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COMPETENCE MANAGEMENT IN THE UK HERITAGE RAILWAY INDUSTRY

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There are over 100 heritage railways in the UK, operated primarily by volunteers. They run vintage trains for leisure and tourism and also undertake construction work in the form of track and infrastructure maintenance including significant new-build, with around 1500 staff involved in such activity. Recent accidents, including a fatality in 2012 have led to competence management being highlighted as a key issue to be addressed by the UK heritage railway industry. Factors such as the volunteer culture, the prevailing language, the diversity of skills, qualifications and learning abilities, are all key factors to be addressed in managing competence effectively. The intention of this research is to identify the issues that need to be satisfactorily addressed when defining and implementing an approach to competence management that is appropriate for the unique structure and challenges of the UK heritage railway industry and to determine whether the contrast of volunteer and professional environments is likely to yield lessons of general applicability to competence management in construction-related activity. A full review of literature and interviews with discourse analysis have highlighted the importance of competence factors such as management, leadership and non-technical skills which resonate with the volunteer culture of heritage railways, and four key discourses have been identified for future study.

Keywords: heritage railway, safety, competence, volunteer

INTRODUCTION

The UK heritage railway industry operates vintage trains for leisure and tourism and carries out construction works to maintain and renew infrastructure. There are now over 100 railways in this sector carrying ever increasing numbers of passengers (Heath, 2013), almost all primarily staffed by volunteers. However, heritage railways still require to be managed and operated in a safe manner, subject to the same overall requirement for safety as the mainline rail network. Safety is thus a key issue in the heritage railway industry, and incidents, including a serious injury in 2010 on the Foxfield Light Railway and a fatality in 2012 on the North Yorkshire Moors Railway, have led to competence management being highlighted by the Rail Accident Investigation Branch (RAIB) as a key issue to be addressed by the industry.

Competence management within the UK heritage railway sector affects all aspects of the industry including construction and maintenance of infrastructure and rolling stock, train operations, corporate management and governance and the overall project management and delivery of change. Although the incidents referred to above are not

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construction related, construction works within the heritage railway sector are significant and routinely involve track maintenance, drainage and occasionally more significant works involving structures, earthworks or major track relays are undertaken, and these can involve the application of large items of plant and significant human resources. The heritage railway working environment poses particular challenges with respect to an effective competence management system, with a largely part time volunteer workforce overseen in some cases by a small full time paid staff. There has been no systematic analysis of this subject matter carried out to date and the intention of this research is to identify the issues that need to be satisfactorily addressed when defining and implementing an approach to competence management that is appropriate for the unique structure and challenges of the UK heritage railway industry.

BACKGROUND

The ability to operate and maintain heritage railways safely is key to ensuring the ongoing viability of the industry. Customers at heritage railways rightly assume that their experience will be safe, as well as enjoyable, and any change to this perception could be very damaging to the industry. The recent incident at the Alton Towers leisure park, where two carriages on a roller coaster ride collided, resulting in significant injuries to some customers, serves as an example of the potential impact that such incidents can have on business performance. The need for competent and appropriately trained staff is therefore vital.

With its origins in the early narrow gauge preservation schemes of the 1950s, the evolution of the UK heritage railway industry gathered pace in the 1960s as a wholly volunteer run endeavour, as groups of railway enthusiasts sought to preserve branch lines that were being closed by British Rail. These enthusiasts came from a variety of backgrounds, with a diversity of reasons underpinning their desire to be involved, and their numbers have grown consistently since then (Rolt 1953). In 2013, there were 18,528 individuals recorded as volunteers on UK heritage railways (HRA 2013). Of these, some 1500 are involved in construction related activities, including maintenance of track and other assets and occasional new construction such as line extensions and new station facilities.

Construction engineering, together with the project management and corporate governance that facilitates it, is therefore a key element of the heritage railway industry where effective competence management is required, in a challenging and unique environment, to ensure the continued viability of the industry. A key aspect to effective implementation of a competence management system in the UK heritage railway sector is the need to understand the issues associated with a largely volunteer workforce drawn from a variety of backgrounds and often working on an informal or "ad-hoc" basis with no effective pre-employment screening in place. Factors such as the volunteer culture, the prevailing jargon, the diversity of skills, qualifications and learning abilities are all potential limitations or constraints to be taken into account for the effective application of any competence management system (Sherratt *et al.*, 2015).

By contrast, in the UK construction industry candidates for specific construction related roles are often required to attend a formal, usually competency based, interview as part of the selection process together with a pre-employment medical, and it is only after successful completion of all of these stages in the recruitment process that a candidate may be offered a position of employment.

RESEARCH OBJECTIVES

This paper sets out to identify the issues that need to be satisfactorily addressed when defining and implementing an approach to competence management that is appropriate for the unique structure and challenges of the UK heritage railway industry, including construction related activities and the management systems that govern them, and to determine whether the contrast of volunteer and professional environments is likely to yield lessons of general applicability to competence management in construction-related activity.

Applicable legislation and codes of practice

Legislation applicable to heritage railways includes the Health and Safety at Works Act 1974, the Management of Health and Safety at Work Regulations 1999 and, more specifically for the rail industry, the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS). All this is prescriptive, placing obligations on employers and employees with respect to competence management in the workplace, but without recognising specific issues that may affect the application of these requirements. ROGS takes into account the heritage railway industry with a risk based and less onerous application of the requirements.

In addition to legislation, there are relevant codes of practice such as the construction industry's Construction Skills Certification Scheme and the Network Rail "Sentinel" personal track safety competence scheme. Guidance on competence management for minor railways is also published by the Office of Rail Regulation (ORR) and for heritage railways by the Heritage Railway Association (HRA). Again, whilst providing a clear basis for effective competence management, these publications do not address the potential factors that may affect effective application.

Information in public domain

The report produced in early 2014 entitled Competence in Construction (Pye Tait Consulting, 2014), and commissioned by the Construction Industry Training Board (CITB) with support from the Health and Safety Executive (HSE) was reviewed as part of our research. This includes various consultations and initiatives that have taken place within the construction industry at all levels since 2011. Furthermore, competence management systems from individual heritage railways, publications by relevant professional institutions and examples from other industries have also been considered as part of a general review of books, articles and other publications from internet and other sources in the public domain.

This review has revealed a diverse approach to addressing competence, with no single definition of what competence is. This is summed up well in the *Pye Tait Consulting Report* referred to above as "interpretations and uses of the word are as varied and numerous as the contexts in which the word is employed...Every sector's approach to competence is shaped by the nature of its working activities but all are concerned with ensuring a safe, efficient and skilled workforce. Most approaches would agree broadly that competence designates the ability to independently perform a role or task to the required standards".

Peer-reviewed research

Considering the peer-reviewed research on competence management, we are able to define a series of clusters of research topic as shown in Figure 1.

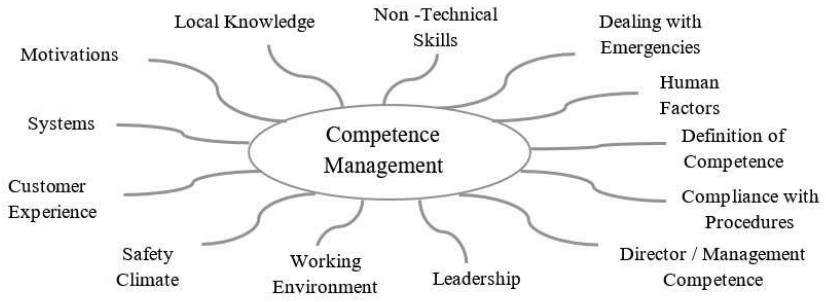

Figure 1: Competence Management Research Topic Clusters

In terms of the heritage industry, and UK heritage railways in particular, it should be noted that a considerable amount of peer-reviewed research does already exist, however none of this research addresses the specific issue of competence management which is the subject of this paper. There are currently a myriad of factors to be taken into account and different approaches to addressing competence management issues. Considering Chinese SMEs, Yan (2011) used a conceptual model to demonstrate the linkage between performance of the company and competence in the key areas of entrepreneurship, marketing and project management. Meanwhile Fu *et al*., (2014) advocated an evaluation index system for core competence, having applied the entropy weight method to determine the relative weights of the evaluation indices.

The need for a methodical approach within the rail sector to developing a competence management system is highlighted with the application of a competence profile advocated as providing an objective and transparent evaluation of an employee's performance in the process of certification (Bayirbekova, 2012). As a result of an assessment and review against leading practice from within and outside the rail industry, risk-based training needs analysis is advocated (Shah *et al*., 2013). Through developing an understanding that knowledge is usually created in higher education institutions and research organisations, continuous improvement of competency within the nuclear industry through lifelong learning is recommended (van Goethem, 2010). Finally, the application of systematic training programmes was determined as a means to address the need to maintain or enhance competence, within an environment of ageing personnel and assets, (Patrakka, 1999).

The Rail Safety and Standards Board (RSSB) mentored the top management teams of many UK rail companies through a self-assessment process and results suggested strengths in areas of strategy, policy and operational control and weaknesses in the areas of risk control, resourcing and support, with human factors being a particular area of concern. As a result, the application of good practice guidelines is advocated to ensure that the top management within an organisation is sufficiently competent to discharge its duties (Johnson and Nelson, 2004). An empirical study that aimed to increase understanding of the involvement of the project manager in competence management within Swedish project-focussed organisations came to the conclusion that this also applied to project managers (Medina and Medina, 2014). A study was undertaken to determine how workers perception of leadership involvement in daily work operations affected the level of safety compliant behaviour in the offshore industry, with leadership seen as a key organisational factor affecting the level of safety compliance (Dahl and Olsen, 2013). In the project management domain, leadership development questionnaires were utilised to profile the required intellectual, managerial and emotional competences of project managers and the

results suggested that more needs to be done in addressing training in the "soft" factors of leadership (Muller and Turner, 2010).

The setting up of a Supervisor Development Centre, providing supervisors with the skills to challenge non-compliance with procedures, is advocated by Leach *et al*., (2013). As the results of the analysis of a safety climate survey undertaken with 4479 Norwegian offshore petroleum employees, on a number of key dimensions including competence, the working environment is also determined as having an influence on attitudes to health and safety (Hoivik *et al*., 2009).

Based on the feedback obtained from a RSSB research project undertaken to develop non-technical skills (NTS) training courses, the inclusion of NTS within an overall competence management system for rail staff is recommended (Bonsall-Clarke and Pugh, 2013). Research undertaken has demonstrated that NTS such as decision-making and situational awareness underpin safe performance at work for safety critical staff, and are therefore particularly relevant for train drivers (Russell *et al*., 2013). Following a review of the implementation of the Manila 2010 amendments [2] to the Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention and Code, recognising the importance of soft skills is advocated with respect to competence in the maritime industry, (Vervoot, 2012).

Related to this, following the development of a generic hierarchical framework to assist future projects to categorise relevant factors for consideration, local knowledge is suggested as important to supplement basic competence (Pickup *et al*., 2013). A case study describing how local knowledge was applied at an assessment centre is used to advocate that this should also be included in the design of assessment tools (Ripamonti and Scaratti, 2012). Finally, based on an assessment of the characteristics required for managers in offshore installations, emergency management simulations are recommended for training and assessment (Slaven and Flin, 1994).

In summary a wide variety of research into competence management across various industry sectors has shown that the competence of managers, particularly in relation to leadership, human factors, and NTS are key factors. All of these resonate with the diverse and voluntary nature of the heritage railway sector as discussed above, suggesting that research into competence management in heritage railways will yield useful insight both in terms of safe operation of heritage railways and also into competence management in safety critical industries, including construction.

METHODS

In view of the potential gains from a study of competence management in the UK heritage rail industry, the following methods have been identified as possibly fruitful ways to progress this research: Reflective study of the authors' own experiences as volunteers working in the heritage rail industry with benchmarking against corresponding experiences in the UK mainline rail industry. Meetings with managers at UK heritage railways with an analysis of the resultant discussions to identify trends and common themes across UK heritage railways for more detailed investigation. Interviews of experienced staff engaged in the maintenance and operation of a representative UK heritage railway with discourse analysis applied to evaluate what issues are revealed through the naturally occurring language and ethnography applied to reveal key competence issues from their perspective.

RESULTS AND DISCUSSION

Based on their own experiences, as volunteers in the UK heritage railway industry and working within the UK mainline industry, the authors have been able to record some initial observations with respect to the different applications of competence management systems within these two environments. Although both entities are involved in the maintenance and renewal of UK standard gauge railway infrastructure, due to the operating and staffing differences of these two environments the approach to, and the application of, competence management systems is quite different.

Comparison with UK mainline rail industry

Initial observations have identified a significant difference to the approach adopted when recruiting and inducting staff for roles, including those that are safety critical. Selection criteria in the heritage railway sector are generally limited to age and physical limitations, contrasting with competence based assessment and pre-employment medicals in the mainline rail sector.

For example, at a typical UK heritage railway, the start of the recruitment process for volunteer roles can take the form of an open day where interested candidates are asked to attend an introduction to the railway and to the various disciplines and departments seeking resources. With a limited introduction to the various (often safety critical) voluntary roles on offer and no formal assessment of competences or medical condition undertaken, candidates are asked to indicate their preference for specific volunteer roles. Candidates are then contacted by the railway at a later date to attend an induction for their chosen volunteer role, with competence assessment and certification coming only later at various stages of advancement within the role (for example the transition from cleaner to fireman and then to driver on steam locomotives). This is generally limited to technical skills and knowledge with no formal assessment of aptitude for any given role.

By contrast, in the UK mainline rail industry candidates for specific roles are required to attend a formal, usually competency based interview as part of the selection process. For some roles, psychometric testing (RSSB, 2013) will also be carried out to determine that candidates possess the necessary attributes for the role. Prospective candidates will also typically be required (always for a safety critical role) to attend a pre-employment medical and this will include, as part of the Network Rail Sentinel scheme, screening for drugs and alcohol usage (NR 2014). It is only after successful completion of all of these stages in the recruitment process that a candidate may be offered a position of employment. As a result of the recruitment process, heritage railway induction processes have to address new recruits with mixed backgrounds and capabilities whereas in the mainline industry these are tailored to defined standards of competence and aptitude.

Meetings with heritage railway management

Four meetings with UK heritage railway management have been conducted and provided some interesting insights into competence management issues that are currently being addressed. A full time paid Operations Manager at a UK heritage railway explained that although the Operations department at their railway has an effective and documented competence management system, they believe that the non-safety critical staff do not have an effective system. Customer-facing skills is one particular area highlighted by this manager which is not addressed by the current system but which is critical to the competence criteria for many operations roles. The same manager explained that regular mutual improvement classes are undertaken and

that their employing heritage railway has its own website for this purpose which is accessible by anyone interested in the subject matter. They believe that the heritage railway movement should share more information about best practices, lessons learned, etc. and is happy for their railway to be one of the leaders in being as open and transparent as possible.

The General Manager at another UK heritage railway explained that corporate memory fade is an issue that is of great concern, as the founding volunteers from the early days of railway preservation now retire from the industry. The same manager explained that with many different types of motive power and a multitude of different operating requirements, it is difficult for staff to maintain competence for all assets on the railway. Competence is managed through a focus on what is important, an example being a register that is maintained of competent footplate staff.

A meeting a with the Safety manager of a UK heritage railway revealed that compliance with ROGS is achieved through a Safety Management System that is stored on a central database, including the competence management system (CMS). There are some policies missing such as lifting, etc. There is currently no mechanism or process in place to address skill fade. At the same UK heritage railway, the Infrastructure Manager explained that volunteer signalling engineers are often better qualified than the full time staff, bringing with them qualifications from their own day to day employment. Due to the transient nature of the workforce, they believe it is particularly important that all staff have grade cards in order that they are able to prove their competence if required, particularly in emergency situations.

Interviews with heritage railway volunteers

Structured interviews were conducted with two heritage railway volunteers and digitally recorded and transcribed as 'verbatim with dialect' (Gibbs 2007). The common notation of I for interviewer and R for respondent was applied to the transcripts. Access to the socially constructed realities of competence in the heritage rail industry can be granted through the analysis of this discourse through examining its linguistic exchange (Sherratt *et al*., 2012).

Due to space constraints, only the four most significant discourses are presented below with extracts from the interview conversations utilised to illustrate the analysis undertaken and how these enhance the understanding of competence management issues to be addressed in the UK heritage railway industry. Effectiveness of Processes - Analysis of the interview data revealed that the volunteers consider the current heritage rail processes that they apply to carry out construction and operations activities to be effective and safe. This can be seen in the extract below:

> I: How would you describe the effectiveness of the processes you've had to comply with?
>
> R1: Erm, I think with, with, most of the competences we are safe.
>
> R2: I think, I think they have been effective, erm, because, erm, er, at the end of the day, er, if you, you know, if you have to refresh your memory and re-check and re-learn something for a test it does make you read it because otherwise you can forget things and one of the issues than can happen with volunteers, particularly with the seasonal nature of the railway, is that people will be working the season, they will then go away for the winter months and when they come back people some will have forgotten an awful lot over that period of time.

A key point is made by one of the respondents that due to the seasonal, and non-contracted, nature of volunteer employment on heritage railways, there is a real risk of

"skill fade" particularly when a particular competence has not been utilised for a considerable period of time. What Should be Changed - The data obtained from the interviews revealed that there is room for improvement with the way that competence is currently managed and this can be seen from the extract below:

> I: What would you do differently if you could change anything?
>
> R1: I think there is still room for improvement with regards to training people...if people had been better trained could we have worked more efficiently.
>
> R2: I think, erm, I think there can be more, erm, practical assessments.
>
> The need to train staff is clearly considered as important, together with the need to verify that training has been effective in practice, with the suggested application of practical assessments. As well as the obvious safety critical dimension of having trained staff, the potential efficiencies that would arise are also seen as a potential benefit.

The Effects of Competence Management on Volunteer Motivation - What is clear from the analysis of the interview data is that being competent, and having competent trained staff working with you, is a motivating factor for workers. However, the counter to this is that if the worker does not feel competent or competent co-workers are not available, for whatever reason, this can be a source of frustration as can be seen from the extracts below:

> I: How does competence management affect your motivation working here?
>
> R1: Erm, you get frustrated sometimes that, that, erm, you may not have the people, you know. Erm, so I think that's one of the things that frustrates me, that we don't get enough, and that's because we haven't got the time within the company to, to, specifically train people.
>
> R2: Erm, I think, I, I, I think that knowing what the competencies are that you need for a particular job does motivate you. If you didn't know what you are meant to be doing I think it would have a demotivating effect.

It is interesting to note that the requirement to train staff, and the inability of the heritage railway to provide this, is seen as a key issue to be addressed. The Importance of Competence Management to the Heritage Railway Industry - The final significant discourse is on the subject of the importance of competence management to the UK heritage railway industry. From analysis of the interview data, on this issue the respondents are clearly of the same view that it is vitally important as can be seen from the extracts below:

> I: Could you describe the importance of competence management to the UK heritage railway industry?
>
> R1: Well I think it is vitally important because if we work in an incompetent manner…the heritage railways are not going to, you know, continue much longer.
>
> R2: Well I think any, I think the heritage railway industry has to be professional in it's approach and it can be no different from the big railway in terms of, what, how it runs itself and so therefore, er, I think it's essential that there is competency management in heritage railways.

The respondents clearly view the future viability of the industry as dependent on being safe, and being seen to be safe, today with a view that there should be no distinction between the UK mainline industry and the UK heritage railway industry in basic standards.

CONCLUSIONS

Research has been carried out to identify issues with competence management in the UK heritage railway industry, bearing in mind the volunteer nature of its workforce, including approximately 1500 staff engaged in construction-related activity. A review of literature across a range of safety-critical industries concludes that the competence of managers, particularly in relation to leadership, human factors, and non-technical skills are key factors, all of which resonate with the diverse and voluntary nature of the heritage railway sector. This has been complemented by the authors' reflective analysis of their own experiences in both heritage and mainstream industry contexts, indicating that research into competence management in heritage railways will yield useful insight both in terms of safe operation of heritage railway and also into competence management in safety critical industries, including construction.

A series of interviews with heritage railway staff, investigated by discourse analysis has identified key discourses for future study as Effectiveness of Process, What Should be Changed, Effectiveness of Competence Management on Volunteer Motivation and The Importance of Competence Management to the Heritage Railway Industry. Further research activities will seek to build upon these initial findings through further interviews in the disciplines of infrastructure, operations, project management and at board level, in order to determine how competence management can be effectively applied to the largely volunteer workforce within the UK heritage railway industry and any lessons of general applicability to industry can be learned.

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