The results of the correlation representing each of these three phases (Phase 1, Phase 2 and Phase 3) forms a valuable framework in order to derive recommendations for the Malay craft industry concerning the applicability of the integrated batik surface decoration and anodised aluminium method.

7.3 Guidelines and Recommendations

The purpose of this section is to review the evidence from the findings that have been developed in the thesis. The outcome is the derivation of guidelines in relation to the research design, with recommendations and suggestions for areas of future research.

The initial phase of the research work including the literature search and review and the survey of craft artefacts in the MHDC showroom, '*Karyaneka*' and '*Infokraf*' in Malaysia, showed that the Malaysian crafts are extrinsically decorative in nature. The type of decoration applied to the artefacts varies according to the type of material use

e.g: batik uses the technique of hand-drawn, silkscreen and stamping to produce surface pattern. In metalwork like silver, the hand engraving technique of repousse is commonly used to build intricate floral patterns. The richness of decorative patterns can be found on the Malaysian East Coast through craft industries such as batik, weaving, brassware and silver work. The region of Kelantan and Terengganu are well known for their batik and metalwork industries not only to the local people but to international tourists.

The nature of batik making consumes dyes, which are imported from Switzerland, Germany and India. The dyes, which are well known as reactive dyes provide an extensive range of colours and hues for batik production. Similarly, in the industrial application of aluminium, the metallic qualities can be enhanced and coloured using the technology of anodising and this is currently used for architectural applications and other engineering components. The finding from Phase 2 of the Experimental Process (Chapter 5), has proved that batik reactive dyes can be integrated with the process of anodised aluminium to provide decorative patterns. The decorative samples produced by the researcher during Phase 2 consisted of a limited number of examples that refer to aspects of interior product decoration. Given the findings of Phase 1 and 2, there is a mandate for the Designer of the MHDC to explore the opportunity of colour variations afforded by anodised aluminium using batik dyes, creating surface patterns that can be applied to both traditional and contemporary types of craft artefacts. This research has recorded the exploration of surface patterns and colour in order to provide a basic reference for their utilisation by craft makers. This will help them to build the knowledge in standardising the appropriate usage of colour, surface pattern etc. required during craft production (**Section 7.2, Chapter 7**). Press (1995) reported on behalf of the U.K Design Council that:

“...not only must designers have the best knowledge of what the market wants, but the better they are informed about the materials and manufacturing capabilities of their business, on what is available to their business and what is available for the future of their business then the better will be their designs”.

This stresses how important technical information is on craft production for the craft designer. Press also said:

“...transferring the design into production and manufacturing requires a high level of understanding and co-operation among all design and production function” (Press, 1995).

Ibrahim cited Pilditch’s views concerning the criteria of a designer, that a good industrial designer is one who is technically minded and is practical and imaginative, and stands somewhere between the factory and the consumer. He also adds industrial designers should have extensive knowledge of the four ‘M’s’-***Materials, Machinery and Methods of Manufacture***. The researcher believes that the criteria mentioned are also applicable to craft designers in various disciplines of the craft knowledge process, designers not only produce attractive craft design but also select materials and enable economically viable production. The example collaborative design reported by Yair, Press and Tonnes (2001) on “Crafting Competitive Advantage: Crafts Knowledge as a Strategic Resource” shows examples of how a Pewter Company’s alliances with craft-based designers has led to a successful innovation in product development due to the integration of knowledge between both parties.

The peer review comments of the stakeholders from educators showed that the integrated decorative process has the potential to be used in present art & design curricula. It was thought that the guided materials of anodised aluminium decorative application developed in Chapter 5 would be feasible to use by students for practical projects involving the use of aluminium. The guided material for the technique is novel not only to local but also to global communities of craft practitioners. This can be seen from expressions of interest individual posted to the website of Metal finishing.com Anodise Forum. For example, one posted by Stef Verro on February 14, 1998 asked:

“I would like to know how to perform a complete anodisation starting from the cleaning to the seal coating on aluminium 6061 and 7005.”

Another example of global interest in anodised aluminium is by Jack Flynn at jflynn@tinet.ie posted to the website of finishing.com on the **October 20, 1997** (reference: letter no.1315). He posed two questions related to colour anodising and plating of metals. His questions are listed below:

1. *“Could anyone tell me where I might find literature to educate myself on the process above?”*
2. *“What equipment is needed to do a DIY non-commercial hobby set-up?”*

These examples indicate that the literature of the guided materials on anodised aluminium decorative application should be designed for reference in the simplest way so that the layman can understand it. These guided materials have been tested in Action Research case studies of craft workshops with Malay craft practitioners (See Chapter 5) and resulted in the craft practitioners being able to produce decorative samples of anodised aluminium of their own.

The suggestion by one of the MHDC Designers in the case study (See Chapter 6), was that the designer’s responsibility in craft making, should not only focus on the design but also design research and marketing. Press has remarked about this relationship:

“ Marketing and design interlink in many more aspects of an organisation’s business. In understanding the market, in translating that understanding into innovative products, in testing and refining those products, launching, promoting and distributing them, the skills of marketers and designers are needed. In order to work effectively, these two functions need to understand and respect each other’s role and skills, communicate frequently and develop understanding of corporate goals and the customer ” (Press 1995)

In relation to the statement above, the findings from the case study of craft practice, suggest that anodised aluminium has market potential based on the decorative

samples and the positive comments from the craft practitioners' experience of the technique in the craft workshops. Here, it is suggested that the MHDC Designers should play the role of researchers identifying potential product diversification of aluminium craft products. The researcher recommends that these Designers should refer to batik crafts as the integrated process which shares some similarities in surface pattern. It is suggested that this relationship will lead to guidelines in designing and encourage meaningful discussion with the marketing agency, '*Karyaneka*' in creating new craft products, which are representational of Malaysian cultural values.

7.4 Contribution to Knowledge

The research process concerning the investigation of anodised aluminium decorative application as a technique for Malay contemporary craft practice within the Malaysian context, enabled the researcher to develop a body of knowledge and experience and contribute this to the craft community from which the research findings were gathered (Section 7.2). The research has enriched the methodological approach that has been applied through the utilisation of an experimental, practice-led methodology, which combined Action research and case study methods as a mode of inquiry. Although the term practice based research has been established in the U.K. in the 80's, it is now beginning to emerge and be utilised by scholars in Malaysian Art & Design higher education institution.

The distinctiveness and novelty of the research is more about reinvention of the existing Malaysian traditional craft industries rather than innovation of their materials and processes per se! It has contributed an historical precedent for the craft industries gained from the participation of the craft community in the research process. The precedent demonstrates the feasibility of using an integrated process of batik and anodised aluminium to produce artefacts that the researcher considers a pioneering collection sample of Malaysian craft metalwork surface decoration. The value of the contribution of knowledge from the research process can be seen from the summary points described below:

- The research has gone through a systematic process for the introduction of a new integrated craft making process related to the culture of Malaysian craft practice. This has been provided through the initial evidence from the literature review, a crafts survey and case study interviews. This evidence illustrated the justification of the research work concerning its benefit to the nature of future Malaysian craft practice.
- The integration of batik and anodised aluminium is a vernacular process with significance for Malaysian craft practice. The participation of craft practitioners in the case study of craft practice, meant that they have experienced the feasibility of the decorative application technique through the integrated process. Their skill and experience of decorative techniques in various specializations such as batik, silverware, brassware, wood-making etc. has resulted a new dimension of decorative method based on their experimentation with the integrated process. Their first use of the integrated process produced various Malaysian traditional elements that can be seen in batik making. Besides experiencing the decorative method, the craft practitioners were also exposed to the term 'recycling', which refer to the reuse of aluminium material for decorative purpose.
- The Experimental process conducted, which successfully integrated batik dyes with anodised aluminium, was not in itself novel. The novelty is more about the acculturation of this process within Malaysian craft practice circles through their ability to experience the integrated process with the assistance of guided materials, produced by the researcher.
- The findings of the research raises the opportunity for further broader research, experimenting with the concept of introducing other new materials and decorative methods to other craft culture as well. The adoption of this concept will enhance the term practice based methodology within the field of Art and Design particularly in its use in Malaysian craft practices and art and design academia.

- The successful use of aluminium, a material well known for its application in Malaysian architecture and household products, could now generate a new extension in the craft making industries, as the research process has enabled the method for testing the receptivity of a refined integrated batik and anodised aluminium decorative method to be planned, undertaken, evaluated and review and disseminated.

The research programmes has established a platform within the field that has been carried out with the assistance of Malaysian craft practitioners, particularly with the help from the MHDC. Future project with this organisation will probably focus the issues related to product diversification, production implementation, quality and marketing.

7.5 Suggestions for Further Research

The outcome of this research process has produced valuable findings from the fusion of Action Research and practice-led experimentation to achieve the research objectives concerning the investigation of anodised decorative application as a technique for Malay contemporary craft practice. Action Research as mention by Swann (1999) requires the research process to be made visible. It demands public accountability and visible self-evaluation, an issue that is assuming increasing importance for current professional practice. Young (1999) cited view Frayling (1994) and Arher (1995) on action research as a systematic investigation through practical action calculated to devise or test new information, ideas, forms or procedures and to produce communicable knowledge. The research was successful in meeting the objectives set out in the original proposal. The researcher considers that the development of new practical craft design and making knowledge in the sphere of Art and Design practice can only be done by explorative or experimental work based upon a practice-led methodology to provide appropriate 'evidence' for study. The sharing of the 'evidence' from the interaction with the craft community has proved the usefulness of this present study and its future potential to contribute to the development of the Malaysian craft industry. It represents a significant contribution

in design research process knowledge, which offers the potential for the investigation of other new materials and processes on behalf of the Malaysian craft industry.

The present study has established an effective interface with the handicraft agency MHDC, which the researcher has to maintain in order to further this line of research work. Following the positive responses from Malaysian craft practitioners regarding the potential of the integrated process of anodised aluminium decorative application to offer a new decorative process in Malaysian craft practice, it is hoped that further support from the MHDC, UiTM, ALCOM and SIRIM, will lead to a pilot study on product development to be established. The focus of such further research would be to provide variations of decorative application technique that are viable, economical and have the necessary qualities for commercialisation.

In the present study the researcher focused on aluminium series 1000 for the experimental process, which proved that it could be used to create surface pattern through anodising. There is an abundance of other grades of sheet aluminium available in the Malaysian market, which could be explored for decorative purposes. Silver, Brass and Pewter used casting methods as part of its craft production. Similar approaches could be utilised with aluminium, as an industrial application has used this production technique in producing aluminium extrusions for architectural applications. Future Aluminium craft production could be achieved from two sources, firstly from individuals who produce craft as a hobby and secondly from individuals who engage with high volume production. The present study, has demonstrated the viability of the anodising process for small-batch production. To enable the full commercialisation of the integrated process of anodised aluminium decorative application, there needs to be an investigation of large batch production methods for the aluminium industry. Such an investigation would need to be carried out with the assistance of ALCOM.

As the culture of Malaysian craft making, maintains a strong hold on the elements of traditional pattern as a surface decoration, it is suggest that the decorative element should be maintained with a blend of various techniques applied in metalwork such as etching, engraving etc. This can be achieved through the natural creativity of

Malaysian craft practitioners. It is hoped the integrated process will lend itself to a variation of anodised aluminium craft products. For the craft products to be accepted in the market, “Karyaneka’ or other craft outlets have the capacity to judge, promote, evaluate and provide an input to upgrade the quality and design of craft products.

It is hoped that this research is beneficial to the Malaysian craft making community as it has been ascertained that the findings have demonstrated that batik dyes can be integrated with anodised aluminium and the process of their application has been calibrated and formed into reference guide for replication on a selection basis by other crafts practitioners. The availability of aluminium can create opportunities for Malaysian craft practice, which has values from artistic, professional, educational and commercial standpoints. It is also hoped that the research process that has been implemented will provide a contribution to the future introduction of other new materials and techniques in craft making.

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