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Investigating Unsafe Acts on a Large Multinational Construction Project

By

David Oswald

A thesis submitted in partial fulfilment of the requirements of University of Edinburgh for the degree of Doctor of Philosophy

February 2016
Declaration

The candidate confirms that the work submitted is his/her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others. The work in this thesis has not been submitted for any other degree or professional qualification.

Signed: 

Date: 

The sections outlined in the table below have been written based on previous publications. In these joint author publications, I was the first author and they were my own work, under the guidance of my supervisors. A complete list of all publications written during this PhD project are on the following page.

### Table 1: Joint author publications and their corresponding relevant section within this thesis

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Acknowledgements

First, I would like to thank my family Janet, Keith, Sarah, and Ailsa for their continued support, which has given me the opportunity to go on to produce this piece of work. This is my greatest academic achievement to date, and would never have been possible without our strong family foundation. Mum, I guess I should have known your ‘killjoy’ ways were always going to be right (!), and younger sis, you told me to hurry up and become a Doctor... well here it is!

I would like to thank FCBC for supporting me, and allowing me the opportunity to carry out this research. I have been fortunate enough to meet many wonderful people on this project, and to have the experience of being involved with one of the largest and most iconic structures ever built in Scotland will live long in my memory. I would especially like to thank those I have met in the Health and Safety department. For ethical reasons I will refrain from naming you... but you know who you are!

I would like to thank my supervisor Dr. Simon Smith, who has been instrumental in guiding me through this research project. This thesis would not be in the form it is in today without his wisdom, supervision, knowledge and experience. I would also like to thank him for introducing me to and involving my unofficial second supervisor, Dr. Fred Sherratt. Without her guidance I would not have been able to undertake this challenging project in the same manner that has been presented here. Thanks for your advice, understanding, willingness to always answer the phone when I needed to chat, making me think outside-the-one-dimensional-positivist-box, and yes... to 'be just as careful with words as you are with numbers'.

The support and encouragement from my supervisors Simon and Fred not only guided my research itself, it allowed me to develop and transform into an academic, in a world that was previously unknown and daunting to me. I felt
this could be demonstrated through two moments, near the beginning and end of my PhD. At my first conference in London, I was so incredibly nervous I needed to leave the room moments before my presentation. To contrast, at my latest conference I had the confidence to have the audience participate in the ‘Funky Chicken’ dance. I thought this is symbolic of how I have grown as both a researcher and person; and this is very much due to the influence of my supervisors. I say supervisors, but also good friends. Thanks again!

Figure 1: Fred and I moments after the team received the Best Paper Award at the CIB W099 Conference in Lund. Photo Credit: Simon Smith
Abstract

At the top of the hierarchy, construction project managers emphasise that safety is a key priority; and at its bottom, front-line workers do not turn up to work to get hurt. Yet, somewhere within the organisation it goes wrong, as accidents still occur. Research has suggested that unsafe acts contribute to over 80% of accidents, and hence reducing or eliminating unsafe acts should take a significant step forward to improving construction safety. While it has been recognised that the vast majority of accidents are still caused by unsafe behaviour, research has shown that organisational and cultural factors considerably affect unsafe work behaviour. This study aims to provide insights on unsafe acts that were committed by construction mangers and operatives; as well as providing insights on the effects a multinational workforce has on unsafe behaviours. Hence, the content within this thesis has purely focused on ‘unsafety’ rather than safe practices, and there were many good safety practices on the QC (Queensferry Crossing). It is the premise that by concentrating on ‘unsafety’, theoretical and practical insights can be gathered for safety improvements in the construction industry.

This investigation explores this problem on a large multinational construction project in the UK, the QC. The contractors of the QC, Dragados of Spain, Hochtief of Germany, Morrison of the UK and American Bridge, represent Forth Crossing Bridge Constructors (FCBC). Adopting an interpretive paradigm, this study used a qualitative approach through ethnographic methods. A moderate participant observer approach was implemented; where the researcher adopted a role as a member of the H&S department and frequented the research setting between one and three times a week for almost three years.

The contribution of this research is the in-depth ethnographic insights into the complexity of unsafe acts. The insights revealed that: there was a blame culture, creating an environment that was very difficult to learn from; that some cost-
saving strategies appeared to increase safety risks; some H&S rules were viewed as excessive and inflexible by construction workers, and therefore their were times when workers used their own judgement about when to follow the rules; there were communication barriers with migrant workers, and the one in six translator policy used in an attempt to overcome this was far from ideal; and that the different ways of working that foreign subcontractors had meant they were difficult to manage, monitor and adjust.

The findings revealed that there were two main underlying themes that were influential in the undertaking of unsafe acts: firstly, the perceived compensation culture and secondly, tight financial budgets. The fear of compensation claims appeared to prompt the H&S rules that were viewed as excessive, and took away ‘common sense’ from some procedures. The operatives desired more of a common sense approach, and felt at times they needed to break the rules in order to complete the job. The fear of claims also appeared to lead to the unconscious adoption of a ‘Person approach’ perspective, which concentrates on individual error and blame, and as far as possible uncouples organisational responsibility from an individual’s unsafe acts. This approach is inextricably linked to a blame culture, where accidents were under-reported, misreported and reported late.

The second theme was tight financial budgets. Previous research has explained that the competitive tendering process in the industry can discourage contractors from factoring into bids the cost of performing the work safely. In this research study, there appeared to be additional risks taken for schedule or cost reasons. Directors and senior managers acknowledged there was significant pressure for production, construction site managers believed the budget they were working with was too tight, and construction operatives explained that a phrase used on site was ‘just get it done’. To cope with production pressure construction site managers used undercover and informal reward schemes, referred to as ‘Vegas Time’ in this study. These schemes strongly incentivise production, potentially at the cost of safety. Ethnographic
insights also revealed the areas where cost saving strategies appeared to increase safety risks, such as temporary designs, labour shortages, machinery and equipment. One of the most obvious cost-saving strategies was to employ a cheap multinational workforce. However this led to many challenges with communication and different work practices, which was also perceived as an additional safety risk.

The theoretical implications of this research work is that to avoid additional safety risks from occurring due to cost-saving strategies, occupational health and safety considerations should be planned and priced for in more detail during the tender stage. Also, the eradication or reduction of the perceived compensation culture would increase the likelihood of adopting the System perspective to unsafe acts, rather than a Person approach, which is inextricably linked to a blame culture.
List of Acronyms

FCBC: Forth Crossing Bridge Constructors
H&S: Health and Safety
HSE: Health & Safety Executive
QC: Queensferry Crossing
PPE: Personal Protective Equipment
SOR: Safety Observation Report
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Chapter One: Introduction

‘...the construction industry clearly needs to shift its safety management effort toward the elimination of unsafe acts’

Mingyu Shin et al.
in Accident Analysis & Prevention
2014
1.0 Introduction

Safety seems so simple - just don’t let people get hurt. Yet creating a safe organisation is a complex challenge that industrial practitioners and researchers have been grappling with for decades and decades. In early safety research, Heinrich (1959) ascertained that accidents are caused by an unsafe condition and/or an unsafe act. Peterson (1982) highlighted two important points from Heinrich’s work: that people are the fundamental reason behind accidents; and that management has the ability and is responsible for the prevention of accidents. Since Heinrich’s work, safety management has concentrated on reducing and eliminating of both unsafe acts and unsafe conditions; however when incidents occur on-site there has been much more focus on unsafe conditions since physical evidence can be gathered to account for the accident (Gould & Joyce, 2009). Even though safety has improved in the last few decades, there has been relatively little effort devoted to reducing or eliminating unsafe acts (Shin et al., 2014), particularly in the construction industry (Aksorn & Hadikusumo, 2007). Donald & Young (1996) suggest that little remains to improve on in terms of physical conditions, and considering unsafe acts have been recognised to contribute to over 80% of accidents, (see for example Heinrich et al., 1980; Salminen & Tallberg, 1996; Lingard & Rowlinson, 2005), further construction safety improvement is hardly expected to improve without more concentration on the reduction or elimination of unsafe acts. As unsafe acts are so prominent in causing accidents and since they are more difficult to identify and prevent than unsafe conditions (Gould and Joyce, 2009), Shin et al. (2014) argued that ‘the construction industry clearly needs to shift its safety management effort toward the elimination of unsafe acts’.

Unsafe acts are often intentional (Donald & Cantor, 1994) and therefore understanding why unsafe acts occur is an important step towards elimination. As the construction industry becomes more globalised, the unsafe act problem
may increase in complexity, due to more nationally diverse organisations. The construction project that forms the focus of this research is the Queensferry Crossing (QC); constructed by a consortium of four contractors from four countries with a nationally diverse workforce. A key aspect of this research is to therefore understand how this diversity affects safety performance, specifically its contribution or otherwise to unsafe acts. This understanding would be of direct relevance to the construction of QC but also to the management of an increasing number of global construction projects.

1.1 Aim, Objectives & Research Questions

Aim:
1. To provide insights on the development of why unsafe acts are committed by managers and operatives
2. To provide insights on the development of unsafe acts that occurred due to the presence of a multinational workforce

Objectives:
• To use ethnographic methods to highlight key themes of unsafe acts
• To write-up ethnographic experiences with respect to current theoretical understanding
• Report findings and make some recommendations

The aims and objectives in this study generated a number of questions that are answered in this research. The first three questions relate to that of Chapter Five, Unsafe acts by Management; the fourth and fifth questions are discussed in Chapter Six, Unsafe Supervisor and Operative Acts; and the final two are answered in Chapter Seven, Multinational Workforces. These questions were adopted through the early to mid-way point into the research study, in light of the recurring themes that the ethnographic approach had brought to light.
The first question focuses on the environment created through management decisions in relation to accident and incident reporting. Creating a no-blame (such as a just or open) culture is the first step to solving problems and creates an opportunity for joint working and effective problem solving (Meng, 2012). A blame culture can have an adverse effects on accident and incident reporting, which in turn, affects safety performance. Though individuals in some positions have more influence than others, decisions made by managers of all levels from site supervisors to senior management that endorse a blame culture could be perceived as unsafe since they increase the safety risks. Hence the first research question:

1. **Do managers create an environment where accidents and incidents are freely reported and learnt from?**

The second question explores whether there were decisions made by management that though increased safety risks, were undertaken for scheduling or cost reasons. According to Reason (2000), it is clear unsatisfactory resolution of the inevitable conflict that exists between safety and production goals can result in repeated patterns of unsafe acts or less than adequate performance. The prevalence of the problem in early fieldnotes, and the recognition in an early focus group study (see Oswald et al. 2013), led to the question:

2. **Do managers make decisions for scheduling or cost reasons which increase safety risks on the project?**

The final question answered in Chapter Five, is related to the concept of changing behaviour through incentive schemes. Insights gathered on such incentive schemes and some of the challenges surrounding designing such schemes are discussed through the following question:

3. **What are some of the challenges associated with trying to change behaviours through incentive schemes?**
The following two questions relate to Chapter Six, *Unsafe Supervisor and Operative Acts*. From the early stages of the research, it was evident that the construction sites on the project could be a confrontational place. A look into previous literature revealed that this was not an uncommon finding, (see for example Latham 1994, Loosemore, 1998) but how or if this confrontational nature could have an effect on unsafe acts is not as well understood. This led to the question:

4. *Does a confrontational nature on construction sites influence whether unsafe acts are undertaken?*

In early fieldnotes it was recognised that operatives were particularly confrontational when issues related to their lack of PPE use were raised. This became quite a significant issue as it was common for operatives to break rules with PPE. Hence, the following question surrounding their reasoning for doing so:

5. *Do operatives routinely break PPE site rules and, if so, why?*

The final two questions are answered in Chapter Seven and explore the additional complexity of having a nationally diverse workforce. Question six is investigated primarily through ethnographic data gathered on a European subcontractor working at QC. Different working practices of foreign subcontractors and migrant workers were expected to cause some challenges, but it was difficult to forecast what these involve. It is hoped that the insights that answer the following question can aid future multinational workforces in the construction industry:

6. *Do unsafe acts occur due to the work practices of different national groups of workers?*

Perhaps the most obvious additional challenge for multinational construction workforces is the issue of communication. This led to the final question, which also answered in Chapter Seven:
7. Do unsafe acts occur due to communication issues between employees of different nationalities?

All these questions are addressed throughout the three findings Chapters (Five, Six & Seven) and then revisited again in the Conclusions (Chapter Eight).

1.2 Research Intentions

It is worth noting that unsafe acts occur in all businesses across all industries, and fortunately many of these will not result in injury or accident. The content within this thesis has purely focused on ‘unsafety’ rather than good safe practices, and it should be noted that there were many good safety practices on the QC. A focus on good safety practices would, however, have been another study, and it is hoped that by concentrating on ‘unsafety’, theoretical and practical insights can be concluded that can help to gather understanding within the industry for improvement.

This research adopted an inductive or ‘bottom up’ approach exploring ‘unsafety’. The aims and objectives of the study were finalised by the end of 2012. Research questions were later developed following immersion in the research setting, and were used to help achieve the aims of the study. Through immersion and familiarisation with the data being gathered, these questions were created to funnel in on important aspects of the environment that had come to light. The first three questions are connected to management decisions, question four and five are related to disagreement with and breaking of the
rules. The final two questions are both connected through the challenges associated with managing a multinational workforce.

1.3 Construction Project Background

In 2005 there was a discovery of structural issues with the original Forth Road Bridge that opened in 1964. This was associated with a significant increase in vehicles that were reaching approximately 23 million per year; despite the bridge being only designed for a maximum 11 million (The Scotsman, 2006). It was realised that the proposed 125 year design life would not be fulfilled. In 2006/07 a study was undertaken to determine the best site for the new Forth Replacement Crossing, with five potential crossing corridors identified. Following this study, the chosen site was West of the current road bridge, with the design to be a cable stayed bridge. In 2008, Transport Scotland investigated the crossing strategy, concluding that the current bridge would be suitable for public transport with all other traffic crossing the new bridge. In 2009, Transport Scotland asked for tenders, and there were 39 expressions of interest but only two bids, due to risk concerns over the ‘fixed-price’ contract (The Scotsman, 2009). The bids were from two consortia: Forthspan (Morgan Sindall, BAM Nuttall and Balfour Beatty) and Forth Crossing Bridge Contractors (American Bridge, Morrison, Hochtief and Dragados). In November 2009, Scottish Ministers introduced the Forth Crossing Bill and it was approved by MSPs on the 15th of December 2010. Royal Assent was received on the 20th of January 2011, and The Forth Crossing Act came into force on the 18th of March 2011. At this point, the design and build bid was awarded to Forth Crossing Bridge Contractors (FCBC) for £790 million, with ForthSpan bidding £1.05 billion. The initial estimate of cost was somewhere between £0.9bn - £1.2bn, and the New Civil Engineer Magazine described FCBC’s winning bid as ‘a shock low price’ (see NCE Editorial, 2011). Some of the cost differences between FCBC and ForthSpan bids was attributed to different foundation designs and that FCBC used floating plant, which reduced temporary structure costs (see
Hayward, 2012). Within FCBC, Dragados had 28% ownership, Hochtief 28%, American Bridge 28% and Morrisons 16%. Dragados are owned by a Spanish civil engineering company Grupo ACS, and in June 2011, following the bid win, Grupo ACS raised their stake in Hochtief to 50.16% effectively taking control of the company.

In September 2011, construction began, and in June 2013 the new Forth Replacement Crossing, was renamed the Queensferry Crossing (QC) by public vote. The project is expected to finish in December 2016, and the fieldwork for this research study was undertaken between October 2012 and July 2015. The construction of the QC will complete an iconic spanning of the past three centuries across the Firth of Forth. The three bridges will not only be a unique landmark across the world but also represent the essential need for a transport link connecting the North of Scotland to the capital, Edinburgh and beyond.

The client for the construction project was Transport Scotland and the principal contractor, FCBC. FCBC employed a number of different subcontractors such as Annick, Cleveland Bridge, and Tecozam to help complete the crossing.

![Figure 3 – An outline of the organisational structure](image)
Individuals within these different organisations were useful informants for the research. Within FCBC the following hierarchal Figure (4) illustrates the important participants within this study. The H&S department were a support group within FCBC and the H&S advisors were ‘gatekeepers’ within this ethnographic study. Teams or departments such as the environmental support group, who were not actively part of the study have been excluded from the diagram. The project director, directors and heads of sections were primarily based in the main offices, while the works managers, foremen and construction operatives were primarily site-based. There are references to ‘supervisors’ within the ethnographic vignettes in this study and this refers to superiors in the hierarchal structure.

![Figure 4- Illustration of the active participants within this study and their position within the hierarchy](image)

1.4 Thesis Outline

This introduction marks the first of the eight chapters within this thesis. An outline of the other remaining chapters are detailed below:
• **Chapter Three** communicates the methodological approach taken to explore the unsafe act problem. This outlines: the theoretical assumptions taken from the rationalist interpretivist position adopted; the use of participant observation as the main research tool in an ethnographic approach; the research design including data collection and analysis methods, threats to validity, reliability and generalisability and ethical concerns.

• **Chapter Four** is a short chapter which acts as a hinge between discussion of the research approach and the findings. The purpose of the chapter is to introduce the style of the ethnographic writing in order to prepare the reader for the following three findings chapters; and to introduce the topics for discussion, most of which are touched upon in the ethnographic vignette of an accident investigation within the chapter.

• **Chapter Five** is the first findings chapter which concentrates on unsafe acts by the management. By management this primarily focuses on office-based 'upper' management, who have the most influences on system changes. This included positions such as the Head of Sections and Senior Management. The first three research questions are discussed in order, (question one links to section 5.1, question two to 5.2 and question three to 5.3) within the three sections of this chapter.

• **Chapter Six** focuses on unsafe acts undertaken by operatives and site-based management. Research questions four and five are investigated in the two sections within this chapter.

• **Chapter Seven** surrounds the complexities of having a multinational workforce and explores the influence this has with unsafe acts. The final two research questions on working practices and communication are answered in this section.

• **Chapter Eight**, the conclusions, summarises the findings and ties the unsafe act problem back to two underlying themes, the perceived compensation culture and tight budgets.
All research needs to take cognisance of the relevant literature and theoretical development of the field of study. This investigation is of course no different and presented in Chapter 2 is a review of relevant *unsafe act* literature that provides a backcloth for the theoretical understanding of the subject and the development of the research that follows it. The review will consider an introduction to unsafe acts, causes of accidents, factors involved in accident causation, unsafe act perceptions, safety culture, the perceived compensation culture, risk and production pressure and the safety of migrant workers.
Chapter Two: Unsafe Acts

Figure 5 - Construction workers on the Forth Road Bridge in 1961
2.0 An Introduction to Unsafe Acts

The safety of workers is a complex phenomenon and has been a challenging problem for businesses across all industries. It is stressed by Wilpert (1994) that while accidents and injuries appear to result from an employees’ unsafe act, they are typically not only caused by single operator errors, but instead a long chain of events and interacting factors on several systems levels. The importance of the link between unsafe acts and accidents has been highlighted by many researchers. Salminen and Tallberg (1996) examined serious and fatal occupational accidents in Finland and found that 84–94% were caused mainly by human errors. Williamson & Feyer (1990) supported this in their study of all occupational fatalities that occurred in Australia, reporting that 91% involved behavioural factors. Lutness (1987) also reinforced this, reporting that more than 95% of all accidents involved human errors. Unsafe acts occur in all industries; but the construction industry is particularly risky due to outdoor operations, work-at heights, complicated on-site plants and equipment operation, coupled with workers attitudes and behaviours towards safety (Choudhry & Fang, 2008).

The definition of an unsafe act is not universally agreed (Aksorn & Hadikusumo, 2007) and for this study the following definition has been assumed:

*An act which deviates from a generally recognised safe way or specified method of doing a task and/or increases the probability of an accident to unacceptable levels.*

A few examples of unsafe acts within the construction context are: cutting across the path of a reversing moving vehicle, working without a high visibility jacket on and working on a roof without edge protection.

Reason (1990) divided unsafe acts into two categories, errors and violations.
Violations are a disregard of rules and regulations, while errors are unintentional behaviours. He outlined the different types of errors and violations:

**Errors**
- *Skill based errors:* An unsafe situation that occurred during an operator’s execution of a routine task relating to procedure, training or ability.
- *Decision based error:* Operators proceed as intended but the chosen plan proves inadequate to achieve the desired end, resulting in an unsafe situation.
- *Perceptual errors:* Where a decision is made based on faulty information.

**Violations**
- *Routine violations:* A habitual action by an operator which is tolerated by the governing authority.
- *Exceptional violations:* Violations that are an isolated departure from authority, and are not typical of the individual or condoned by the management.

It can be difficult to determine what type of unsafe act has occurred, considering it depends on factors such as an individual’s understanding, knowledge and the information provided to him/her. Hence this research study on the QC has primarily not tried to identify the type of unsafe act committed, but instead the protocol was to simply identify if the acts were unsafe or not.

The aim of this thesis is to provide insights on unsafe acts that are committed by management and operatives; and to provide insights on the development of unsafe acts that occurred due to the presence of a multinational workforce. Hence, the first part (2.1 & 2.2) of this literature review introduces unsafe acts; discusses accident models; briefly summarises factors which can influence unsafe acts and accidents; and discusses unsafe act perceptions. The second
part (2.3, 2.4 & 2.5) focuses on unsafe acts within the wider social and industrial context of the construction industry. Section 2.3 Safety Culture, outlines typical positive safety cultures and safety culture indicators; both of which are influenced by management decisions. Section 2.4 Social Context, discusses the perceived 'compensation culture', which has prompted construction managers to adopt more site safety rules, and stricter site safety rules. Section 2.5 Industry Context, discusses how issues such as work production pressures can influence management and operative unsafe acts; and how additional unsafe acts can occur multinational workforces due to communication barriers and national cultural differences.
2.1 Accident Research

*Figure 6 – The dominoes of the original Domino Theory (Heinrich et al., 1980)*
2.1 Accident Research

For around one hundred years, researchers have put forward and examined many different accident theories and models. In Khanzode et al.’s (2012) comprehensive review of occupational injury and accident research, theories are divided into four different generations. Early accident causation models in the first generation suggested that accidents were caused by personality traits and unsafe behaviours (see Greenwood & Woods, 1919). Domino theories, where a conceptual chain of events lead to an accident, were the second generation of accident models. The third generation of accident research is represented by injury epidemiology models, which holds the view that accident prevention efforts do not necessarily involve injury control within a work system. As work systems became increasing complex, systems approaches to accident causation emerged and this represents the fourth generation of accident research.

2.1.1 First Generation: Accident Proneness (originated 1919)

Up until the 1920s, the pure chance hypothesis prevailed, though it is not generally regarded as a ‘theory’ (Haddon et al., 1964). This hypothesis states that there is an equal chance of an accident amongst everyone, there are no accident patterns and that accidents are acts of god. Khanzode et al. (2012) state that it is obvious that in modern accident and injury research this hardly finds any place. The first theory to systematically review accident proneness of individuals in a working system was accident proneness theory (ibid). This was a term that was supported by researchers (see Greenwood & Woods, 1919; Greenwood & Yule, 1920; Farmer & Chambers, 1929); suggesting there was innate personality traits within a certain subgroups of people meaning they were more likely to meet accidents. Initially accident proneness was a non-modifiable characteristic, but later studies proposed the influence of transient factors such as stress, the work environment and safety culture in explaining
accident proneness (Khanzode et al., 2012). Hence the accident prone group changes with time, and is also influenced by previous accident experience (ibid). Researchers have found that liability can both increase or decrease with accident experience (see for example Schulzinger, 1954; Kirchner, 1961; Surry, 1969; Shaw & Sichel, 1971; Verhaegen et al, 1976). Salminen & Heiskanen (1997) found correlations to suggest that those who are prone to injuries at work are also prone to injury in other places such as at home or while undertaking leisure activities. Visser et al. (2007) suggested that repeated injuries are higher than that expected of chance, which indicates the presence of accident proneness. Other early theories include the unconscious motivation theory which believes and accidents are caused by subconscious processes such as anxiety, aggression and ambition; and Adjustment-stress and goal-freedom-alertness theory, which suggests that those who cannot adjust their work and work environment are more prone to accidents (Kerr, 1950).

2.1.2 Second Generation: Domino Theories (originated 1930s)

Perhaps the most quoted model thus far is Heinrich's (1931) Domino theory. This theory conceptualised a chain sequence of events leading to an accident. Heinrich claimed that any injury (5th domino) is caused by an accident (4th domino); which is caused by unsafe acts of a person and/or unsafe conditions (3rd domino); that is preceded by fault of person (2nd domino) and ancestry and social environment (1st domino). Removal of one domino would break the chain of events. From case studies of 75,000 accidents, Heinrich recommended that removing the 3rd domino is the simplest and most effective way to stop the sequence. The accident records he explored revealed that 88% of all industrial accidents were caused primarily by unsafe acts, 10% unsafe conditions, and 2% by acts of God. Hence, even in very early safety research the importance of unsafe acts was stressed, and since then many researchers have supported the notion that human errors or unsafe work behaviour cause the vast majority of accidents. According to Heinrich et al. (1980) the severity of the injury in
domino theory is pure chance; though this was contested by Shannon & Manning (1980), who argued injury severity is a function of job-related factors (or work-system characteristics). Both Bird (1974) and Zabetaki (1975) proposed adaptations to Heinrich's domino theory; while Bird practically just renamed the dominoes, Zabetaki contended that an unwanted or immediate release of energy is the immediate cause of an accident. This theory of energy release added a new perspective to accident causation theories (Seo, 2005). Though it should be noted that this theory has not been validated by scientific studies, and has similarities to the original domino theory, in that a release of energy is triggered by unsafe acts or conditions (ibid). Kjellén (1984) proposed deviation theory, which is a variation of domino theory, where a domino can have quantifiable deviations. As domino theory updated over the years, there was additional emphasise being placed on management as a primary cause on accidents (Abdelhamid & Everett, 2000). Management models, such as the Adams (1976) updated sequence and the Weaver (1971) updated domino, tried to identify failures in the management system, and hold management responsible for causing accidents (Abdelhamid & Everett, 2000). Despite such developments in domino theories, Petersen (1971, 1988) warned against narrow interpretations of domino theory, instead suggesting multiple causation theory. This theory sustains that there are multiple causes of accidents and that ‘these factors combine together in random fashion causing accidents’ (Petersen, 1988, p.10). Domino theories do not account for the complex interactions that occur during injury. Khanzode et al. (2012) also note that risk quantification across dominoes have not been addressed, and that the few dominoes in the model leads to error or generalisation.

2.1.3 Generation Three: Injury Epidemiology Models
(originated 1960s)

The injury epidemiology approach believes that accident prevention efforts do not necessarily lead to injury control (Khanzode et al., 2012). This approach
concentrates on the energy transfer involved in an injury, and attempts to minimise the transfer to reduce losses (ibid). Three factors are used to explain the injury phenomenon (Haddon et al., 1964): the host (injured person), the agent (energy leading to the injury) and the environment (biological, physical and organisational). Of the environmental factors, the ones which change with time (transient factors) are the most immediate causes of injury (Khanzode et al., 2012). Chow et al.’s (2007) study explored transient risk factors for hand injuries in different occupations in Hong Kong, finding that being rushed and working overtime were significant factors for the absence of gloves. In 1942, early injury research was undertaken by Hugh DeHaven (see De Haven, 2000) on 50-150 feet falls. In this classic work, he found that by spreading the transfer of energy forces over time or spatial area can reduce injury. Injuries can arise from various forces such as blast, shear and acceleration/deceleration, though the two major forces leading to injury are blunt and penetrating forces (Songer, 2014). Despite this generation’s focus on injury severity and energy interactions; in the next generation of models, prevailing system models analyse and explain the accident causation only.

2.1.4 Generation Four: Systems Models (originated 1970s)

Since early accident theories, organisations have become more and more complex in order to meet demands in terms of productivity, quality and safety (Khanzode et al., 2012). This has led to questioning of the relevance of simple linear models. To overcome the limitations of simple linear cause-effect approaches to accident analysis, multi-linear event sequence models, such as STEP (Sequentially Timed Events Plotting), have been used (Herrera & Woltjer, 2010). However, researchers (for example Amalberti, 2001; Leveson, 2001; Dekker, 2004; Hollnagel, 2004) have argued that the complex dynamics and interdepended commonly associated with a sociotechnical system, are not represented in linear approaches. Leveson, (2004) explained that for complex events, a linear approach is insufficient, and a holistic system approach should
instead be adopted. These holistic models require quantitative analysis to increase their strength of explanation (Attwood et al., 2006). Systematic models and methods proposed include the Functional Resonance Analysis Model (FRAM) and System-Theoretic Accident Model and Processes (STAMP).

### 2.1.5 Accident Causation Models in the Construction Industry

While many generic accident models and theories have been proposed, researchers have questioned their ability to explain accidents across different industrial contexts, highlighting that accidents in different industries vary substantially (Williamson et al., 1996). Consequently, there have been a number of construction-industry specific causation models.

Abdelhamid & Everett (2000) developed an accident root causes tracing model (ARCTM), which aimed to be tailored towards the needs of the construction industry. The term ‘root cause’ was simply described by Dekker (2006) as the place where you stop looking any further. ARCTM outlined three root causes: ‘failing to identify an unsafe condition that existed before an activity was started or that developed after an activity was started; deciding to proceed with a work activity after the worker identifies an existing unsafe condition; and deciding to act unsafe regardless of initial conditions of the work environment.’ The American authors, Abdelhamid & Everett believed that the need to investigate unsafe acts is emphasised in ARCTM. Following the publication of the ARCTM a ‘European perspective’ was offered by Gibb et al. (2001), who suggested that the paper had not sufficiently addressed the ‘real’ root causes of accidents. They argued that the discussion and debate about root causes in Europe tends to be way before the construction site activities. This has been driven by European regulations that have channelled the consideration of root causes back up the supply chain to designers and the owners of buildings and facilities (ibid).

Discussing the model, Suraji & Duff (2001) also had concern surrounding the use of the term ‘root cause’ considering the narrow focus of the causes which
concentrated entirely on site personnel, and more specifically worker behaviour and immediate motivation causes. Abdelhamid & Everett (2000) welcomed the discussion and agreed that root causes of some accidents can be traced upstream to owners, managers, regulatory agencies, designers and others. They argued that these off-site influences or lack of influences may appear in the ‘unsafe conditions’ of the ARCTM model. The American authors also acknowledged that a difference of opinion on some issues could have resulted from different industry practices across the globe.

Suraji et al. (2001) proposed their own model of risk factors that were identified as proximal causes or distal causes. Proximal factors are those directly related to the incident such as worker actions, construction practices and site conditions. Distal factors are those the lead to the introduction of proximal factors such as design complexity or time pressure. Suraji et al. (2001) developed and validated 70 specific classifications of incident causes and more widely categorised them into: construction control, site condition, construction planning, construction operation and operator control. Behm & Schneller (2013) explained that when considering the application of Suraji et al.’s model, they found that the 70 classifications proved too many for practical purposes and instead opted for the Construction Accident Causality (ConAC) model, a model developed by Loughborough University researchers. They found the language within the ConAC model simple to understand and apply in practice, and noted that this was a reason the researchers believed that such a model could be implemented and used within a construction organisation. The Construction Accident Causality (or ConAC) was developed on 100 mostly minor accidents and categorised casual factors as immediate accident circumstances, shaping factors and originating influences (see Haslam et al., 2003). Cooke & Lingard (2011) report that ConAC model is ‘potentially useful in causal analysis of work-related fatal incidents in the construction industry.’ However, they do also report two specific limitations: that the classification of factors is open to interpretation that could lead to different causal pathways, and that not all incident scenarios were represented adequately by the
'hierarchal' sequence of causal factors implied by the HSE model. With use of the work of Behm & Schneller (2013) and Cooke & Lingard (2011), Gibb et al. (2014) assessed the value of the ConAC framework arguing that it can: aid analyse on the causes of accidents resulting in outcomes of varying levels of severity, that the framework has international applicability and that the framework's terminology is sufficiently generalisable. However, they do also acknowledge the issue of WYLFIWYF (what-you-look-for-is-what-you-find). This is raised by Lundberg et al. (2009) in reaction to inconstant incident investigations techniques. They argue that models used in any investigation heavily influence the outcome and that it is logical to assume that where people only look for immediate accident causes, then that is what they will find. Gibb et al. (2014) acknowledge this concept challenges the assertions of some of their work.

Back in 1994, Rasmussen et al. discussed how constraints inherent within a work system such as workload demands, safety requirements and financial imperatives shaped boundaries of acceptable behaviour. In his model, workers 'migrate' towards the boundaries of acceptable performance due to pressures for production efficiency and the natural human tendency to seek the working path of less resistance (ibid). Functional safety boundaries that are acceptable are established within organisations, and continuous pressure to work close to these boundaries suggests that, as far as possible work, systems should be designed to being error tolerant (ibid). Mitropoulos et al. (2005) built on Rasmussen’s work and developed a systematic model of construction accident causation. This model theorises that a combination of context characteristics and construction activity create hazardous conditions. When human error coincides with hazardous conditions there is potential for an accident (Mitropoulos et al., 2005). These hazard exposures can be mitigated by efforts from workers to control conditions and/or a tendency for competent action (ibid).
The Human Factors Analysis and Classification Scheme (HFACS) previously implemented in the aviation industry, was adapted by Hale et al., (2012) to analyse the causes of construction fatalities. In the HFACS framework adaptation, the construction classifications of unsafe acts were divided up into violations and errors; and then into further subcategories including routine violations, exceptional violations, skill-based errors and knowledge-based errors. The framework identified preconditions that could prompt these unsafe acts as well as other organisational and environmental influences. According to Hale et al. ‘the HFACS model provided a meaningful data elicitation process providing a link between the errors which created the proximal conditions for and/or precipitated the accidents, and the underlying causes in terms of the management delivery, corporate systems and wider environmental influences’.
2.1.6 Summary

There are some parallel themes across the decades and generations of accident research. The first, second and fourth generations of accident research focus primarily on accident prevention, while the third generation concentrates more on injury control. The first generation is firmly in the person-as-cause, as it views personality traits and individual-related factors responsible for accidents. The second generation domino theories also focus on the person when designing interventions, but do have some systems factors, such as unsafe conditions (Khanzode et al., 2012). The system-as-cause theme ascertains that rather than holding an individual responsible, the reasons for failure should be traced back to the system (Deming, 1986). The fourth generation, systems models support this view and inspect organisational-related factors for accident causation (Reason, 1997; Zohar, 2010). It has also been recognised that generic accident models may not be able explain accidents across different industrial contexts, since accidents in different industries can vary substantially (Williamson et al., 1996). Hence, construction safety researchers have proposed models that are tailored specifically to the construction industry (see for instance Abdelhamid & Everett, 2000; Suraji et al., 2001; Haslam et al., 2003; Mitropoulos et al., 2005; Hale et al., 2012).

Despite the modelling changes within the generations of accident research, unsafe acts have always had an important role to play in accidents causation. Unsafe acts were highlighted as the primary reason for accidents in early research, and the latest and fourth generation of accident research believes that organisational-related, job-related and individual-related factors cause accidents; factors that are discussed in the following section, and can increase the likelihood of unsafe acts occurring at various levels within the organisation.
2.2 Factors influencing Accidents
2.2 Factors Influencing Accidents

In the latest generation of accident research, system models examine organisational-related, job-related and individual-related factors that can contribute to accidents (Khanzode et al., 2012). Job-related factors include: occupation (e.g. Maiti et al., 2001), workplace hazards (e.g. Khanzode et al., 2011), materials and equipment (e.g. Haslam et al., 2005) shift of working (e.g. Frank, 2000), location of work (e.g. Maiti et al., 2001) and workplace factors (e.g. Haslam et al., 2005). Individual-related factors are for example: age (e.g. Shuford & Restrepo, 2005), experience (e.g. Laukkanen, 1999) and gender (e.g. Lin, Chen, & Luo, 2008). According to McLeod et al. (2003) the relationship of job-related factors to injury events is stronger than that of individual-related factors. In the 1970s organisation-related factors were highlighted as important causal factors of accident occurrences (see for example Powell et al., 1971). This led to the term ‘safety climate’ (see Zohar, 1980), which explores the accident problem through an organisational context (see Section 2.4 in this chapter). Examples of organisational factors include: workgroup size (e.g. Guastello & Guastello, 1987; Aboagye-Nimo, 2013), workplace safety status (e.g. Gillen et al., 2002), management, co-worker and supervisor support (e.g. Maiti et al., 2004) and management’s commitment to safety (e.g. O’Toole, 2002).

Below, some these researched factors are highlighted and then discussed within the context of the construction industry. These factors include workers age, experience, gender, tiredness, risk perception, alcohol and drug use, training, design, management and equipment and materials.

2.2.1 Age

Age has been highlighted in investigations seeking a correlation between age of workers and accident rates. According to the European Statistics on Accidents at
Work (ESAW, 2007), on average 3.3% of the working population have an occupational accident with more than three lost days; and young workers aged 18-24 years, are statistically a greater risk with 4.7%. The work injury rates of younger workers have been reported to be significantly higher than those of older workers (see for example Mowlam et al., 2010; Salminen, 2004; Sreenivasan, 2002; Schulte et al., 2005). Shuford & Restrepo (2005) found from an analysis of workers’ compensation claims that older workers typically have a lower frequency of workplace injuries, but a higher injury related costs than younger workers. Arndt et al., (2005) revealed that older construction workers experience a higher risk of occupational disability from accidents, and this becomes an increasing concern, considering we are living in an increasingly ageing population (Frommert et al., 2009). Eaves et al. (2016) found that older construction workers were aware of the physical demands of their job and the aches and pains that come as a result of their work. Through Eaves et al.’s study they suggest that engagement of the workforce should be encouraged to reveal ways of making their jobs easier, safer and more comfortable, in order to enable workers to stay fit for work for longer.

2.2.2 Design

Traditionally, safety focus for designers has been exclusive to the end-user personnel of the designed facility, with disregard for the individuals constructing it (Tymvios & Gambatese, 2015). Yet, the influence design has on accident causation has been highlighted (see for example Behm, 2005 and Donaghy, 2009). Hence the existence of legislation such as the Construction Design & Management regulations in the UK which places duty on designers to eliminate and reduce risk at the design stage. Reasons for a lack of involvement from designers include an inability to direct worksite activities and lack of education and training (Gambatese, 2000). Toole (2005) outlines five ways that designers could increase their role in worker safety: a ‘review for safety’, where as well as cost and quality, safety is discussed in the peer review process to
ensure that the completed design is not inherently more dangerous than necessary; to create design documents for safety, where worker safety can be considered throughout the whole design process; to procure for safety, so designers can assist owners in reviewing and soliciting bids; review submittals (design-related documents submitted by the contractor) for safety; and to inspect site operations for safety. In Figure 4 below, Szymborski’s (1997) conceptual model hypothesises that the ability to influence safety is reduced through each stage of the project schedule.

![Figure 7 - A conceptual model of the designer’s ability to influence safety throughout the project schedule (recreated from Szymborski, 1997)](image)

### 2.2.3 Gender

Gender has also been considered in health and safety research as a contributory factor to accidents. A study by Agapiou (2002) on the perception of gender in the Scottish construction industry revealed that there were views that the presence of women on-site makes the workplace safer and encourages the adherence of health and safety regulations on lifting limits. Lin, Chen, & Luo (2008) found that male workers had a much higher occupational fatality rate
than female workers (7.4 compared to 0.9 per 100,000 full time workers). Jensen et al. (2014) argue that the performance of masculinities in accordance with social norms can result in work-related accidents. For instance, performing masculinity may prevent male workers from asking for help, and risk taking can in some social contexts be a way of performing masculinity (ibid). Considering that the construction industry is very male-dominated, it is likely that this factor contributes to the industries high accident rate.

2.2.4 Alcohol and Drugs

In the construction industry, high rates of alcohol and other drug use, combined with the safety-sensitive nature of the industry has prompted drug surveillance and prevention strategies (Gerber & Yacoubian Jr., 2000). A study by Biggs & Williamson (2012) of nearly 500 construction workers in Australia found that 16% admitting to using cannabis within the last 12 months, and 162 (32%) had used ecstasy or meth/amphetamine type. Comparing that with the whole of Australia: 10.3% admitted to taking cannabis, 3% ecstasy and 2.1% ATS (World Drug Report, 2012). Using the validated AUDIT test, the study also revealed that 286 (58%) were above the cut off score (8) for hazardous alcoholic consumption. Though it is not clear how great an affect hazardous drinking out of work hours will have on safety during construction, it would be naïve to think that none of the workers would be impaired. The link between risk perception and alcohol use was highlighted in a study on Portuguese construction workers (see Arezes & Bizarro, 2011); where it was concluded that those with a lower risk perception were the highest alcohol consumers.

2.2.5 Risk Perception

Risk perception is defined as the subjective judgment that one makes about the frequency and severity of particular risks. There are theories that suggest risk perception can have a direct impact of behaviour. For example, risk
compensation, which is a controversial theory (O’Neill & Williams, 1998) that suggests there is a certain level of risk at which people can accept that they are exposed to. Therefore, if a safety measure is introduced that reduces the risk; people can adjust their behavioural response i.e. take on more risk. This can lead to an unjustified lower level of perceived risk and hence more risky behaviour (Sheehy & Chapman, 1987). For example, if seat belts are worn (the safety level increased), then the individuals can drive faster to reach their destination (behaviour change due to increased safety from seat belt).

Therefore, according to this theory, the introduction of a safety measure is, in the long run, eliminated by human behavioural response (Peltzman, 1975). Fear of compensation was a central issue in the debate over the use of nets to protect workers on building the Golden Gate Bridge, where management feared that reducing the consequence would increase risk taking behaviour (Howell et al., 2002).

In order to quantify and compare risk tolerances, or in other words an individual’s subjective assessment of risk, Hallowell (2008) states that risk perceptions must be solicited in a standardised fashion. In the construction industry, hazard identification has been found to being far from ideal with up to 35% of potential hazards being missed from typical construction project risk assessments (Carter & Smith, 2006). Though Hallowell (2008) later found that construction workers were capable of identifying and rating occupational safety and health risks with a reasonable level of accuracy. Haines et al. (2004) note that the fluctuation of risk perception amongst individuals makes it difficult to identify the causes, effects and prevention techniques for risk-taking behaviour. In a recent study on the risk perception of construction equipment operators, Gürcanlı, Baradan, & Uzun (2015) revealed that working with an assistant, and health and safety training was important.
2.2.6 Health and Safety Training

In 2003, Loosemore et al. noted that the construction industry does not have a good record of investing in the training of employees and invests less in training than many other industries. Strong health and safety training programmes not only improve employee retention but also compliance with health and safety requirements (Wilkins, 2011). Findings from a study by Fang, Huang, & Hinze (2004) indicated that workers that were poorly educated and trained at work gained no evident safety knowledge or awareness with accumulation of experience on site. Comparing workers in the construction industry with those employed with others, Center for Construction Research and Training (2007), found that construction industry workers had a lower level of educational attainment. This low educational attainment is likely to be linked to the poor literacy levels in the construction industry, which have been highlighted as one of the greatest challenge or barrier for trainers (Wilkins, 2011). Despite the lack of effective training in the construction industry (ibid), the impact of health and safety training should not be underestimated (see for example Swuste & Arnoldy, 2003; Tam et al., 2004). As previously highlighted, young construction workers are higher risk than older workers, and Nyateka et al. (2012) suggest that the education and training programmes may be insufficiently preparing young workers for hazardous. Other studies (see for example Breslin et al., 2007 and Chin et al., 2010) have also highlighted that a large proportion of young workers do not receive occupational H&S training. Workers without sufficient training or knowledge should not be expected to identify all unsafe conditions at work (see Abdelhamid & Everett, 2000; Shapira & Lyachin, 2009). Wong et al., (1999) and Lam (1997) revealed that safety training significantly affects safety performance of construction sites.
2.2.7 Experience

Human experiences influence safe or unsafe actions on-site and involvement in safety management systems (Fang et al., 2004). Haines et al. (2004) explain that experience appears to increase an awareness of risk, as assessing risk and its consequences can be determined more accurately by individuals who have greater experience. In the construction industry, Aboagye-Nimo et al., (2015) explain that experienced workers can pass local knowledge to less experienced workers through on-site training; Eaves et al. (2016) found that older and often more experienced workers have a wealth of knowledge and it is important that this is retained; and Baarts (2009) revealed that experts and experienced construction workers have practised and observed for long enough to know about different situations, and therefore can anticipate and thus manage looming dangers on site. Other researchers have previously linked inexperience with poorer safety performance including: Laukkanen (1999), who highlighted that experienced and skilled construction workers have fewer stress symptoms and are less prone to hazards than inexperienced workers; and Girard et al. (1995) found that most occupational accidents (79%) occurred during the first four weeks on the construction site. Though it has also been suggested that experience can reduce carefulness and increase an individual’s confidence to deal with any eventuality (Gherardi & Nicolini, 2002).

2.2.8 Sleeping Pattern and Tiredness

From a review of sleep literature, Womack et al., (2013) highlighted that sleep loss is positively associated with risk taking behaviour. Hinze (1997) suggested that the disruption of circadian rhythms can impact construction worker injury rates when performing shift work; though later found no statistical evidence between accident rates and clock phase advances (see Holland & Hinze, 2000). However Barnes & Wagner (2009) established that following phase advances employees had 40 minutes less sleep, 6% more accidents and lost 68% more
working days, than on non-phase change days. These findings were based on mining injuries between 1983 and 2006 – comparing the Monday after the phase advance with other days. Rosa (1995) recommends that long work shifts should be issued with caution, and that extended work shifts should probably be avoided if experts in a certain industry or job already consider a job to be dangerous on an 8-hour shift. Arditi et al. (2003) also expressed the importance of safety concerns when making decisions about performing construction at night.

2.2.9 Materials and Equipment

A study by Haslam et al., (2005) found that deficiencies with the suitability and condition of materials, including packaging, featured in more than a quarter (27%) of incidents; and that shortcomings with equipment, including personal protective equipment (PPE), were identified in over half (56%) of the incidents. One of the items of PPE equipment that construction workers often remove are safety glasses. A study by Lombardi et al. (2009) found that a lack of comfort/fit and fogging or scratching of eyewear were important barriers to PPE usage; and when undertaking ethnographic research as a construction worker, Löwstedt (2015) acknowledged that he and others in the group removed their glasses, as necessary, when they became misty.

2.2.10 Management

Within the organisation the management team is duty bound to creating safety awareness (Choudhry & Fang, 2008). For a satisfactory safety level, the factor that has the upmost importance in the management’s support, involvement and commitment to safety (Jaselskis et al., 1996; Sawacha et al., 1999; Mohamed, 2002). Haslam et al. (2005) found that risk management was a factor in 84% of accidents investigated; which they note as not particularly surprising, considering accidents invariably involve an inadequately controlled risk,
indicating a management failing. The importance of safety management has been stressed by many researchers, and an aspect of this is the perception the management team have of unsafe acts within their organisation; which is discussed in the following section.
2.3 Unsafe Act Perceptions

‘A man can fail many times, but he isn't a failure until he begins to blame somebody else.’

John Burroughs

Naturalist
2.3.1 Person Model

There are a number of different perspectives as to why unsafe acts occur and how they impact the operations in question (Reason, 2008). Two of these views are the Person model and the System model (ibid). The Person model is derived from an occupational health and safety approach to industrial accidents (Lucas, 1992), that concentrates on individual errors and blames individuals for forgetfulness, inattention or moral weakness (Reason 2000). Despite the fact that practitioners and students are taught that ‘accidents are caused by multiple factors and occur due to the complex interactions of numerous work system elements, human and non-human … person-centered approaches to safety management still prevail’ (Holden, 2009). At least in the UK, it is more legally convenient to blame individuals (Reason, 2008); and investigating employee-based causes can be attractive to internal investigators, as they may be put in a difficult position if an underlying cause of an incident is an organisation’s policy or culture (Kletz, 2006). Hence, considering the Person approach focuses on individual unsafe acts and personal injury accidents, it is perhaps unsurprising that the Person model is an intuitively appealing approach that is frequently and inappropriately applied to organisational accidents (Reason, 2008). The Person approach, as far as possible, uncouples organisational responsibility from an individual’s unsafe acts in the interests of system managers and shareholders (ibid); though this can create an environment where workers feel that management do not care greatly about their safety.

The Person approach is directed at reducing unwelcome variability in human behaviour, usually through methods such as fear poster campaigns, additional procedures, disciplinary measures, retraining, naming, blaming and shaming (Reason, 2000). Proponents of this approach tend to treat errors as moral issues (ibid), in what psychologists have called a ‘just world hypothesis’ (see McCauley et al., 1970). In this phenomenon, people want to believe that the world is just or fair and that people get what they deserve. Therefore, injustice is often
explained or rationalised by blaming the victim. The shortcomings of the *Person* approach significantly out-weight the advantages (Reason, 2008). The perceived compensation culture in the UK discussed later can tend organisations towards a *Person* approach, which is extrinsically linked with blame (Reason, 2008).

Research has shown that a blame culture prevents learning, has a negative effect on staff motivation, inhibits reporting and prevents a thorough examination of incidents (Health and Safety Commission (HSC), 2001, p. 69). Paul (1997) refers to a 'Reinforcing Cycle of Blame' where the fear of punishment leads to: reduced innovation and creative solutions; reduced information sharing and more cover ups; and an increasing tendency to rely on short term solutions and immediate relief. Whittingham (2004) has identified a number of characteristics of a blame culture:

- Staff try and conceal errors.
- Employees feel fearful and may report high stress levels.
- Employees are not recognised or rewarded and thus lack motivation.
- Errors are ignored or hidden.
- Management decisions tend to be taken without employee consultation.
- There is often a high staff turnover.

Organisations should try and move away from a blame culture to a just culture, or one of accountability (Human Engineering, 2005). Paul (1997) discusses useful differences between blame and accountability. He states that 'accountability emphasises keeping agreements and performing jobs in a respectful atmosphere; blaming is an emotional process that discredits the blamed'. Accountability refers to allocating responsibilities in advance and requires a clear discussion of common difficulties (Paul, 1997). By holding individuals accountable, there is recognition that mistakes are made and this is
viewed as a learning opportunity (ibid). The following table outlines the differences between the two concepts as summarised by Paul (1997):

<table>
<thead>
<tr>
<th>Accountability</th>
<th>Blame</th>
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<tr>
<td>Mutuality</td>
<td>Fear</td>
</tr>
<tr>
<td>Trust &amp; Respect</td>
<td>Judgement</td>
</tr>
<tr>
<td>Inquiry</td>
<td>Anger</td>
</tr>
<tr>
<td>Moderation</td>
<td>Punishment</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Self-Righteousness</td>
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</table>

Creating a no-blame (just or open) culture is the first step to solving problems and creates an opportunity for joint working and effective problem solving (Meng, 2012). A just culture is meant to balance learning from accidents with accountability for their consequences (Dekker, 2009). In a no-blame culture, time is not wasted trying to allocate blame (Meng, 2012) but instead, the parties involved try to find the best possible solution (Bennett & Peace, 2006). These positive error cultures make errors transparent, encourage good errors, and learn from bad errors to create a safer environment (Gigerenzer, 2014, p. 50).

An organisation’s disciplinary process has a large influence in the development of a just or open culture (Human Engineering, 2005). If disciplinary procedures purely focus on the individual involved without acknowledging system-induced faults, it is difficult to develop an open or just culture (ibid).

The most widely known model in the framework of Person approach is the ‘Bad Apple’ approach (Kuselman et al., 2012). Dekker (2002, p.3) explains that in the Bad Apple theory one ‘identifies bad apples (unreliable human components) somewhere in an organization, and gets rid of them or somehow constrains their activities’. This theory is the ‘old view’ of human error, which states that (Dekker, 2002, p. 3):
• Human error is the cause of many accidents.
• The system in which people work is basically safe and the main threat to safety comes from the inherent unreliability of people.
• Progress on safety can be made by protecting the system from unreliable humans through training, selection, procedures, automation, and discipline.

The bad apple theory believes that errors are unpredictable, unexpected and do not belong to the system (Dekker, 2006). These errors come from ‘bad apples’ who do not do what they are supposed to, and eradicating the bad apples would leave the system adequate for intended use (ibid). According to Dekker, the new view first succeeded the old view approximately when human factors pioneers Fitts and Jones were requested to advise the US military on how to choose less error-prone fighter pilots. They instead discovered that it was the planes’ design not the pilots that needed changing in order to improve the compatibility between the pilot and the plane. Many lives and dollars were accredited to this systems-centered view during the Korean War and World War II (Helander, 2006). According to the new view (Dekker, 2002, p.3):

• Human error is a symptom of trouble deeper inside the system.
• Safety is not inherent in systems and has to be created. Contradictions occur in the systems themselves between multiple goals that people must pursue simultaneously.
• Human error is systematically connected to features of people’s tools, tasks and operating environment. Understanding and influencing these connections allows for safety progress.

Human errors that are caused by an underlying fault within a system are known as system-induced errors (Human Engineering, 2005). If blame from system-induced errors is proportioned to an individual, the latent problem is left undetected and uncorrected, which means the same error could recur
This view is based on the *Systems* approach perspective on unsafe acts.

### 2.3.2 System Approach

The *System* perspective in accident explanation goes beyond the local events and attempts to find contributory factors in the workplace, organisation and system as a whole (Reason, 2008). It is the view that frontline personnel are not so much the instigators of a bad event, but inheritors’ of latent conditions that have been accumulating within the organisation for some time (ibid). A *System* approach focuses on the conditions in which individuals work, and tries to build defences to avert errors or mitigate their effects (Reason, 2000). The basic premise of this approach is that humans are fallible and even in the best organisations errors are expected (ibid). In such an approach, errors are perceived as consequences rather than causes and countermeasures focus on the assumption that human conditions cannot be changed, but the conditions under which humans work can be (ibid). This approach was adopted in aviation maintenance, where 90% of quality lapses were judged as blameless (Discipline, 1997). This reveals that there are rare times when blame is deserved, and it should be attributed for offences such as gross negligence, deliberate violation of rules or misconduct (Whittingham, 2004; Human Engineering, 2005).

Though the *System* model appears much more appropriate than the *Person*, both have their limitations when taken to extremes (Reason, 2008). Since people on the frontline have very little opportunity to make rapid system improvements, there should be a balance that continues to promote systematic improvements, while giving those who have little chance of changing the system some mindfulness or mental skills that will help avoid error traps and recurrent accident patterns (ibid). One model based on the *System* approach is the Swiss Cheese Model (see Reason, 1997) and it is the most widely known model in the framework of *System* approaches (Kuselman et al, 2012). In the Swiss cheese
model (Reason, 1997) each system layer is imagined as a slice of cheese. Holes in the cheese are like the holes or weaknesses in the system layers. These holes can be open, closed and shift (unlike a real Swiss cheese). Holes in a layer do not necessarily lead to system failure, since other layers can prevent any bad outcomes. These holes derive from two sets of factors active failures and latent conditions, or their combinations (Reason, 2000). Active failures are short-lived mistakes, lapses, slips and violations committed, while latent conditions are ‘resident pathogens’ within the system that arise from decisions made by designers, builders, procedure writers, and top level management (ibid).
2.3.3 Summary

The *System* approach is the ‘new’ and more desirable view on unsafe acts (Dekker, 2006). However, it should not be taken to the extremes as this would reduce individual mindfulness (respecting dangers and being aware of hazards and having contingencies to deal with them) with those on the frontline who have little opportunity to make systematic improvements (Reason, 2008). The *System* approach is beneficial as it goes beyond the local event to find contributory factors in the workplace, organisation and system as a whole (ibid). It holds the view that frontline workers are not necessarily the instigators of the event, but more the inheritors of latent conditions that have been accumulating.

Despite that the *System* approach is more beneficial from a safety point of view, the *Person* approach is a more popular approach for organisations, as under the UK legal system, it is more desirable (Reason, 2008). This is because as far as possible it uncouples the organisation from individual unsafe acts and personal injury (ibid). Nevertheless this advantage is strongly outweighed by the disadvantages of the *Person* approach (ibid). The heart of the problem is that a *Person* approach is inextricably linked to a blame culture. There are many negative effects associated with a blame culture such as the following (see Whittingham, 2004): staff try and conceal errors; employees feel fearful and may report high stress levels; employees are not recognised or rewarded and thus lack motivation; errors are ignored or hidden; management decisions tend to be taken without employee consultation; and there is often a high staff turnover.
2.4 Safety Culture

‘While the vast majority of accidents are still caused by unsafe behaviour as suggested by Heinrich as early as in 1931, research has shown that organizational and cultural factors considerably affect unsafe work behaviour’

Professor Dong-Chul Seo, 2005

Professor of Applied Health Science
Indiana University Bloomington
2.4 Safety Culture

In the 1980s, several investigations into major industrial disasters steered research into another area of study as findings revealed that ‘the root causes involve more than technical or human failings’ (Hale et al., 1998:4). It was discovered that in high technology industries, it is the organisational and cultural factors that cause disasters (IAEA, 1986; Turner & Pidgeon, 1997; Weick et al., 1999). As previously discussed, unsafe behaviours still cause the vast majority of accidents, but research has revealed that organizational and cultural factors considerably affect unsafe work behaviour (Brown et al., 2000; Oliver et al., 2002; Petersen, 1988; Tomas et al., 1999). Hence, there have been many studies exploring safety culture and safety climate. However, before reviewing safety culture and safety climate, the paragraph below summarises organisational culture, as a review of safety culture may not be complete without it, when site operations are influenced by organisational characteristics (Sawacha et al., 1999).

‘Organisational climate’ first came to light in the 1970s and referred to a global concept underlying the events and processes of an organisation (Guldenmund, 2000). During the 1980s this concept became known as ‘organisational culture’ and nowadays this is the case, with ‘organisational climate’ being a manifestation of ‘organisational culture’. Schein (1992) defines organisation culture as: ‘a pattern of basic assumptions – invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration; that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems’. Williams et al. (1989) view that organisational culture reflects shared behaviours, beliefs, attitudes and values; while according to Hofstede (1990), organizational culture is considered the top-management business. In the workplace, it provides the cornerstone for managerial and employment decision-making, as it sets the boundaries for
accepted human behaviour by establishing behavioural limits and norms (Remawi, 2011). Organisational culture plays a key role in determining the success or failure of an organisation (Choudhry et al., 2007); yet there is no apparent consensus on how to describe the culture of an organisation (Guldenmund, 2000), and still an unresolved debate as to whether an organisation ‘is’ or ‘has’ a culture (Choudhry et al., 2007). Since safety culture is perceived as a subculture of organisational culture, it is not surprising no accepted model of safety culture exists.

Safety culture is a natural by-product of organisational culture, and hence is an environment created by management that shapes attitudes to safety (ICAO, 2009). The term ‘safety culture’ first made an appearance in the 1987 OECD Nuclear Agency Report following the devastating Chernobyl disaster in 1986. Since then, many enthusiastic researchers have investigated the effects of safety culture in the workplace, with Pidgeon (1991) describing it as the most important theoretical development in health and safety research in the last decade. Lardner (2003) notes the importance of safety culture through an airline example, as despite that aircrafts fly across the world in similar types of planes, the risk to passengers varies by a factor of 42 across the world’s air carriers. Reason (1997) has argued that since organisations have very similar systems, structures and technologies, the difference in performance is largely due to systematic differences in behaviour of employees, or in other words, their safety culture. The definition of safety culture is not universal, and Guldenmund’s (2000) seminal review on both safety culture and safety climate, gives a comprehensive review of all the used definitions of both phenomenon. Table 3 below gives an example of some of the early definitions of safety culture. Guldenmund (2000) explained that these different definitions arose because of the lack of widely accepted definitions of safety culture. Hence, this lack of acceptance led to researchers redefining safety culture in relation to their specific area of interest (ibid). In a review and re-conceptualising of safety culture, Edwards et al. (2013), noted that partially due to the different definitions of safety culture, and the nature of the specific problem under
Table 3: Examples of early safety culture definitions in literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Cox &amp; Cox, 1991</td>
<td>Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety</td>
</tr>
<tr>
<td></td>
<td>Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance</td>
</tr>
<tr>
<td>International Safety Advisory Group, 1991</td>
<td>The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious</td>
</tr>
<tr>
<td>Pidgeon, 1991</td>
<td>The concept that the organisation’s beliefs and attitudes, manifested in actions, policies, and procedures, affect its safety performance</td>
</tr>
<tr>
<td>Ostrom et al., 1993</td>
<td>In a total safety culture (TSC), everyone feels responsible for safety and pursues it on a daily basis</td>
</tr>
<tr>
<td>Geller, 1994</td>
<td>The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, and organisation’s health and safety management</td>
</tr>
<tr>
<td>Lee, 1996</td>
<td></td>
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</table>

investigation, research has focused on a varying number of influences and factors including: job design, organisational management systems, policies and procedures, employee involvement in decision making, work pressures, training, and perceptions and attitudes regarding the work environment (see Arboleda et al., 2003; Choudhry et al., 2007; Cox & Cheyne, 2000; Grote, 2008; Håvold, 2010; O’Toole, 2002; Parker et al., 2006).

In 2007, Choudhry et al. noted that despite the concept of safety culture being relatively new in the construction industry, it was gaining popularity, since it has an ability to embrace all psychological, perceptual, behavioural and managerial factors. A poor safety culture has been identified as one of the main reasons as to why accidents have occurred on many different construction sites. From 100 random accidents that were investigated by the HSE (2003), it was concluded that safety culture contributed to over half of them. Hence, due to the perceived importance of safety culture, there has been various attempts to
measure its main components and investigate what constitutes negative and positive safety cultures. Remawi (2011) explains that positive safety cultures are typically:

- **Informed cultures**, where people understand the hazards and risks within their area of operation;
- **Learning cultures**, where learning is valued as a lifetime process, rather than a requirement for initial skills training;
- **Reporting cultures**, where employees can share safety information without threat of punitive action;
- **Just cultures**, which takes the fundamentals from a reporting culture, but also creates an environment where the workforce know and agree what is acceptable and unacceptable behaviour. A just culture recognises that in some situations there may be a need for punitive action, as negligence and violations are not tolerated by management.

From previous studies numerous organisational safety culture indicators have been identified and proposed, ranging from as little as two to as many as 19 (Flin et al., 2000). This is perhaps unsurprising considering the numerous definitions of safety culture in literature. From a close inspection of previous reports (see Global Aviation Information Network, 2002), Remawi (2011) suggested there were at least five indicators of safety culture: organisational commitment, employee empowerment, manager involvement, reward systems, and reporting systems.

### 2.4.1 Organisational Commitment

Organisational commitment refers to the extent that upper-management determine safety as a core value. Upper management commitment of an organisation has long been recognised as playing an important role in reducing accidents and promoting organisational safety culture (see for example Cohen
et al., 1975; Smith et al., 1978; Hofstede, 1990; Marsh et al., 1998). According to Westrum (1995) an organisation’s commitment to safety is reflected in upper management’s ability to promote safety in a consistent manner across all levels of the organisation, and demonstrate an enduring, positive attitude towards safety, even in times of fiscal austerity.

2.4.2 Employee Empowerment

Frontline workers are usually the last line of defence before an accident occurs (Eiff, 1999) and organisations with a ‘good’ safety culture, empower workers and ensure that they have an understanding of their critical role in promoting safety (Remawi, 2011). According to Hudson (2000), empowerment refers to the individual perceptions or attitudes that result from upper-management’s delegation of authority or responsibility. Within the context of safety culture, empowering employees’ means that they have a substantial say in safety decisions; hold themselves and others accountable for their actions; have the leverage to initiate and achieve safety improvements; and take pride in the safety record of their organisation (ibid).

2.4.3 Manager Involvement

Within the context of safety culture, manager involvement is the extent to which both upper and middle managers are personally involved in critical safety activities within the organisation (Reason, 1997). Day-to-day participation from upper and middle management, communicate an attitude of concern for safety to their employees, which subsequently influences the degree to which employees comply with safe practices and operating rules (Eiff, 1999). According to Reason (1997) management involvement is a combination of: this presence, a contribution to safety seminars and training, active oversight of safety critical operations, an ability to ‘stay in touch’ with everyday operation
risks, and the extent to which up and down the organisational hierarchy there is good communication.

2.4.4 Reward Systems

A key component in an organisation’s safety culture is the manner in which safe and unsafe behaviours are evaluated and the consistency of the rewards and penalties that are issued (Reason, 1990). Reward schemes could come in many different forms, such as the safety award schemes, or contractual incentives for reaching targets, and are ways of achieving control in organisations (Kerr & Slocum, 2005). They are used to promote desired individual and organisational behaviour to achieve the organisation’s goals (Lawler, 1995), yet there is no guarantee that individuals will behave the way the organisation intended (Kerr, 1995). A fair evaluation and reward system is required to promote safe or discourage unsafe behaviours (Eiff, 1999). A just/fair characteristic was one of the many characteristics that were identified by researchers (see Bolt et al., 2012) that contributed to the Olympic Park success. An aspect of this characteristic was reinforced standards, values and priorities through reward and punishment.

When it comes to producing lasting change on attitudes and behaviours, rewards, like punishments, are strikingly ineffective (Kohn, 1993). Incentives are a version of what psychologists call extrinsic motivators, which alter our behaviours but not our underlying attitudes (Kohn, 1993). However, in the short term, rewards and incentives have been proven to provide temporary compliance and behaviour change (Eriksson, 2011).

Incentive schemes should be carefully thought-out, considering that pay and reward systems for productivity are seen as a major factor in risk taking (Langford et al., 2000). Productivity and good safety practice are compatible and one should not be sacrificed for the other (Hinze & Parker, 1978) and
awards which incentivise safe behaviour while achieving the productivity levels desired should be devised (Langford et al. 2000). Safety awards are commonly used on construction projects, even though the safest firms are not necessarily the ones that use safety awards (Hinze, 2002). However incentives may be effective in reducing workplace injuries, depending on how the awards are structured (ibid).

2.4.5 Reporting Systems

A reporting culture is one of the foundations of a true safety culture (Eiff, 1999). According to Remawi (2011), for improving safety it is critical that an organisation is willing and able to proactively learn and adapt operations based on near misses and incidents. A good reporting system not only encourages and allows employees to report safety problems, it also provides valuable and timely feedback to all employees (Hudson, 2000). From data collected by construction companies, Gyi et al. (1999) revealed that the quality of reporting process were poor, and that this was coupled with failure to collate and undertake effective analysis of the collected data.

2.4.6 Measurement of Safety Culture through Safety Climate

The HSE (1999) recommends that organisations in high-risk industries measure their safety culture regularly. This is normally achieved through using self-report questionnaires to assess safety climate (Flin, 2007) - as the majority of studies linking safety culture to safety outcomes use quantitative methods, safety climate is measured not culture (Lardner, 2003). Indeed when psychometric measurement is involved, the term safety climate appears to be preferred (Cox & Flin, 1998; Hale et al., 1998).

Safety climate is ‘a snapshot of the state of safety providing an indicator of the underlying safety culture of a work group, plant or organization’ (Flin et al.,
Guldenmund (2000) explained that safety climate refers to the organisations attitudes towards safety, while safety culture is more than that, embracing concerns with underlying beliefs and convictions of those attitudes. Glendon & Stanton (2000) described safety climate as more superficial and it is now accepted that safety climate is a surface expression of safety culture (Wamuziri, 2013). Zohar (1980) coined the phrase ‘safety climate’ in the initial study of the phenomenon, which revealed that an employee’s perception of management was the most important predictor of safety climate. Since then perceived safety climate has been found that one of the most prominent contributory factors to unsafe work behaviour (Brown et al., 2000; Hofmann & Stetzer, 1996; Oliver et al., 2002; Rundmo et al., 1998; Tomas et al., 1999). Supervisor safety support, management commitment to safety, co-worker support, competence level, employee participation, and have been highlighted as dimensions to perceived safety climate (Seo et al., 2004). Guldenmund (2000) concluded that safety climate could be used as an alternative measure to safety culture.

2.4.7 Safety Climate Surveys

Measuring safety performance is notoriously problematic (Cooper & Phillips, 2004). The construction industry traditionally has used accident rates and compensation statistics as methods of measuring its safety performance. Though these are important indicators, they are lagging and re-active. The ‘softer’ and more pro-active measuring techniques such as safety climate surveys remained largely ignored until after the millennium, with Mohamed in 2002 suggesting they were in their ‘infancy’. Exploration into safety climate measures has increased since and such measures have tended to be used as substitute measure of the safety culture. Questionnaire based methods are useful for gauging the safety climate of an organisation (Wamuziri, 2013), and there have been a few examples of where climate survey approaches have demonstrated considerable value in improving safety performance such as:
Donald & Cantor (1993) who found a set of scales used in the chemical industry that reliably measured safety attitudes and (Carroll, 1998) who used a nuclear plant case study example to show how surveys were used to identify problems within a departments safety culture. A study exploring a safety climate survey used by an external consultant on the QC project found that the safety climate survey was able to forecast future accident trends (see Oswald et al., 2014). Despite these successes a clear limitation is that the survey method only provides a superficial description of culture within an organisation and practices are often too complex to be meaningfully described through wording in a survey (Hopkins, 2006).

Thus far there is no accepted and unified model for measuring safety climate. Variance in modelling techniques is often due to the requirements and input from the sponsoring body (Flin et al., 2000), though there has been a few replications of independent questionnaires (see Dedobbeleer & Béland, 1991). The wide range in styles (content, sample size and composition and method of analysis) of survey questionnaires has made it no simple task to compare findings, not only because of the methodological inconsistencies but also the language and cultural differences across countries and industries (Flin et al., 2000). A factor analysis has been typically used to identify the underlying structure, but researchers have found between two and 19 factors that influence the safety climate. A result which led Coyle et al. (1995) to state that it was 'highly doubtful' a universal and stable set of safety climate factors would be established. While theory and research have advanced, a unanimous preferred measuring approach and a comprehensive theory are still lacking (Wu et al., 2007).

Safety culture and safety climate are both well-researched areas of within safety literature, despite that they are both yet to have a universal meaning or established measurement method. Researchers have highlighted typical positive safety cultures such as reporting, just, informed and learning cultures; as well as safety culture indicators such as reward systems, employee empowerment, reporting systems and organisational involvement. Management decisions
within the organisation influence these cultures and indicators, and create an environment where unsafe acts are more or less likely. The following section communicates how construction managers have introduced additional stricter rules and regulations, due to the social context within the construction industry. This has changed the boundaries as to what acts are considered or perceived as safe and unsafe.
2.5 Social Context

‘We simply cannot go on like this’

David Cameron, 2010

UK Prime Minister
2.5 Social Context

Suraji et al. (2001) explained that in the conceptual development of a project, the client is under many social, economic and political pressures. These pressures on the client initiate constraints in which the designers and project managers have to operate. Subsequently, the clients outlined constraints provoke construction management responses, and subcontractor constraints and responses. This cause-and-effect process can potentially increase operative constraints through inappropriate construction control procedures or planning, and can lead to inappropriate site conditions, construction operations or operative actions (Suraji et al., 2001). In the following two sections, 2.4 Social context and 2.5 Industry context, some of these social, economic and political pressures are discussed.

Safety procedures, rules and regulations are primarily created to control behaviour in problematic or risky situations (Reason, 2008) and are the core component of safety management systems (Mohamed, 2002). Initially procedures may simply have provided instructions on how to do the job or deal with foreseeable hazards (Reason, 2008). However, procedures are constantly amended to incorporate lessons learned from previous incidents (ibid). Amendments of health and safety procedures and rules have also been influenced by external bodies, such as regulatory bodies and insurers, and there are suggestions that these have had a negative impact on safety since they can be excessive or can lack ‘common sense’.

The Löfstedt report (2011) suggested that the problem does not lie with the health and safety regulations but more with the way they are interpreted and applied. In a response to this report, it was noted that health and safety systems will be ineffective if businesses continue to over-comply with health and safety regulation due to fear of civil litigation (Department for Work and Pensions, 2011). This over-compliance is linked with the perceived ‘compensation culture’
in the UK; as in an attempt to avoid workers’ compensation costs, firms have implemented excessive safety measures (Manu et al., 2013). The existence of a 'compensation culture' have been challenged by researchers (BRTF, 2004; Williams, 2005; Lord Young of Graffham, 2010), with Williams (2005) suggesting that 'loose talk of a compensation culture' is benefiting newspapers and the insurance industry, but lacks clear evidential basis (Williams 2005). The BRTF (2004) report dismissed 'compensation culture' as media construction, albeit one with real consequences. For example, in a poll of over 700 UK doctors, two thirds revealed they were practicing defensive medicine as a result of the 'compensation culture' (BBC, 2001). Media-fuelled advertisements in the UK have led to the nationwide belief that there is a compensation culture, yet it is one of perception rather than reality (Lord Young of Graffham, 2010). This has led to fears that businesses will be sued for even the most minor accidents and hence aim to eliminate all workplace risk, instead of setting out a rational and proportionate approach (ibid). The excessive rules that have been introduced by businesses to eliminate all workplace risk have altered perceptions of upper management on what behaviours are acceptable or safe. In 2010, concern over the growing compensation culture in the UK reached the prime minister of the UK, David Cameron. He stated:

‘Good health and safety is vitally important. But all too often good, straightforward legislation designed to protect people from major hazards has been extended inappropriately to cover every walk of life, no matter how low risk. A damaging compensation culture has arisen, as if people can absolve themselves from any personal responsibility for their own actions, with the spectre of lawyers only too willing to pounce with a claim for damages on the slightest pretext. We simply cannot go on like this. That’s why I asked Lord Young to do this review and put some common sense back into health and safety. And that’s exactly what he has done.’

In a report to the Prime Minister, 'Common Sense Common Safety’, Lord Young of Graffham (2010) highlighted that a growing compensation culture in the UK
construction industry has had adverse effects on health and safety performance and that it must be eradicated in order for common sense to prevail. In agreement with Lord Young, Löfstedt, (2011) added that matters concerning health and safety have become increasingly ridiculed and therefore gradually losing its importance in society. It also indicated that excessive bureaucracy and red tape requirements have been blamed for preventing individuals from engaging in socially beneficial activities, overriding common sense and eroding personal responsibility. The HSE stated that is imperative that workers and working groups disassociate ‘safety’ from ‘bureaucracy’ (HSE, 2003). Thus more emphasis needs to be placed on genuine safety and concern for workers’ wellbeing if fear of the compensation culture is eliminated (Löfstedt, 2011). The perception that there is a compensation culture has led to the general abandonment of a traditional ‘common sense’, which according to Wheen (2004) is driven by overzealous bureaucracy and related to (American inspired) ‘political correctness’. Conceptually, common sense in safety lacks clear definition, and application of dictionary definitions to safety practices on a construction site is problematic (Aboagye-Nimo, 2013). In Ludhra’s (2015) recent book, ‘Common Sense Guide to Health and Safety in Construction’, common sense is defined as the ability to behave in a sensible way and make practical decisions. Aboagye-Nimo et al. (2013) explain that common sense in the case of construction site safety refers to more than basic level of practical knowledge but requires experience and long term knowledge gained through training, experience, experiential learning in new situations. Aboagye-Nimo et al., (2015) argued that ‘common sense’ is a hidden form of knowledge, which is an indication that it is tacit knowledge.

Many construction sites and projects are known to be dynamic and involve large, small and micro firms at different stages of the project (Izam Ibrahim et al., 2013). Due to the fluidity of the activities on construction site, an overlap of cultures between strict and standardised safety measures and common sense safety may exist on large projects. This creates an opportunity for research of ‘common sense safety’ approaches operating alongside strict safety procedures
within large project environments. The following figure (5) illustrates this, from a study (see Aboagye-Nimo et al., 2013) on the views of workers on the differences in safety approaches adopted by construction companies with respect to their sizes. It illustrates that the bureaucratic and context-free approaches used in large firms that have been partially driven by the compensation culture, while small firms adopt a more common sense and situational approach.

Previous studies have suggested that some safety rules are inadequate with: Embrey's (1999) study on a large petrochemical plan in the UK, finding one of the reasons for not following formal procedures was that: ‘if the job was followed to the letter, it wouldn’t get done’; and Paap's (2003) ethnographic study, where she found that safety is interpreted in two forms: the official procedures and the actual working operations. This further emphasises the importance of correct procedures, rules and regulations, and according to Reason (2008) procedures can: give the wrong information, be inappropriate, unworkable in the current situation, be out of date, not known about, not understood or not written for a particular task. It should be also noted that subcontractors’ employees are sometimes not familiar with the rules and regulations of the principal contractor (Choudhry & Fang, 2008). To illustrate

Figure 8: An illustration in the different approaches from both small and large firms in Aboagye-Nimo et al., 2013
Reason’s (2008) point, he highlighted that 70% of all human performance problems could be traced to bad procedures in the nuclear industry. Considering procedures can be inappropriate for situations meaning safety rules can be good or bad (Reason, 2008), the flexibility of a common sense approach could bode well for sites that are well-managed.

The aim of Lord Young of Graffham’s (2010) report was to: ‘free businesses from unnecessary bureaucratic burdens and the fear of having to pay out unjustified damages claims and legal fees. Above all it means applying common sense not just to compensation, but to everyday decisions once again.’ Since the commissioning of this report, researchers, policy makers and industry practitioners have been compelled to rethink their views on the state of safety issues in the UK (Aboagye-Nimo, 2013). While in 2011, the DWP, outlined progress updates on 35 of the proposed actions from Lord Young of Graffham’s (2010) report, there have since been researchers who have still noted compensation cultural influences in the construction industry (see for example Aboagye-Nimo, 2013; Manu et al., 2013; Wamuziri, 2013).

Managers of construction firms (especially large ones) have been found to be affected by the fear of the compensation culture the most as they have a larger workforce to cater for and as such, end up creating further strict rules and regulations to prevent claims from occurring (Gyi et al. 1999; Wamuziri, 2013). In reference to the law of tort, Lord Young of Graffham (2010) states that the compensation culture has created a belief that when accidents do occur someone is at fault and financial compensation is perceived to make good of an injury, rather than accepting they can and do happen. This gives the perception that for every accident that occurs, blame should be attributed, which inextricably linked to a Person approach or a bad apple model (Reason, 2008).
2.6 Industry Context

‘No organisation is in the business of being safe’

Professor James Reason, 2008

Professor of Psychology,
University of Manchester
2.6.1 Production Pressure Risks

In the construction industry, the competitive tendering process means that there is little room for error (Morton & Ross, 2007), and despite guidance from the UK government that the lowest price should not determine the cost of the contractor, the vast majority of work is still secured on this basis, particularly in the public sector. Lingard & Rowlinson (2005) explain that competitive tendering can encourage contractors to bid low and discourages them from factoring in the cost of performing the work safely. Low prices can induce tight budgets and greater production pressure. In 1978, Hinze & Parker explained that good safety performance and high productivity are compatible and should not be sacrificed for one another (Hinze and Parker, 1978). Since then, it has been noted that a key component of safety culture is maintaining a balance between the pressure for production and safety (ACSNI, 1993); and that conflict between production and safety can be an important explanation for large-scale accidents (Reason, 1997). Many researchers have highlighted that perceived production pressure can result in a degradation of safety performance (see Hinze, 1997; Rundmo et al., 1998; Brown et al., 2000; Mohamed, 2002; Seo, 2005; Mitropoulos et al., 2005; Hinze & Parker, 1978 Goldenhar et al., 2003; Mitropoulos & Cupido, 2009; Oswald et al., 2013), but this issue has been a topic of accident research that in general has not been adequately addressed in the construction industry (Liu, 2014). The value of safety over production pressure remains to be an important message that must be communicated by both the top and site management team (Choudhry & Fang, 2008). Under production pressure, safety may not be a management priority and this means that safe behaviour is often inhibited (Wadick, 2007). Hinze (1997) demonstrated that schedule status correlates with accident rates; in other words, contractors who were ahead of schedule had fewer incidents than those behind schedule. This has led to the suggestion that under production pressure the managerial priority may not be given to safety (Han et al., 2014).
In Flyvbjerg et al.'s (2002) paper they observed that costs are underestimated in almost 9 out of 10 public sector projects. Usually, when a project experiences a large cost overrun, it overruns its schedule significantly as well - the Perth Arena in Western Australia and Edinburgh Trams projects being recent high profile examples (see Murphy, 2010; Railnews, 2012). Time and costs calculated in the early stages of the project are, at best, only guesses, according to Atkinson (1999), as Ahiaga-Dagbui & Smith (2014) note that very little is known about the project at this stage. The frequency of underestimates in the projects suggests that many projects will be under real production pressures, and as highlighted, production pressures have been found in many studies to having an adverse effect on safety.

One way of trying to improve productivity in a tight schedule is to have bonuses or awards. However these need to be carefully thought through, considering Choudhry & Fang’s (2008) study found that productivity bonuses led workers to achieve higher production at the cost of safety. People tend to commit unsafe acts because they have been rewarded for doing so (Sawacha et al., 1999), and Mullen (2004) postulates that operatives always compare the positives (e.g. money) against the negatives (e.g. perceived potential health risks). Mullen (2004) explains that as long as the positives outweigh the negatives, operatives are more likely to engage in unsafe behaviours. Therefore on-site production incentives needed to be applied compatible with good safety performance (Choudhry & Fang, 2008). From in depth analysis, Reason (2008) states that the most powerful pushes towards repeated patterns of unsafe acts come from an unsatisfactory resolution of the conflict between production and safety goals. These goals represent a delicate balance, and it is important to realise that no organisation is in the business of being safe (ibid). Reason (2008) explains that companies must obey both the ALARP principle (keep risks ‘As Low As Reasonably Practicable’) and the ASSIB principle (and still stay in business). Two important principles considering in 1997 Reason recognised that it had become increasingly clear that few organisations can survive a catastrophic organisational accident. The overall 'value' of the service provided by the
contractor, should include occupational health and safety performance; not least because poor health and safety performance reflects badly upon construction clients (Lingard & Rowlinson, 2005).

Hudson (1996) demonstrated that there can be a close relationship between profitability and the amount of risk taken. To remain competitive, many companies operate in a moderately risky zone, with occasional excursions into a high risk region (Reason, 2008). Additional risks can, for example, come in the form of hiring cheap subcontractors, which can have an adverse reaction on safety (Lingard & Rowlinson, 2005). It is worth noting that as traditional practice has been to select contractors on the basis of lowest price (Winch, 2000). Contractors have to bid very hard to win contracts and then have strong incentives to maximise profits by cutting corners (Sorrell, 2003). A lack of direct control or inability to co-ordinate the activities of subcontractors (Debrah & Ofori, 2001) can have an effect on site safety. Saloniemi (1990) found that subcontractors can inadvertently create hazards for others on site, even if they are working safely themselves; and Salminen (1995) revealed that subcontractors' workers strayed into danger zones more often than those of the main contractor. More recently it has been noted that subcontracting continues to have an adverse effect on H&S in the construction industry (see Loosemore & Andonakis, 2007; Yung, 2009; Manu et al., 2013). For example, in the face of programme pressures and small profit margins, subcontractors are often squeezed so tight that investment in training and development activities are restricted, even in major organisations (Loosemore et al., 2003). In such major organisations, there is also little sense of paternalism towards the subcontractors they employ (ibid); and when reliance is mainly on subcontracted workers who are of different nationalities, the risk of accidents at the work site is compounded (Debrah & Ofori, 2001). Statistically, migrant workers have been found to approximately double the chance of a fatality (CCA, 2009), though such statistics need to be further unpacked in terms of research knowledge (Tutt et al., 2013a).
2.6.2 Multinational Workforces

Globalisation is an inescapable fact, and the use of migrant workers in construction is a world-wide phenomenon that is common practice in the UK (Bust et al., 2008). The expansion of the European Union has led to an influx of foreign workers into the UK from the A8 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia). There is no universally accepted figure for the number of migrant workers in Britain and statistics on their nationality or migration status are limited and uneven (Pink et al., 2010); although it has recently been estimated that they make up around 12% of the UK construction industry site-based workforce (McMeeken, 2015). Multinational misunderstandings that occur can lead to health and safety problems, and therefore a new approach to health and safety management is required (Bust et al., 2008). Statistical evidence (see for example CCA, 2009, HSE 2011 & HSE, 2012) suggests that there was a rise in deaths of migrant workers in construction that is at the very least twice what should be expected, which suggests that migrant workers may be at a higher risk than UK workers (Tutt et al., 2013a).

The use of migrant workers in construction has become a particularly controversial topic (Davis & Gibb, 2009), and has put pressure on the management of health and safety at a time when the industry was progressing relatively successfully (Bust et al., 2008). Owen (2007) attributed a 25% increase in construction fatalities to communication issues and poor work practices following an influx in migrant workers; a claim which according to Tutt et al. (2013a) needs to be unpacked in terms of research knowledge. The following two sections explore the current understanding of communication and differences in national culture.
2.6.2.1 Communication Issues

A reliance on cheap and ‘flexible’ sources of regularly and irregularly employed migrant workers has always been a key feature of the UK construction sector (Balch & Geddes, 2003). Yet, the influx of migrant workers has created additional challenges to employers in the UK (Tutt et al., 2011). This problem is not only found within the UK construction industry, with research suggesting the United States is facing a similar problem (Hare et al., 2013). Perhaps the most obvious issue is communication. Countries appear to be dealing with this challenge in similar ways, with the use of interpreters, translation of safety information and a variety of visual communication methods (Bust et al., 2008). Consequently the response from the UK, and indeed wider global construction industry, has often been to: use interpreters, to include an English speaker within each work gang, to translate safety information and training into common languages found on the sites, and to draw on a variety of visual communication methods (Dainty et al., 2007; Bust et al., 2008), from films to cartoons (Kivrak et al., 2013). Though it is essential that there is an assessment of the effectiveness of these methods (Bust et al., 2008).

McKay et al., (2006) found that two-thirds of migrant workers received no health and safety training and the other third tended to have a short site induction that as often not understood or communicated effectively. The issue of understanding has been highlighted by Hare et al. (2013), following a study by Halverson (2003) in the US, where he found training did not result in reduced accident rates among non-English speaking workers. At least in the short term, language barriers are the greatest obstacle to the smooth integration of migrant workers (D’netto, 1997). Despite concerns regarding communication within the construction industry, Loosemore & Lee (2002) argue there has been an insufficient examination of inter-cultural communication problems within an increasingly diverse construction workforce and found significant communication problems with migrant workers. Communication difficulties have obvious implications including
worker engagement and health and safety management (Hare et al., 2013). The importance of safety communications has been highlighted by many in safety literature, with researchers including safety communication in their assessments of safety climate (e.g. Mearns et al., 2003; Lin et al., 2008). Hare et al. (2009) believe that an essential starting point is to developing methods of effective communication and Bust et al. (2008) believe that a new approach to health and safety management is required for nationally diverse projects. Trajkovski & Loosemore (2006) recommend that safety training is provided in a variety of languages following strong support for this by non-English speaking migrants in their Australian study. However, some concern has been highlighted that this may hinder foreign worker's integration and could discourage learning English (Commision on Integration and Cohesion, 2007). The best long-term investment is considered to provide English language courses (Hare et al., 2013), though this approach may not seem appealing as according to McKay et al., (2006) most migrant workers in construction are employed in the short term.

2.6.2.2 National Culture

Cultural diversity that is managed well can be a significant asset, and many of the world’s most successful companies such as Siemens, AT&T and Xerox have shown that it can be used to competitive advantage (Shaw, 1995). However these companies are in a minority and the construction industry has been highlighted as having a particular poor record in this area (Cavill, 2000). According to Baiden (2006), an integrated project delivery team working together as a single unit, remains an aspiration in the construction industry.

As well as communication and language issues, the UK Health and Safety Executive (2015) attribute differences in culture and understanding of the UK health and safety standards as a reason why there could be a potential increase in risks for migrant workers on sites. Workforces can be drawn from many different countries, which as well as using different languages, have a variety of
cultural backgrounds. These variations can lead to different work practices and safety behaviours on-site. Such behaviours can be perceived in a different way across the globe and are informed by specific sets of conventions and cultural knowledge, which can lead to cross-cultural misunderstandings that initiate health and safety issues (Bust et al., 2008). Ochieng & Price (2009) note that one of the competencies required for a project manager within a multicultural project is the ability to explain the behaviour of individuals in the project team and predict how the team will behave.

There has been an increase in the awareness of the importance of understanding cross-cultural management (Torrance, 2004). Various studies (such as He, 1995; Baba, 1996; Ngowi, 1997; Chan, 1997; Helmreich & Merritt, 1999; Ngowi, 2000; Phua, 2002; Pheng & Yuquan, 2002; and Low & Shi, 2002) on national cultural influences in the construction industry, led to Ali (2006) stating that national culture was increasingly capturing the attention of researchers as an issue of concern. Yet despite this recognition Mearns & Yule (2009) highlighted that there has been a lack of empirical research analysing the effects of national culture on safety attitudes, behaviour and performance. Helmreich (1999) argues that if safety measures are to be effective and worthwhile, the organisations need to have a full appreciation of the influence of national culture.

In 1980, Hofstede proposed four dimensions on which the differences among national cultures can be understood. Although there have been debates and critics on Hofstede’s cultural dimensions, his work has remained influential (Mearns & Yule, 2009) and it is accepted as one of the most convenient structures to use in empirical research (Seymen & Bolat, 2010). Many studies (e.g. Havold, 2007; Burke et al., 2008; Mohamed et al., 2009) have supported that national cultural differences are affecting safety culture. When making these relations, Hofstede’s cultural dimensions are widely used as: they draw the most convenient and comprehensive framework in workplace safety and are highly accepted (Ali, 2006). To give an indication of cultural differences,
Hofstede’s four original dimensions, and their relation to safety, are outlined below:

2.6.2.2.1 Power Distance

Power distance (PD) is related to how the hierarchical structure of the organisation is interpreted. In countries with high PD, the management’s authority is accepted as a natural consequence of inequality; while countries with lower PD have a tendency to consider others equal despite their official status. Hence, in high PD countries superiors are expected to exercise power and subordinates are expected to be passive. The organisation is hierarchical with decision making decentralised (Mearns and Yule, 2009), which means decisions related to safety are made by superiors and are expected to be obeyed by subordinates (Gyekye & Salminen, 2005). Employees believe all workplace safety responsibilities belong to senior management, and their only responsibility is to obey the rules (Seymen & Bolat, 2010). This high PD culture does give senior management more control over the safety culture through one way down communication determining rigid rules, procedures and strict supervision.

According to Seymen and Bolat (2010), PD is manifested as a dimension closely related to behaviours and attitudes towards safety. Ali (2006) found that Pakistan construction managers had a strong perception for power distance, they felt reluctant to ask for participation of workers while developing site safety plans and were hesitant to allow workers to stop work immediately if they encounter any safety hazard conditions. Using the Pearson correlation of interactions between manager’s cultural trends and their safety practices, Ali (2006) found some strong relationship patterns.

In low PD countries, the organisational structure is much flatter with subordinates able to participate in the decision-making process (Mearns and Yule, 2009). Employees in such cultures want to participate in every stage of the safety management process, express opinions and suggestions and use
initiatives when a workplace safety problem arises (Seynam & Bolat, 2010). Reason (1997) argues that in a low PD country an ‘efficient’ safety culture can be realised through eager and active participation from employees, which makes a low PD culture a more convenient structure in terms of safety culture.

2.6.2.2.2 Uncertainty Avoidance
Uncertainty avoidance (UA) is related to the extent to which cultural members feel anxious from uncertain and complex situations. Cultures with high UA desire predictability and structuring within their organisations. Seymen and Bolat (2010) state that UA avoidance and safety concept is ‘inevitable’ and that there are various researchers supporting this relation within academic literature (see Havold, 2007; Burke et al., 2008; Schubert & Dijkstra, 2009; and Mascarenhas et al., 2010).

Burke et al. (2008) suggest that UA avoidance has a special role on safety culture and raises two important points of note. Firstly that in high UA cultures, standard structures and didactic training regimes such as lectures or videos were preferred in comparison to more uncertain and experimental methods such as discussion of cases, role play and scenario simulations. This was due to the wider range of variations associated with a more experimental training process. Secondly, high UA cultures have a more unquestioning automation and dependency on standard procedures, which may limit adaptation to changing situations. This resistance and inadaptability to change may result in the effect of safety training being less in high UA cultures. Hence, high UA cultures prefer standard methods, systems, policies and rules to be present and protect them from safety risks; while low UA cultures safety standards and procedures are more complex, less formalised and are more open to a wider range of safety systems.

2.6.2.2.3 Individualism vs Collectivism
Individualism is when members of a society perceive themselves before group members; while in collectivistic cultures individuals perceive themselves as a
member of the group before individuals. Individualistic employees are expected to take care of themselves and their behaviours are emphasised on personal benefits; while collectivistic individuals have greater loyalty to their group's interest. Hence, individualistic cultures see themselves as responsible for themselves and their immediate family, while individuals in collectivistic cultures perceive themselves as responsible for their extended families, relatives, friends and organisations.

If collectivism is dominant, individuals are reluctant to express their personal opinions and views on critical decision making. Thus they are more likely to obey standard rules and following others, rather than taking initiatives individually. According to Fiske (2002), as individualism is associated with more direct communication and problems, this culture will be more beneficial in developing a positive safety culture.

Shupp and Williams (2008) suggests that in high risk situations, groups are more risk adverse than individuals, which demonstrates the lower risk taking behaviour tendency in collectivistic cultures (Seymen & Bolat, 2010). This could be due to individualistic cultures being overconfident, which Chui et al., (2010) stressed was within an individualistic culture. In acquiring a positive safety culture it is crucial to consider the Individualism/Collectivism cultural backgrounds (Seymen & Bolat, 2010). For individualistic cultures, an empowering and participative approach should be considered, with detailed personal safety trainings, personal safety awards and safety should be emphasised as being a personal responsibility. Collectivistic cultures, safety can be shown as mutually beneficial for the collective group, with the safety management approach being structured by group norms.

2.6.2.2.4 Masculine vs Feminine

In masculine cultures, assertion, effectiveness, materialism, competition and enthusiasm are dominant; while in feminine cultures, quality of life, relations, equal rights and responsibilities. According to Seymen & Bolat (2010) there are
studies which suggest Masculine/Feminine may influence safety culture to some extent.

In masculine cultures, individuals have high personal responsibilities and desire to feel 'safe' because of this. This means that individuals in a masculine culture may behave more cautiously and comply with rules and procedures. Instead of caring for others, masculine cultures crave individual success, development and material benefit, suggesting personal safety awards and qualifications would be more beneficial in this type of culture. In feminine cultures, there is greater onus on relations and others’ health and safety (Mearns and Yule, 2009). Workplace and colleagues safety are more important and are related to their own personal safety. Different approaches should be used by safety management for both masculine and feminine cultures (Seymen & Bolat, 2010). In masculine cultures distributing information on safety concerns that effect individuals personally will be beneficial; as well as offering career development chances and extrinsic awards for safety performance. In feminine cultures, encouraging others’ safety as well as personal safety such as announcing safety successes of the whole organisation will be more efficient.
2.7 Chapter Two Summary

Unsafe acts have been highlighted by many researchers as being a major cause in accidents (see for example Heinrich et al., 1980; Salminen & Tallberg, 1996; Lingard & Rowlinson, 2005). This has led to researchers arguing that the construction industry should shift its safety management effort towards the elimination of unsafe acts (see Shin et al., 2014). The definition of an unsafe act is not universal and this study has assumed the following definition: *An act which deviates from a generally recognised safe way or specified method of doing a task and/or increases the probability of an accident to unacceptable levels.*

Unsafe acts can be errors (unintentional behaviours) or violations (a disregard of rules and regulations). They can also be divided into active failures (short-lived mistakes, lapses, slips and violations committed) and latent conditions (‘resident pathogens’ within the system that arise from decisions made by designers, builders, procedure writers, and top level management). All of these types of unsafe acts can be undertaken by those at operative or management level, and this study has not tried to decipher between different types, instead just grouped and identified them all under the wider unsafe act umbrella.

Accident causation models have developed throughout time from accident proneness theories to domino theories, and more recently, system theories. Throughout all of these developments, unsafe acts or behaviours to some extent, have been inherent within the accident models. There have also many contributing factors to accidents that have been highlighted by researchers and they can be grouped under three headings: job-related factors (such as occupation, work shift, equipment and materials), individual-related factors (such as age, gender and experience) and organisational-related factors (such as workgroup size, co-worker support, management commitment to safety).
There are different perspectives on unsafe acts; two of which are the Person approach and the System approach. The Person approach concentrates on blaming individual errors, while the System approach goes beyond the local events and attempts to find contributory factors in the workplace, organisation and system as a whole (Reason, 2008). Unsafe acts through a Person model perspective has the benefit of uncoupling individual unsafe acts and the organisation's responsibility (ibid). However, its advantages are strongly outweighed by its disadvantages (ibid). The greatest shortcoming of the Person model is that it is inexplicably linked with a blame culture, where unsafe acts and accidents are not reported, misreported or late reported creating an environment that is difficult to learn in. Dekker (2006) highlighted that the Systems approach is the 'new' approach and that is more desirable.

Since the 1980s, researchers have acknowledged that unsafe acts or behaviours are considerably affected by organisational and cultural factors. The literature review explored such factors in the wider social and industrial context of the construction industry. Safety culture was first discussed in a report on the Chernobyl disaster in 1986. Since then, typically good safety cultures such as just culture, learning culture and reporting cultures have been highlighted; and various safety culture indicators such as reward systems, management involvement and worker empowerment have been outlined (see Remawi, 2011). These cultures and indicators are created through management decisions and can influence safe or unsafe acts that are undertaken.

In a social context, the perception that there is a 'compensation culture' in the industry has led construction managers to create more rules and stricter rules. This has created an impractical approach where all risks are attempted to being eliminated, especially when, according to Young Graffham of Young (2010), the prevalence of compensation culture is a perception, rather than a reality.

Within an industrial context, previous literature has strongly linked construction production pressure and unsafe acts. While it is clear that no
organisation is in the business of being safe, and risks do need to be undertaken to remain competitive, risks should not reach unacceptable levels. Such risks can involve cost-cutting, through actions such as employing a cheap multinational workforce. In a safety context, previous research has highlighted that some dimensions of national cultures are more desirable, and there can be additional challenges in multinational projects such as communication issues.

This literature review revealed the importance and prevalence of unsafe acts within accidents. It has been highlighted how unsafe acts can be influenced by various individual-related, job-related, and organisational-related factors, and prompted through different social, cultural and industrial contexts; which has created a platform for this research study on why the unsafe acts occurred at the QC project.
Chapter Three: Research Philosophy & Methodology

‘You must be clever to be at University... aged 12’

FCBC Construction Worker

2013

Figure 9 – A ‘youthful looking’ researcher: Your scribe on-site during early construction of the Queensferry Crossing
3.0 Research Philosophy & Methodology

The previous chapters have outlined the unsafe act problem and discussed relevant research literature. This following chapter explains how the problem will be explored. After a brief discussion on the theoretical approaches undertaking in the construction management research field (3.1.1), the theoretical approach and philosophical assumptions of this study are laid out (3.1.2). Philosophical assumptions are important as they determine the contribution of the research to knowledge (Zou et al., 2014) and affect the way data is collected and analysed (Dainty, 2008). This outline of philosophical assumptions leads into an introduction of the research approach chosen, ethnography (3.2). This is followed by a discussion on the research design (3.3), data collection (3.4), data analysis (3.5), validity, reliability and generalisability (3.6) and ethical considerations (3.7).
3.1 Research Philosophy

‘Construction appears to have nothing to do with philosophy as it is a practical activity’

Professors David Boyd & Mark Addis, 2010

Birmingham City University
3.1 Research Philosophy

At first, it may seem that construction and philosophy have little in common. However, construction is a rich source of philosophical problems, and research must meet the constant demanding challenge of ensuring the relevance of theory to practice (Addis et al., 2014). From a research viewpoint, philosophical considerations can have significant influence on the quality of research work (Easterby-Smith, 1997) and researchers should clearly explain their philosophical assumptions upon which their contributions are based before selecting a research methodology (Zou et al., 2014). This helps explain why certain research methodologies are appropriate for conducting certain types of research (Creswell, 2009). The two main philosophical considerations in social research are ontology and epistemology. Ontology is concerned with the assumptions and implications of conceptual reality (an individual's version of reality or an experience of reality) and the question of existence (Fellows & Liu, 2008). The ontological position of objectivism infers that social phenomenon confront social actors as external facts beyond their influence (Zou et al., 2014). Though the construction management research community has no established research practices or methodologies, studies by Dainty (2008) and later Zou et al. (2014) found that construction safety researchers mainly adopt an objectivist ontological position.

Epistemology refers to what should be regarded as accepted knowledge in a discipline (Bryman, 2008) and epistemological assumptions are about how the social world may be understood and communicated (Zou et al., 2014). Positivism and interpretivism are often seen as two epistemological extremes. In construction management research, Dainty (2008) suggested the interpretivist approach has been underestimated and Zou et al. (2014) believe an alternative paradigm could better enable for collaboration between researchers and industry practitioners in construction safety performance.
3.1.1 Construction Management Research Philosophy

The boundaries of construction management research are not well defined (Dainty, 2008) as it sits on the intersection between natural and social sciences (Love et al., 2002). There has been a predisposition to understand the construction industry through quantitative methods of the natural sciences (Love et al., 2002; Sherratt, 2013) and this has been the case for many years (Fellows & Liu, 1997). Dainty (2008) believes this has created orthodoxy of ‘natural science’ methods to study social phenomena and has challenged the construction research community by writing widely on the matter (1997), (2008), (2010).

Concerns over the apparent dominance of positivism in the mid-1990s led to a philosophical debate initiated by two papers in particular (Seymour & Rooke, 1995; Seymour, Crook, & Rooke, 1997) in the journal Construction Management and Economics. These papers questioned this dominance suggesting that the culture of research would have to change if researchers were to have an influence on the industry. In response to Seymour and Rooke (1995), Runeson (1997) entered the debate claiming that any move away from traditional positivist methods to a more interpretivistic would be ‘anti-scientific’, and that interpretivist methods could only be used for building hypothesis rather than testing them. Harriss (1998) also argued that the scientific approach was the best method to produce good research, and Raftery et al. (1997) welcomed the debate but also responded critically. Seymour et al., (1997) defended their position claiming Runeson (1997) had misunderstood a number of their points. Harty & Leiringer (2007) suggest that, in broad terms, research in construction management either adopts: a positivist approach, and focus on something factual about the world it focuses on or an interpretivist view, where understanding how different realities are constituted is the objective.
A number of writers are of the opinion that the opposite of the positivist research paradigm is rationalism (Goles & Hirschheim, 2000). Philosopher Vernon Bourke (1962) defined rationalism as a theory ‘in which the criterion of the truth is not sensory but intellectual and deductive’. It is the idea or concept that logic or reasoning is the underpinning basis of knowledge and fact (Gough, 2005). A high confidence in reason means rationalists believe that proof and physical evidence are unnecessary to ascertain truth. Or in other words: ‘there are significant ways in which our concepts and knowledge are gained independently of sense experience’ (Stanford, 2013).

Phelps & Horman (2010) concluded that traditional construction research methods have enabled a focused but narrow understanding and that they are not adequate to investigate the complex interactions that lead to many of the industry’s persuasive social and technical problems. This issue of complexity and intricacy was highlighted in a research network, ‘Rethinking Project Management’ which consisted of practitioners and researchers between 2004 and 2006. The practitioners involved particularly stressed that ‘real projects and programmes are much more complex, unpredictable and multidimensional than the rational, deterministic model which dominates the literature’ (Winter et al., 2006 p.644). They also highlighted the need to understand projects as social processes, with greater research focus on social interaction and advocate different approaches which allow researchers to explore ‘the actual reality of projects’ (ibid, p.643). Cicmil et al. (2006, p.675) stress the need to understand ‘project actuality’ which they define as the ‘complex social processes that go on at various levels of project working’. The chosen research method for this study is ethnography, which is discussed in more detail later in this chapter. Ethnography offers an opportunity to explore what ‘actually’ happens on-site (Aboagye-Nimo, 2013), and hence can provide insights of the actualities within the complex social setting of a construction project.

In 2010, Dainty believed that there had been little change in methodological approaches, though this was countered by some (e.g. Fellows, 2010). In a recent
analysis of construction safety research methods used in five highly ranked international journals and one international conference proceedings, Zou et al. (2014) found that 23.9% were qualitative research and over half of these used interviews through individuals, groups or focus groups/workshops. These findings suggest more of a paradigm shift, but Zou et al. (2014) still believe that it is prudent that more researchers adopt a more constructivist ontological and interpretivist philosophical standpoint; suggesting that there may be a gap between the direction taken by researchers and the practical needs of the construction industry with relation to safety. This discussion represents a brief summary of the on-going debate, and the arguments have been taken into consideration when determining the most appropriate research philosophy and methodology for the project in question.

3.1.2 Theoretical Approach for this Research Study

This study adopted a rationalist ontology and interpretivist epistemology. Within this theoretical framework, reason is the primary source of knowledge (Schuh & Barab, 2007) and there is a belief in the ability of human beings to explain and understand their social world (Uddin & Hamiduzzaman, 2009). Interpretivism requires the researcher to depict the subjective meaning of social action (Bryman, 2008), and is particularly valuable for research in management and other social areas by indicating that reality is socially constructed by the people involved (Fellows and Liu, 2008). As discussed in the previous section, traditional construction management research is often rooted in an objectivist positivist theoretical position. However, such a paradigm may not be appropriate for this project, considering even the definition of an unsafe act is not universal. Dainty (2010) highlighted that concern is raised when such theoretical approaches are applied to social aspects of construction and in particular, people. The processes in construction industry are carried out by people in social settings through social engagements and is therefore is very much a people industry (Barrett & Sutrisna, 2009). Seymour et al. (1997) also
pointed out that the ‘object’ of the research in construction management is usually people. Unsafe acts are committed by people and acts are determined safe or unsafe by people. They can be committed in social engagements (e.g. a supervisor telling a worker to do work they are unskilled for) in a social setting (usually the construction site or office). Considering the focus of this study is people and that unsafe acts are committed in the social construction site arena, this leans on a move away from the traditional objective and positivist construction research approach.

The rationalist interpretivist philosophy assumed for this study means that the method will tend towards a qualitative approach. Qualitative approaches aim to gain insights and to understand people’s perceptions of the world (Fellows and Liu, 2008). Potential research methods using a more qualitative approach for this project included: interviews, observation, action research and ethnography. In such methods, the researcher often has a more interactive, co-operative and participative role where the observer is part of what is being observed (DiBella, 2005). This is quite different from traditional construction research methods where the researcher’s relationship tends to involved rigid separation where the observer is independent.

The main task of a qualitative research interview aims to understand the meaning of what the interviewees say (Kvale, 1996). One of the criticisms of such an approach is that researchers have become over-dependent on interviews without considering their limitations (Hammersley, 2003). Despite the dominance of interviews in qualitative construction management research, they may not reveal the true nature of construction safety issues alone (Zou et al., 2014). Therefore, it is worth considering other methodological approaches. Action research aims to build and/or test a theory to solve an immediate practical problem (Azhar et al., 2010) and produce guidelines for best practice (Denscombe, 2010). However, this research is usually carried out by a team of researchers and members of the organisation (Zou et al., 2014) which was impractical for the project in question. Observation is a fundamental way of
finding out about the world, but is more than just looking or listening. Observers need to be selective in order to become systematic and their observations need to be recorded in some way. Observation should be considered when ethnography is impractical (Zou et al., 2014), which was not the case for this study. Ethnography takes observation a step further as an aspect of the role of an ethnographer is participation in the setting observed (Pole & Morrison, 2003, p. 20). Full access of the site was permitted as part of the PhD contractual agreement, giving the opportunity to use an ethnographic approach.

The theoretical framework was based on a rationalist ontology and interpretivist epistemology, which meant that reason was used to interpret the real ‘meaning’ of the data. Considering ethnographers are ‘meaning finders’ (Miles & Huberman, 1994) this research approach was deemed appropriate. Ontologically, the underpinning assumption of ethnography is that ‘social reality is presented, not known’ (Van Maanen, 1988, p.7), a suitable assumption for portraying reality through reason. There is a strong history of ethnographies that focus on ideas and thought, since ethnographers are especially interested in the relationship between thought and behaviour (Murchison, 2010, p.140).

While ethnographic inquiry can vary greatly, an important feature is a concern with action, with what people do and why (Hammersley & Atkinson, 2007, p. 168), which makes this an appropriate choice for unsafe behaviours. Most behaviour can be fully understood by either engaging in conversation surrounding the behaviour or experiencing the behaviour in action (Murchison, 2010, p.28). Such engagements allow the researcher to start to understand sentiments and motivations that underlie behaviour (ibid). Mahalingam & Levitt (2004) propose the use of ethnography to explore how global construction projects interact, which is another aspect in this study discussed in more detail in Chapter Seven.

In summary, it was decided that the philosophical position for this particular study was a rationalist ontology and an interpretivist epistemology. This position was decided based on following points which were outlined in more detail above: the difficulties in defining, quantifying and measuring unsafe acts;
that the construction site is a social arena; that the objects of the research were people; the calls for different methodological approaches produce different kinds of knowledge; the complexity of construction interactions and practice; and the diversity of the workforce. A suitable qualitative method chosen for this theoretical framework was ethnographic methods. The following sections first discusses in more detail an ethnographic approach in the construction industry before explaining the ethnographic research design used.
3.2 Ethnography:  
A Rare Approach in Construction Management Research

‘Ethno-what? You just made that up didn’t you... You mean interview or questionnaire?’

FCBC Employee  
2012
3.2 Ethnography: A Rare Approach in Construction Management Research

The research approach chosen for this PhD project is ethnography – a method of studying a specific group in their natural setting usually through participant observation (Phelps & Hormann, 2010). Ethnography has ‘deep and diverse roots’ (Atkinson et al., 2001, p.4), is continuing to develop across different disciplines (Shipton, 2013) and is often concerned with explaining and understanding social interaction (Pole & Morrison, 2003, p.46). Ethnographers portray people as constructing the social world, through their interpretations of it and their actions based on those interpretations (Hammersley & Atkinson, 2007, p. 10-11). It is an approach that places researchers in the ‘thick of it’, allowing them to examine and participate in phenomena as perceived by participants and represent these as accounts (Phelps and Hormann, 2010).

Ethnographers often use participant observation as a main research tool. Although it is an approach that generally requires a significant time commitment (Murchison, 2010, p. 48), it does make ethnographic research unique, and gives the researcher an opportunity to access data that would be hard to obtain otherwise (Murchison, 2010, p. 41). Participant observation and fieldwork appear to be interchangeably used terms to denote data collection techniques that incorporate observations for long time periods and discussions with subjects about what they are doing (Delamont, 2004). In participant observation the researcher enters an environment (e.g. a site meeting) and learns principally through the instruction of other members of those settings (Rooke et al., 2004). As participant observers we can come to interpret the world in more or less the same way as the people we are studying (Hammersley & Atkinson, 2007, p. 8). Participant observation in the field can provide insights beyond the participants’ impression management, which can be problematic with faster methods such as interviewing (Delamont, 2004). It is conducted in natural settings and these types of settings reflect the reality of life experiences.
of participants more accurately than contrived settings (LeCompte & Goetz, 1982).

The in-depth insights revealed through ethnographic investigations can be useful and highly relevant with regards to making recommendations, and this goes some way to explaining the prevalence of ethnographic studies in workplace practices (Shipton, 2013). Ethnographic approaches in workplace settings are used to going beyond superficial views and instead reveal complexities that cannot be perceived from a distance (Yaneva, 2009), that can have ‘crucial implications for those making policy about work’ (Orr, 1996, p.155). It is an approach highly suited to exploring and representing the everyday practices of people on projects (Shipton, 2013), and Pink et al. (2013) claim ethnography can provide ‘a powerful way of providing the kinds of insight necessary for theoretically informing our understanding of construction practice’. Though ethnographic approaches are infrequently used by construction researchers (Pink et al., 2010), it is now emerging as part of the repertoire of approaches for understanding the construction industry (Pink et al., 2013). For example, in the last few years there has been the application of ethnography to issues such as class, gender, safety, knowledge transfer, intercultural communication and change management (see Nycyk, 2011: Thiel, 2012; Shipton, 2012; Subbiah, 2012; Thiel, 2013; Shipton & Hughes, 2013; Pink et al., 2013; Shipton et al., 2014; Loosemore et al., 2015). Table 4 on the following page gives a sample of ethnographic research on construction safety within the construction management research field:
Table 4 - A sample of ethnographic safety research work within the construction management field

<table>
<thead>
<tr>
<th>Description</th>
<th>Author(s) and Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explores the use of tacit knowledge in areas such as training newcomers and also identifying and managing imminent risks</td>
<td>Aboagye-Nimo et al., 2015</td>
</tr>
<tr>
<td>Explored the health and safety management of migrant workers in the Malaysian construction industry</td>
<td>Tutt &amp; Shafie, 2015</td>
</tr>
<tr>
<td>Investigated local and national safety cultures in Denmark</td>
<td>Koch, 2013</td>
</tr>
<tr>
<td>Stressed the need to explore otherwise ‘hidden’ communication channels that are central to how safe working practices are achieved following a study involving a gang of migrant curtain wall installers</td>
<td>Tutt et al., 2013a</td>
</tr>
<tr>
<td>Used ethnographic studies in Crewe (UK) to explore migrant workers experiences inside and outside of work</td>
<td>Tutt, et al., 2013b</td>
</tr>
<tr>
<td>Bory’s ethnographic study on the role of safe working method statements (SWMS) in Australia</td>
<td>Borys, 2012</td>
</tr>
<tr>
<td>Explored attitudes to occupational health and safety (OHS) held by subcontractors in the domestic building construction industry</td>
<td>Wadick, 2010</td>
</tr>
<tr>
<td>Explore the nature and scope of individualist and collectivist preferences pertaining to the practice of safety at a construction site</td>
<td>Baarts, 2009</td>
</tr>
<tr>
<td>Exploring why white working-class males put themselves in harm’s way</td>
<td>Paap, 2006</td>
</tr>
<tr>
<td>Explores the link between masculinity and occupational health and safety (OHS) in the Australian (state of Victoria) construction industry</td>
<td>Iacuone, 2005</td>
</tr>
<tr>
<td>Investigated Integration, differentiation and ambiguity in safety cultures</td>
<td>Richter &amp; Koch, 2004</td>
</tr>
<tr>
<td>Demonstrated that safety must be interpreted as having two different forms: the official policies and the actual operating procedures</td>
<td>Paap, 2003</td>
</tr>
<tr>
<td>A study exploring how safety is mastered by novices on a construction site</td>
<td>Gherardi &amp; Nicolini, 2002</td>
</tr>
<tr>
<td>How safety knowledge and organisational safety learning are enacted</td>
<td>Gherardi &amp; Nicolini, 2000</td>
</tr>
</tbody>
</table>
The sample studies in the table span over the last fifteen years, as ethnographic research exploring construction safety are rare. Yet despite their infrequent use, ethnographic approaches can offer practical and rich understanding regarding the complexity of informality in safety learning processes (Baarts, 2009). There is no known previous study that identifies its primary focus to explore unsafe acts through ethnographic methods, though some of the studies in the table above that are related to the work within this thesis. For example, the work of Paap’s (2003) is linked with the ‘common sense’ discussion that is explored in Chapter Six of this thesis, as well as aspects of Chapter 5, such as the production pressure findings. Also, Tutt et al.’s (2013a & 2013b) work explored safety communication amongst migrant workers, which is connected to the findings within Chapter Seven. The use of ethnography in this study approaches the unsafe act problem from another angle, illustrating the various possible ways to capturing knowledge in the construction industry. It is hoped that by approaching the problem from another angle, there will be valuable insights that can move construction safety forward. The following section discussed the research design adopted for this study.
3.3 Ethnographic Research Design

‘All you seem to do is just chat and observe...’

*FCBC Manager*

2012
3.3 Ethnographic Research Design

The following section outlines the design of the ethnographic research project with discussions on: field access; the use of participant observation as a main research tool; the researcher’s identity; informant choices and gatekeepers; the social situations and conditions data was gathered in; spurious conclusions; reactivity and observer effects; and a detailed protocol for overcoming these effects and establishing rapport.

Field access (3.3.1) is often a challenge for researchers but due to a contractual agreement between FCBC and the University of Edinburgh (that was instigated by a Key Performance Indicator) this was not an issue for this study. When in the field, the researcher and the setting usually lends itself to one half of the participant-observation (3.3.2) ‘equation’. In this case, since many unsafe acts or behaviours are difficult to purely observe and following a self-critique of the researcher’s personality, a more ‘participant half’ was chosen. In such an approach it is important to be reflective with the researcher’s identity (3.3.3) and how the researcher is perceived by others in the setting. The researcher was viewed by construction employees as a member of the H&S department with an apprentice or trainee-like role. The reasoning for adopting a position in the H&S department is discussed in the following section, Informant Choices (3.3.4). In a subsection, (3.3.4.1) it is explained that time-sampling techniques were used for history and mortality threats associated with losses and gains in membership of participants in the setting. Other threats, such as those associated with the social conditions (3.3.5), spurious conclusions (3.3.6) and observer effects (3.3.7) are then discussed and counteracted. To enhance the replicability of the study the social conditions are outlined in the ethnographic vignettes throughout this research; threats to spurious conclusions were reduced through corroborating results over time and triangulating with other data sources; and a six-stage protocol was created to reduce undesirable observer effects.
3.3.1 Field Access

Accessibility is an issue that is probably the single most important practical concern (Murchison, 2010, p.29). Obtaining access can be a problem that ‘looms large in ethnography’ (Hammersley & Atkinson, 2007, p. 41) and it can often come as a ‘rude surprise’ (Feldman et al., 2003) to researchers that had not anticipated the difficulties that could be involved. For this PhD project, one of the Key Performance Indicators (KPIs) for the construction of the Queensferry Crossing was to support research. Hence, it was agreed between the University of Edinburgh and FCBC that this research project would be set up, which allowed the researcher full access to the field. The employee that granted the official permission acted as my initial point of contact and ‘gatekeeper’ for the project entry, which is not unusual (Hammersley & Atkinson, 2007, p. 49).

Leaving the field can also have its difficulties, and the quality of relationships within the setting can sometimes be reflected (Hammersley & Atkinson, 2007, p. 95). The more successful one has been, the harder it can be (ibid). Most ethnographers retain friendships and acquaintances with the research participants, sometimes for a long time (Miller & Humphreys, 2005). Often leaving the field is because of non-availability of further resources or deadlines for written reports (Hammersley & Atkinson, 2007, p. 94), which was the case for this study with this PhD thesis.

![Figure 10: An engraved cube made from concrete used to build the QC, given as a leaving present by the H&S department](image-url)
3.3.2 Participant Observation

Observational research does not intervene with the activities being investigated (Alder & Alder, 2000) which makes ethnography particularly suitable for studying sensitive issues (safety in construction is often a very sensitive issue) since this type of research can provide rich, detailed descriptions about the poorly understood (Li, 2008). Ethnography often uses participant observation as its main research tool, and this was the case for this study. As a participant observer, the ethnographer is in a powerful research position if the opportunities are utilised properly (Murchison, 2010, p.87). The researcher’s personality and research plan determine which half of the participant-observation equation comes most easily (Murchison, 2010, p. 87). The participant-observation equation is essentially whether the researcher adopts more of a participant role or more of an observer role. Those that are naturally outgoing and gregarious will find it easier to become an involved participant, while those more reserved and private in social settings, may find it easier in the role of an observer (Murchison, 2010, p. 87). An honest self-critique helps preparation for participant observation (ibid) and for this study it was decided that the researcher would be more comfortable with the role as a participant. This led to the majority of ethnographic evidence, findings and analysis coming from engagement with informants. It was hoped that this approach would reveal understanding into unsafe acts or behaviours that are hard to see. The research setting may lend itself to an emphasis to one or the other (Murchison, 2010, p. 87) and as figure 8 below illustrates, there are many health and safety behaviours that are difficult to observe. Hence in an attempt to explore the ‘difficult to see’ behaviours as well as the ‘easier to see’; a more participant approach, rather than a more observation approach, was deemed more appropriate. This helped to reveal insights on critical health and safety behaviours such as ‘leadership & direction’ and ‘management actions’.
3.3.3 The Researcher's Identity

The researcher's identity, or in other words, how others see the researcher, is shaped by background, sex, ethnicity, age and others along with social setting participation. Research identities are ‘socially constructed in different spaces and times’ (Sage, 2013, p. 104). They are dynamic and can change throughout the fieldwork. For example Thiel (2012) and Sage (2013) discuss their ranging identities from suspicion and animosity, to confusion, amusement and trust. The researcher’s identity is fundamental to the undertaking of the fieldwork, the representation of the data and the type of knowledge subsequently produced (Shipton, 2013). This has been widely acknowledged as the ‘reflexive turn’ in ethnography. The reflexive turn is a figurative ‘look in the mirror’ by the researcher and partly came about due to a backlash against assumed authority, objectivity, and even superiority, of the researcher (Shipton, 2013). Reflexivity denies the possibility that ethnographers ever achieve an entirely objective
position since they are part of the social worlds they are studying (Pole & Morisson, p.103) and always impact their chosen fields of study (Pole & Morisson, 2003, p. 28). We may ‘change ourselves’ as observation causes us to reconsider, rethink and reflect our actions and attitudes, which makes participant observation especially demanding (Pole & Morisson, 2003, p. 29).

It is worth noting that as a local male person of White-British origin, the researcher blended in with the majority of identities on the QC, even though it was a multinational joint venture project. As well as being conscious of how the physical features may influence the researcher, it is also important to be aware of the preconceived ideas on the work setting or phenomenon being studied (Shipton, 2013). The researcher’s background was primarily in structural and fire safety engineering, which meant that knowledge of unsafe act research literature was actually very limited. As the researcher started immersing into the setting from the very beginning of the PhD studies, this meant that research began with an inductive nature.

At the beginning of the project the researcher became a member of the health and safety department. This seemed logical as his PhD was within the field of health and safety. It also meant the researcher had a common interest with his closest informants, which can lead to potential informants assisting you and engaging in your project (Murchiston, 2010, p. 92). The researcher was introduced as a ‘PhD student studying (or researching) safety’. While many of the construction workers are very skilled at what they do, their understanding of the academic system is very limited considering this is not a path the vast majority of them have chosen. This is perhaps why many workers seemed to perceive the researcher as a student aspiring to be a H&S advisor and made enquiries such as: ‘When you filling big Tam’s [H&S advisor] boots then?’ Considering the H&S advisors were often the researcher’s ‘local’ person or ‘gatekeeper’ in the environment, it is understandable why workers assumed this trainee H&S advisor role. When studying an unfamiliar setting, the ethnographer is necessarily a novice (Hammersley & Atkinson, 2007, p. 79). In
many ways, a novice acts like a social scientist by making observations and interferences, asking informants and constructing and acting on hypotheses (ibid). Ethnography can be very productive if the researcher assumes the role of an apprentice (Murchison, 2010, p. 42). Hammersley & Atkinson (2007, p. 82) even highlight that a problem with 'settings in one's own society is that it may not be possible to take on a novice role'. Bryman & Bell (2011, p.439) call this an 'apprentice' like role and Lofland (1971) describes it as being an 'acceptable incompetent'. The researcher’s incompetency was apparent because, he was not a H&S advisor before, nor a construction professional. This trainee role assumed was reinforced by his age (23-26 during the research), youthful looks and that he was in a department that was usually full of more experienced professionals, within the age range of 45-55. Also his ‘student’ status, and the fact he was part-time and attached to the University of Edinburgh supported this perception of an apprentice role. As an apprentice you assume a position to learn from an expert who possesses a great deal of specialised knowledge (Murchison, 2007, p.42). His trainee role shaped an unthreatening perception due to his perceived lack of power, knowledge, naivety and inexperience. Though these are perhaps characteristics individuals would wish to change, he found them a very beneficial way to get participants to open up about their work. Adopting this role made it natural to ask questions; and informal questioning often forms part of participant observation (Hammersley & Atkinson, 2007, p. 177).

At times, he did need to be resilient in what is a ‘lad’ or ‘macho’ environment, as workers made jokes about his lack of knowledge in areas. For example, one employee said: ‘You have had 8 years at university... what you been doing? Playing with your tadger [penis] all day?’. Similar to Sage (2013) and Shipton (2013), the ‘student status’ brought many presumptions among subjects. Often jokes were made about the arrival of my next student loan, drinking beer and tough early mornings. Some also had preconceived perceptions of students due to their own experiences. For example, one construction worker asked: ‘The other day my laddy [his son and college student] came back from a night out, was
sick all over the kitchen and then fell asleep in the dog kennel... are you like that?”
The moderate participant observation approach also lent itself to light-hearted
comments about being a ‘part-timer’. For example: ‘presume the student union
must be closed today if you are in?’ Shipton (2013) found it ‘a bit annoying’ after
a while but ‘played along with the lazy student jokes to keep things light-
hearted’. She also got the ‘impression that people were not even listening when
I talked about my studies’, perhaps suggesting that they weren’t very interested
or didn’t understand. Hammersley & Atkinson (1983) stated that ‘telling the
whole truth might not be a wise or even feasible strategy’ and within the QC
project on occasions the researcher felt that it was not feasible to fully explain
my purpose to some workers. Either because they simply weren’t interested or
they weren’t familiar with PhD students and their research purposes. This was
another similarity that Shipton (2013) found: ‘it was frustrating that most
people did not understand what I was doing, why I would choose to spend over
three years to do it or the value attached to research.’

Ethnographic approaches focus on describing and interpreting the social world
through first-hand field study (Saunders et al., 2009), and as a participant
observer, conversations and observations are paramount to the research
approach. Yet this could be misconstrued for laziness in the work setting. An
example of this occurred early in the research when an employee said to the
researcher: ‘all you seem to do is just chat and observe’, implying that it appeared
the researcher was never doing any ‘work’. This was another challenge that
arose from a lack of understanding by participants of the research work. This
was an important notion which led to the researcher spending more time
evidently working (such as writing up fieldnotes or reading papers) on his
laptop in the research setting.
3.3.4 Informant Choices

The best ethnographies are rooted in strong engagement with informants (Murchison, 2010, p. 122). Informants (data providers) can provide access to some people but not others and association with one group may forfeit life experiences of other groups (LeCompte & Goetz, 1982). This meant it was important to establish rapport with all of the H&S advisors to allow for exposure to different areas of the project. It was also important to realise that association with the health and safety department may forfeit information that may have been gathered in another construction team (such as a team of steel-fixers). Given that every ethnography is unique, the precise nature of what may be achieved will vary (Pole & Morrison, 2003, p. 3) and therefore association with another group could have yielded different findings. The decision was taken to associate with the health and safety department because: this would allow access to all sites on the project, the data opportunities on health and safety issues, common interest with employees, H&S insights could be obtained in office and site settings on H&S, and my services could be offered back to FCBC.

Careful descriptions of those who provide data are a common way to handle threats to reliability posed by informant bias (LeCompte & Goetz, 1982). This was the case for this ethnography, where informants would be described primarily through their position on site. The nature of the study explores undesirable behaviours in unsafe acts that from an ethical point of view could cause harm to informants if mishandled. Hence in some cases descriptions of informants are not as detailed as they could be, to avoid any chance of harm to the informants.


\begin{center}
\textbf{3.3.4.1 History & Mortality}
\end{center}

Losses and gains in membership pose special difficulties for ethnographers as groups change over time (LeCompte & Goetz, 1982). As the ethnographic researcher conducts research in natural settings, changes occur with time in what experimenters designate as history (ibid). The ethnographic task is to determine which data remains stable over time and which changes (ibid). In order to assess change ethnographies tend to be long-term research projects, which was the case for this study (nearly three years). This permitted time-sampling techniques where data changes were possible to track. For example, changes in employee personnel would often result in changes on how safe or unsafe actions and practices were undertaken. However, some data remained stable despite losses and gains in membership, such as production pressure.

The project had a relatively high turnover in workers and the health and safety department itself was also subject to a high turnover, especially at the beginning of the project. This meant the researcher had to be flexible and able to establish rapport with many different subjects. The departures can be topics of study in themselves, especially considering a stable group is associated with low accident rates (Gherardi & Nicolini, 2002). It requires careful attention to baseline data (data before an intervention or change) so the researcher can compare activities and events across time (LeCompte & Goetz, 1982).

\begin{center}
\textbf{3.3.6 Social Situations and Conditions}
\end{center}

The setting that the data was gathered in should be outlined to enhance the replicability of the study (LeCompte & Goetz, 1982). The three main settings in this study were: office-based, land-based and marine-based. Data gathered in an office scenario would usually occur during meetings and informal discussions. Land-based data consisted of site walk-arounds that involved observations and
conversations with the guys ‘out on the park’. Marine-based data also involved site walk-arounds but on the caissons and then towers in the river Forth.

3.3.7 Spurious Conclusions

Spurious conclusions can be corrected by corroborating results over time, triangulating with other data sources, testing associations between independent and dependent variable domains over time, conducting interviews and seeking indigenous explanations for causality and observing causal sequences in field settings (Schensul & LeCompte, 2012). The length of time in the field allowed for corroboration of findings, and avoided situations where atypical relationships could give false representations. Schensul & LeCompte (2012) believe that it is easy to jump to premature conclusions based on insufficient data, especially in the early stages of fieldwork. Where appropriate, data was triangulated with other sources including ethnographic fieldnotes in different times and spaces, safety climate surveys, safety observation reports and witness statements.

Being a moderate participant ethnographer meant that the lead researcher could not be there all the time. Even if a complete participant observation method was undertaken with the construction site being so large, it still would not have been possible to be involved in all points of interest to the research. As Pole & Morrison (2003, p. 27) put it: ‘observers cannot be everywhere’. This meant that there were two different types of data sets possible. This study has defined them as principal data and non-principal data. Principal data is data gathered while the researcher is physically there when the acts of interest are occurring and are being discussed. For example, the accident incident investigation (see Chapter 4) of a minor accident was being discussed and undertaken while the researcher was physically present. This represents principal data. If the researcher was not present, but was discussing the accident investigation with an informant who was present, this would represent
non-principal data. Both types of data were useful and if they were on the same phenomenon, they could act as a triangulation using different variables. These variables were often different social actors and settings in the environment. Principal and non-principal data is further discussed in section 3.4.3.

3.3.8 Observer effects

Reactivity from observer effects is as problematic for ethnographers as it is other social researchers (LeCompte & Goetz, 1982). The Hawthorne effect and other forms of reactivity can contaminate the pure social environment being studied (Hunt, 1985). Therefore it is of no great surprise that there are many ethnographers that are concerned about this phenomenon (O’Reilly, 2009). This concern has resulted in some ethnographers using covert observations to avoid any reactivity, such as in Rawlinson & Farrell (2010), and in Iacoune (2005), who avoided observer effects by being an undisclosed ethnographic researcher on a construction site for six months. Ethnography usually occurs on a long-term basis, and such sustained observation can be used as a check against reactivity (Adair, 1984). However, sustained observation alone does not necessarily guarantee success in overcoming reactivity, as ethnographers also rely on building trusting relationships (Carroll & Mesman, 2011) usually through participant observation.

To counter these issues a research protocol, first introduced in Oswald et al. (2014b), was developed by the researcher to act as a guide throughout the research period. The protocol, briefly introduced below, was used to establish rapport with participants and reduce observer effect threats. The six key stages developed (shown in Figure 9) acted as a protocol for establishing rapport through conversation. It is more likely that the data collected from the conversation will be more accurate if the first five stages are completed before the conversation is led in the direction the participant wishes to explore i.e., in the area that the observer is researching. The first stage involved gauging the
participants in the social setting in order to adopt behaviours that would ‘fit in’. Then it was important to have a non-threatening perception which required self-reflexivity on issues such as the researcher’s role and clothing. The next stage focused on the introduction process and setting foundations for the following stage, establishing rapport. Creating this harmonious understanding between individuals was crucial to the success of the research and the point when this rapport was indicated was when participants made a light-hearted comment or joke. This was known as the ‘relaxed signal’ and represented Stage 5. From this point, it was more appropriate for the researcher to link the topic of conversation to the area of interest (Stage 6).

Figure 12 – Six stage protocol for establishing rapport and overcoming observer effects
(see Oswald et al., 2014b)
3.4 Data Collection

‘In god we trust, all others must bring data’

William Edwards Deming

The Elements of Statistical Learning
3.4 Data Collection

The following section describes the data collection process; what was recorded and why, the use of low-interference descriptors for internal reliability, the mechanically recorded data used, the selection of informants and further detail on the types of data collected namely: primary, secondary, principal and non-principal.

Methods limit and constrain the data collection process, in the same way that the tools of a plumber or carpenter restrict the work that he or she can do (Pole & Lampard, 2002). People are not completely free to design their research methods if they want it to be seen reliable (Brewer, 2000). Methods of data collection and analysis should be clearly stated so that others could use it as an operating manual by which to replicate the study (LeCompte & Goetz, 1982). Even ethnographic projects with similar aims can have a wide variety of data collection methods (Robson, 2002). The collection of data typically involves the researcher writing detailed field notes on their observations and conversations and then expanding and reflecting on these notes once out of the field (Delamont, 2004). According to Thiel (2012), a main aim of data collection in the field is to then ‘try and identify forms and patterns’ in the data ‘that might provide clues about social organisation’.

3.4.1 Mechanically Recorded Data

Mechanically recorded data involves recording and preserving data (LeCompte & Goetz, 1982). While the data gathered was primarily through conversations with informants, other documentation was sometimes used to support this data such as: safety climate survey data and comments, witness statements, safety observation reports and meeting minutes. Photographs were used very rarely in this study, as they can represent a delicate issue, something which was also noted by Murchison (2010, p. 49). The dangers of using photographs were
highlighted when representatives of the client took photographs of FCBC employees at work. Some FCBC workers referred to these as ‘drive-by shootings’ and it caused frictions between relationships. Information on the setting can be provided by documents that are sometimes not available through other sources, which can provide important corroboration or challenge information that has been received by informants or from observations (Hammersley & Atkinson, 2007, p. 122). These documents have not always been given the attention they deserve within ethnographic work (Hammersley & Atkinson, 2007, p. 139) and have the capacity to tell a great deal to the researcher about those who created them and the context and social world they were created in (Pole & Morrison, 2003, p. 48).

One of the common characteristics of ethnography is ‘the use of a range of different research methods which may combine qualitative and quantitative approaches but where emphasis is upon understanding social behaviour from inside the discrete location, event or setting’ (Pole & Morrison, 2003, p. 3). Data gathering through conversations and other sources, leads to triangulation, which ethnographers use as a matter of routine (Bryman, 2001, p. 75). Triangulation involves a comparison of data on the same phenomenon at different phases of the fieldwork, different times and the accounts of different participants (Hammersley & Atkinson, 2007, p. 183). In social research, relying on one single piece of data can be in danger of being exposed to undetected errors and hence different kinds of data reaching the same conclusion can give more confidence in the finding (ibid). A common triangulation method is to compare data produced from different data collection techniques, which can provide a basis for checking interpretations (Hammersley & Atkinson, 2007, p. 184). Triangulation is often a feature of ethnography (Bryman, 2001, p. 59) and it is possible to triangulate both qualitative and quantitative data. Triangulating quantitative (such as questionnaire surveys in this study) and qualitative data (participant observation) to explore in detail is a plurism of method, but not a methodological plurism – a case Pole & Morrison (2003, p. 8) wish to argue for in what they call inclusive ethnography. According to Fellows and Liu (1997)
there is an increasing recognition by most disciplines in the social sciences that both types of research are important for a good research study and they both have their strengths and weaknesses. Pole & Morrison (2003, p.50) note that quantitative data can have a legitimate role in ethnographic research and offer an important source of supporting and contextualising data. There were rare occasions when this research study used both qualitative and quantitative methods.

3.4.2 Low-Interference Descriptors

As memories are ‘frail’ and ‘selective’ (Denscombe, 1998, p. 151) there is a need to note-take in the field, where possible, as well as making additional notes outside the field or as soon as possible after the observation (Pole & Morrison, 2003, p. 26). Low-interference descriptors provide ethnographers with the basic observational data gathered and interpretive comments can be added, deleted or modified later. There were a variety of low-interference descriptors used: writing on meeting minute notes when in meetings (see figure 10), the ‘notes’ section on a mobile phone (see figure 11) when on site, and directly into nVivo when computer access was available in the office. An ethnographic researcher directly participates in the setting and collects data in a systematic way while attempting to avoid imposing external meaning – an approach Patton (2002) referred to as ‘systematic seeing’. The rest of this section describes the systematic approach to data collection.

At an appropriate moment after a conversation, ‘refresher notes’ would be taken on low-interference descriptors to highlight the important issues. This is not unusual, as for a variety of reasons, the initial fieldnotes are ‘jottings, snatched’ during the course of the observed action (Hammersley & Atkinson, 2007, p. 143). In many settings participants do not carry around notebooks (paper or electronic), as such activity would prove very disruptive because it is either generating distraction or distrust, or would disrupt the ‘natural’
environment (Hammersley & Atkinson, 2007, p. 142). One way of allaying fears is by note-taking as unobtrusively as possible (Bryman, 2001, p.87) and this was achieved by taking notes on a mobile phone rather than using a pad and paper.

Figure 13 – Example of ‘refresher’ notes taken during a H&S meeting
This was less obtrusive as the researcher could have been on his mobile phone for a variety of reasons, which led to less disruption of the natural environment. Hammersley & Atkinson (2007, p. 143) reveal a common joke about ethnographers relates to frequent toilet trips to hastily write up notes in private. Refresher notes could also be taken on meeting minutes during meetings, or directly into nVivo if in the office with laptop access. Even the briefest notes can be valuable aids for the construction of a more thorough detailed account. Fieldnotes are always selective since it is not possible to capture everything and should be written as soon as possible (Hammersley & Atkinson, 2007, p. 142). Therefore, in this study, following return from site and into the construction office, notes would be written-up in more detail.

![Figure 14 – A Screenshot of refresher notes that were taken while having an on-site discussion](image)

The image above represents an example of ‘refresher’ notes following a conversation with a Czech worker, who was also an English interpreter on the site. An important first step is plan how to organise the fieldnotes (Murchison, 2010, p. 117). The next step, once returning from site to the office, was to input notes in more detail into software program nVivo:
3.4.3 Choosing what to Record

Critics of observational methods highlight that the researcher produces fieldnotes and chooses what to record. Suchman (2007, p. 118) states: ‘situated action cannot be captured empirically through either examples constructed by the researcher, paper and pencil observations, or interview reports. Analyses of contrived examples, observations, or interviews all rest on accounts of circumstances that are either imagined or recollected’. Those of this perspective prefer naturally-occurring data that is a direct recording rather than data sources that undergo an initial interpretation process through construction of the researcher’s fieldnotes. However, ethnographic data in either format still undergoes an interpretation process, which means it could be argued to some extent that all ethnographic data is ‘imagined or recollected’ (Shipton, 2013).

The production of fieldnotes is inevitably selective as the researcher collects data on what they see as significant based on their interests (Emerson et al., 2001). In addition to observations and conversations, all relevant materials and ‘fragments of observation’ such as interview transcripts and documents from
the field that can contribute to the research should be collected (Yaneva, 2009, p.26).

A fundamental principle that is supposed to guide the ethnographer is to 'follow the action' (Goffman, 2005). However, this is often easier said than done. In this thesis, Goffman's (2005) idea of following the action has been undertaken. In this approach, ethnography is emotionally charged, uncertain and even risky; features that make it interesting and capable of delivering profound insights (Marshall & Bresnen, 2013). However, this choice consequently can underplay the routine, patterned, more habitual and frankly more boring elements of day-to-day life within the organisation (ibid). In other words, the action that was chosen to be recorded was that of unsafe acts that occurred, rather than of the more mundane day-to-day aspects of life within an organisation. Considering it is important for ethnographers to collect notes that can answer these research questions (Murchison, 2010, p. 76), it is argued that this position on ‘action’ being unsafe acts was appropriate. Once this ‘action’ was determined, three clear themes emerged, which were outlined in the introduction: unsafe acts by the operatives (e.g. non PPE compliance), unsafe acts by upper management (e.g. organisational commitment to safety) and the challenges different nationalities brought with relation to unsafe acts.

Often unsafe acts would occur when the researcher was not present which meant that there were different types of data collection. These different types of data collection types obtained findings in different social constructs, which were useful for testing across different variables and triangulation. A protocol, created for this research study, on the data collection types was adopted and termed the following:

- **Principal** - where the researcher is physically present during an event
- **Non Principal** - where the researcher is discussing an event, that he was not present for, with an informant
• **Primary** - Data gathered through the primary research method: conversations with informants

• **Secondary** - Data gathered from another source such as a safety observation report

Table 5 - The differences between Principal, non-Principal, Primary and Secondary data in this study. The majority of the data in this study used Primary and Non-Principal data.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal</td>
<td>Conversations with informants where the investigated phenomenon directly unfolding in the ethnographer’s presence</td>
<td>Other supporting documents where the investigated phenomenon is directly unfolding (for example a witness statement being taken while the ethnographer is present)</td>
</tr>
<tr>
<td>Non-Principal</td>
<td>Conversations with informants where informants are explaining their interpretations of an event that has already occurred</td>
<td>Other supporting documents where the investigated phenomenon has already unfolded (for example a copy of a witness statement or meeting minutes)</td>
</tr>
</tbody>
</table>

3.4.4 Selection

Selectivity can be a serious problem for ethnographers and failure to obtain an adequate inventory of subgroups, factions, events and social scenes may lead to findings representative only of certain participants or particular circumstances (LeCompte & Goetz, 1982). Hence though all ethnographers have keys informants and ‘gatekeepers’ that can provide deep and significant insights, using a range of informants in conjunction has value. Data was gathered from operatives, security guards, supervisors, middle-managements, senior management, engineers and the client’s representatives to avoid problems with selectivity.
3.5 Data Analysis

‘Data are just summaries of thousands of stories – tell a few of those stories to help make the data meaningful.’

Professor’s Chip Heath (Stanford University)
& Dan Heath (Duke’s University)
3.5 Data Analysis

The analysis of data is not a distinct stage of ethnographic research, beginning with the formulation and clarification of research problems through to the writing up processes (Hammersley & Atkinson, 2007, p. 158). Ethnographers need to present description and interpretation of the findings, and both of these areas are of great importance (Atkinson & Hammersley, 1994), as this is a process where the researcher puts meaning to the data (Bryman, 2001, p. 122).

Once the data was collected, and logged on a low-interference descriptor, it was input into the software application nVivo. The following section describes the use of this program, the thematic approach used, the codes used for analysis and the subsequent ethnographic vignettes that were written.

3.5.1 Analytic Constructs and Premises

An iterative-inductive approach was undertaken, which is not unusual in ethnography (O'Reilly, 2009). This led to the research becoming progressively focused over time, a characteristic funnel structure that ethnographic research should have (Hammersley & Atkinson, 2007, p. 160). This data was then analysed using a thematic approach, the most common form of analysis in qualitative research (Guest et al., 2013), which gives the researcher a 'bird's-eye view' of emerging patterns that could be drawn out (Aronson, 1994). This thematic approach identifies patterns across data sets that are relevant in addressing the research aims (Braun & Clarke, 2006). The thematic approach consists of six stages: familiarisation with data, generating initial codes, searching for common themes, reviewing them, defining and naming themes and producing a final report (ibid). To assist with this process, more researchers are using software (King, 2008) and it has gradually becoming the norm in qualitative research (Richards, 2005). Computer aided analysis of ethnographic data is growing in number and has three main advantages (Pole &
Morrison, 2003 p. 73): data management, assisting analysis process and its approximation to positivist approaches. There are several software packages available, but none of these can claim superiority as each have their own advantages (King, 2008). For this research the software application nVivo was used. Data analysis takes us to the heart of ethnography and its epistemological and technical challenges (Pole & Morrison, 2003, p. 73). The technical challenge often represents the sheer volume of textual data, while the epistemological challenge is the range of approaches available to interpret and represent meanings.

Figure 16 – A screenshot highlighting the different codes used in nVivo

There is an agreement among most researchers that the first stage of qualitative data analysis is to ‘organise’ the data (Miller, 2000). In this instance it was done by coding text. LeCompte & Goetz (1982) explain that even if a researcher’s relationships are reconstructed and informants and social contexts are duplicated, replication may still remain impossible if the constructs, definitions or units of analysis which shaped the original research are poorly portrayed. They highlight that invented constructs that are mandated by the data, as well as their assumptions, definitions and limitations should be outlined explicitly,
along with their relationships to existing concepts. The units of analysis in the case of this research study were the codes used in nVivo. The coding of data provides an important infrastructure for searching and retrieval later on (Hammersley & Atkinson, 2007, p. 152). The codes were kept simple and clear to avoid any confusion. For example ‘management decisions’ were simply unsafe decisions by management (from supervisors to project director) that were of interest to the research question. ‘Time pressure’ was events that appeared to be influenced by production pressures. ‘Common sense safety’ captured events where there was bending or resistance to the formal procedures and rules. Occasionally the nodes developed. For example, ‘nationality’ which was events that related to safety and nationality, developed into two separate nodes due to the vast data gathered on Spanish and Portuguese workers. Hence another node was created: ‘nationality’ and ‘Spanish and Portuguese’. The research outlined by theoretical premises and defined constructs informs and shapes replication (LeCompte & Goetz, 1982). Once the data is analysed, the ethnographic vignettes were written:

Figure 17 – A screenshot of the nVivo notes transformed into an ethnographic vignette from the discussion with the Czech worker (see page 99)
According to Atkinson & Hammersley (1994) whatever the research design, ethnography typically uses relatively unstructured empirical materials, a small number of cases and a style of writing and analysis that stresses description and interpretation. The small numbers of cases were written as vignettes to provide more detailed insights in order to retain some of the complexity and ‘realness’ of these situations. The use of these descriptions is a valuable part of the original contribution of the research in providing in-depth ethnographic insights. In ethnography, textual representation is interwoven with analysis and hence fieldwork write-up is a representation of ethnographic data and an integral part of analysis (Shipton, 2013; Pole & Morrison, 2003, p. 104; Hammersley & Atkinson, 2007, p. 191). Ethnographic writing can be a ‘frustrating business’ as separate analytical themes do not present themselves in the social world (Hammersley & Atkinson, 2007, p. 193). Hence, ethnographers have to disentangle multiple strands of social life to make sense of them and then reintegrate them into an ethnographic account (ibid). The challenges include constructing a coherent account that does justice to the complexities of the social world being studied, ordering events and themes and providing evidence and adequate details (ibid). Ethnographic writing should also have a reflexive awareness that takes into account the potential audiences for the finished product (Hammersley & Atkinson, 2007, p. 201). Writing for the academic world and the construction world can be difficult, considering they are both very different, which is an additional challenge for this study. The style chosen for this thesis write-up was designed to be academically sound and rigorous, as well attempting to be tailored towards construction professionals by using language appropriate for both worlds. Particular attention to this style was adopted in the summaries and conclusions.

### 3.5.1.1 Participant Researchers

Participant researchers refer to the use of informants, such as the members of the H&S department, to help reduce internal reliability threats. LeCompte & Goetz (1982) highlight how ethnographers have used informants: some
researchers use local informants to confirm that the observations are identical between observer and subjects, other researchers use participants as arbiters who review their daily field notes; though more commonly ethnographers request reactions to processed material or working analyses from informants. This was the case for this study when proposed paper publications were sent to the informants. Written and spoken responses included: ‘I find your paper to be really good and factual’; ‘I appreciate your research and ability to determine the shortfalls in our industry’; ‘Excellent work David, insightful and accurate’; ‘I found it easy to follow and comprehend’; and a new member of the H&S department verbally said, ‘I particularly liked your paper on the Funky Chicken, I could really relate to that’.

Presentations were also delivered to informants and would often initiate discussion afterwards, where agreement or views on research findings were discussed. An example of this was when discussing the common sense safety phenomenon, (see Chapter 6) a debate on safety glasses ensued. Informants made comments such as: ‘they [construction workers] kick up fuss and come out with all the excuses simply because they don’t want to use them... but they don’t seem to complain when the sun comes out and they wear their sunglasses – that’s the only time there are no issues’. These discussions could provide useful insights for research within another social setting, while also the use of participants in this way tends towards internal reliability.

The figure 15 below represents one of the slides used in the presentation to outline a snapshot of findings to informants. Reactions of processed material sought confirmation at various levels of the data collection and analysis process such as: explanations for overall structures and processes, description of events and interactions and interpretation of participant meanings (LeCompte & Goetz, 1982).
The high turnover of gatekeepers meant that checking my research notes or interpretations at the end of each day was not an option that was ideal. However, my interpretations of events were sometimes discussed with participants, to act as a form of internal reliability check. These discussions could then be added to the ethnographic vignettes.

The following section summarises how through the ethnographic design, data collection and analysis process discussed above, the study has tended towards attaining validity and reliability. Generalisability is discussed below and then further detailed on a visit to industrial practitioners, which can be found in Appendix A.
3.6 Validity, Reliability & Generalisability
3.6 Validity, Reliability & Generalisability

This section draws on the information within this chapter to summarise how this study has reduced validity and reliability threats. External reliability was tended towards by a self-critique of the researcher’s identity; an explanation of informant choices and the social situations; and discussion of data collection methods and analysis. Internal reliability threats were reduced by: low interference descriptors with refresher notes; mechanically recorded data including safety climate surveys, witness statements and safety observation reports; and through discussing events and checking final publications with participants. A strong internal validity is perhaps the greatest asset of an ethnographic approach, yet threats were still considered and reduced through: time-sampling techniques for history threats; a six-stage protocol for observer effects; use of a wide range of informants from different roles to collect data for selection threats; and triangulation techniques used to reduce spurious conclusions. External validity or generalisability is discussed in the final part of this section. Findings that arose from this project were presented to another joint-venture construction project and comments through discussion and a survey were collected. The discussions that ensued from this event illustrate that the findings seem relevant to the wider construction industry.

3.6.1 External Reliability

External reliability comprises of whether independent researchers working on the same or similar context would obtain consistent results (Freebody, 2003). Ethnographers approach rather than attain external reliability (Hansen, 1979). Enhancing the approach towards external reliability can come in forms such as: researcher’s identity (see 3.3.3), informant choices (see 3.3.4), social situations and conditions (see 3.3.6) and methods of data collection and analysis (see 3.4 & 3.5). It was highlighted in section 3.3.3 that the researcher was often perceived as a student/trainee H&S advisor with little or threat to informants. Within the
ethnographic vignettes that follow in the findings sections, the roles of the informants are identified to enhance reliability through what LeCompte & Goetz (1982) call ‘informant choices’. The roles of the informants were identified, and the social situations and conditions are outlined in the vignettes; as some informants will feel more comfortable revealing information in some social contexts but not others (LeCompte & Goetz, 1982). The method of data collection and analysis has been discussed in detail above.

3.6.2 Internal Reliability

Internal reliability within a single study raises the question of whether multiple observers will agree (LeCompte & Goetz, 1982; Freebody, 2003). One way to reduce the threats of internal reliability is to use multiple researchers, but funding is rarely available for more than a single fieldworker (LeCompte & Goetz, 1982). This was the case for this study. Ethnographers consider that multiple data collection procedures and triangulation enhances internal reliability (Freebody, 2003). This can include the use of low-interference descriptors, such as the meeting minutes and mobile phone notes (see page 99), and mechanically recorded data, which included the use of safety climate survey data and comments, witness statements, safety observation reports and meeting minutes (see section 3.4.1). This study also used participant researchers as a method of tending toward internal reliability, where informants were used to check ethnographic interpretations and paper publications. Peer examination is another method that relies on corroboration of findings of researchers operating in similar settings. After consideration it was deemed that there were no suitable corroboration opportunities with other researchers due to the rare setting and study: an ethnographic study on unsafe behaviours on a very large multinational construction project building the longest three-tower cable stayed bridge in the world.
3.6.3 Internal Validity

Miles and Huberman (1994, p. 278), associate internal validity with questions such as: 'Do the findings of the study make sense?, Are they credible to the people we study and to our readers?, Do we have an authentic portrait of what we were looking at?'. According to LeCompte & Goetz (1982) validity may be ethnography’s major strength and this becomes evident when ethnography is compared to survey studies, experimentation and other quantitative research designs. The high internal validity claim comes from the data collection and analysis techniques used by ethnographers (see Denzin, 1978). LeCompte & Goetz (1982) state three reasons to support this claim that are relevant to this PhD project. First, being amongst participants and undertaking data collection for long periods allows for continual data analysis and refinement. The second is that participant observation is conducted in a natural setting that reflects the reality of the participant life experiences more accurately than contrived settings. Finally, the ethnographic analysis process incorporates self-monitoring of the researcher that exposes all research phases to continual questioning and re-evaluation. Nevertheless, the threats to internal validity (history effects, observer effects, selection, mortality, and spurious conclusions) must be considered (LeCompte & Goetz, 1982).

History threats focus on changes in the natural setting as time passes. This was tended to through long-term existence in the natural setting allowing for time-sampling techniques (see 3.3.4.1). Observer effects were covered in the six-stage protocol (see 3.3.8). Selection threats (see 3.4.4) were tended to by selecting a wide range of informants from different roles to collect data. Though the H&S advisors were the researcher’s gatekeepers, data was also gathered from construction managers, operatives, civil engineers, the client’s representatives etc. Triangulation techniques were used to reduce threats from spurious conclusions (see 3.3.7).


3.6.4 External Validity or Generalisability

In ethnographic research we must consider its relevance as well as its validity (Hammersley, 2013). External validity is often associated with ‘generalisability’, with the terms often being used interchangeably (Ferguson, 2004). Aronson et al. (2007) describe external validity as the extent to which the results of a study can be generalised to other situations or other people. External validity threats are those that obstruct or reduce a study’s comparability and translatability (LeCompte & Goetz, 1982). Some ethnographers argue that their studies are so unique that neither their results nor techniques can be applied elsewhere (Schensul & LeCompte, 2012), but critics highlight this as an inability to generalise (Pole & Morrison, 2003, p. 15). In contrast to theories that are intended to be universal and focus on the general, ethnographic accounts are embedded and focus on the particular (Shipton, 2013). However, in ethnographic research there must be analytical insight that ‘allows deeper understanding of the setting in question’ (Harper, 1998) and goes beyond a pure description of what is immediately observable (Pink et al., 2010, p. 658).

Based on work on construction sites with regard to health and safety, Pink et al. (2010, p. 657) summarise the application of ethnographic findings to practice: ‘The situated nature of ethnography need not preclude the generation of recommendations for informing practice, so long as they can be appropriated in ways that reflect the nuances of the contexts in which they are subsequently applied. As such, care was taken to avoid the imposition of prescriptive or normative advice, but to highlight pertinent insights or areas of promising practice’. Researchers from a more positivist tradition accuse ethnography of imprecision, where descriptions through language are perceived to lack rigour with description and characterisation rather than quantification (Pole & Morrison, 2003, p. 15). The approach is also accused of subjectivity, where opinions are presented in a style that is perhaps more common in journalism than in science (ibid). Pole & Morrison (2003, p. 15) agree with such challenges but do not seek to counter them as that would ‘fall into a technical trap of
judging ethnography by a character to which it does not aspire’. They argue that as long as researchers do not claim that their research can meet essentially positivistic characteristics then such challenges are largely irrelevant. Instead the counter-argument to non-ethnographic methods is that they are over precise, do not account for uncertainty of social life, lack detail and depth of social action and fail to acknowledge the researcher-researched interaction in the production of social knowledge.

The insights from this research were put to industrial practitioners on another joint venture project to ‘seek fit’ and give an indication as to whether they were relevant to the industry. This occurred on Monday the 29th of June 2015, when a presentation was given to approximately fifteen construction industry practitioners from a Costain & Vinci joint venture project in Glasgow, Scotland (See Appendix A). The aim of the presentation was to share insights of health and safety challenges that had been experienced at the Queensferry Crossing project, and to ‘seek fit’ with these research findings with other construction industry professionals. The presentation was of an interactive form, took approximately one hour and discussed eight health and safety challenges. Participants were also asked to fill out a short survey with one question on each challenge in an attempt to capture perceptions of those who were not as active in the discussions as well as those that were. From participant’s responses and comments some of the findings seemed to ‘seek fit’ more closely than others. The important point of note is that all of the findings outlined brought good discussion and comment, which suggests that these findings are, to some extent, relevant to the wider construction industry.
3.7 Ethics

Ethnography asks a lot from its informants as a research strategy (Murchison, 2010, p. 31). It is an incredible privilege to have access to personal thoughts and experiences of the informants, and while this can be very informative it does also carry significant responsibility (ibid). An ethnographer’s primary duty is to not harm an informant in any way (McCurdy et al., 2004). This is not as simple as it sounds: when informants teach us about their culture they may reveal things that could be embarrassing or harmful (McCurdy et al., 2004). Though ethnographers cannot provide failsafe protections and guarantees, they must take every reasonable step to protect informants (Murchison, 2010, p. 32). An evaluation of potential benefits and costs to informants must be considered, with the goal being for the benefits to significantly outweigh the costs (ibid). Such an assessment should be fundamental in the decision to pursue a particular topic or not (ibid). The products of the research should not be able to be used against participants in any foreseeable way (Murchison, 2010, p.62). This assessment took place for possible research topics. For example, a possible topic for exploration related to unsafe behaviours could have been the consumption of alcohol and drugs. There were sources of data that suggested that there could be a presence of alcohol and drugs, such as an extract from a health and safety alert stating:

‘It has been brought to the attention of senior management that we are experiencing persons reporting to work under the influence of Drugs or Alcohol, and have found empty alcoholic containers within our areas of work. This type of behaviour is putting the individual and others at risk which will not be allowed on this project site’.

Also, climate survey results found that 31% of 475 participants thought that alcohol and drugs were ‘always’ a factor in accidents (see Oswald et al., 2013). Further investigation was considered, however due to the potential harm this
could cause informants, this was not carried out. This does not mean to say that further research should not be conducted in future studies on alcohol and drugs in construction, though a different research methodological approach may be more appropriate for such an investigation. This is the case for any topic that involves illegal or illicit activities such as drug use and requires careful thinking about privacy areas due to the potential negative effects this could have (Murchiston, 2010, p. 32). Very serious incidents, especially those under legal privilege, which protects all communications between a professional legal adviser and the clients, were sensitive and avoided in this study to avoid any potential harm.

Obtaining consent is possibly the ‘thorniest issue’ for ethnographers and when possible researchers should plan to explain their project (Murchiston, 2010, p. 61). It is unethical for ethnographers to misrepresent themselves (McCurdy et al., 2004) though they rarely tell the participants everything about the research (Hammersley & Atkinson, 2007, p. 210). Even when research is explicitly taking place, it is not uncommon for participants to quickly forget once they come to know the ethnographer (Hammersley & Atkinson, 2007, p. 210). In this study, the researcher felt that the majority of participants were may not be very interested in the research, and therefore an insistence on providing information on the PhD project could be very intrusive and potentially damage relationships. Never-the-less, the researcher still briefly introduced himself (or was introduced by a gatekeeper), in an attempt to avoid misrepresentation.

A standard convention in ethnographic presentation is to protect anonymity in response to the issues of privacy and identity (Murchiston, 2010, p. 32), which was the case for this study. As well as names, anonymity of specific places on site or groups of workers was often kept, to reduce risks of identification. Ethnographers often try to give participants an opportunity to decline to be observed or interviewed (Hammersley & Atkinson, 2007, p.211). For example, when an informant was asked about a topic of interest by the researcher, and the informant replied it was: ‘Just another piece of construction’. While this brief
answer and passing comment could have been because the informant was busy, it was interpreted as a polite way of declining to be involved. To avoid disturbing this informant or creating tensions, the researcher avoided at attempt to discuss research topics with this informant. Situations such as this were very rare but it was important to respect them.

Hammersley and Atkinson (2007, p. 214) state that the publication of ethnographic accounts can have potential harmful consequences; and McCurdy et al. (2004) suggest that ethnographers can ask informants to read drafts of your ethnography and also change the names of people and places when you write to avoid harm. Publication drafts were sent to two employees, and the names of people and places were also made anonymous in all research publications. The research setting (QC) was identified only in the thesis, as was agreed between the two parties at the beginning of the project in the studentship agreement. It was decided that the viewing of the thesis was to be restricted until after the project was completed to reduce any unlikely risks of negative ramifications of this publication affecting the projects performance. Considering FCBC would also no longer exist after this point risks of individuals being identified or any commercial damage would have been significantly reduced.

The ethnographer also has to consider protecting notes and even disguise their research activities for privacy reasons (Murchison, 2010, p. 32). For this reason, all notes were typed up and password protected and the researcher made efforts to avoid association with the project (for example on social media or a ‘linked-in’ profile).

Health and safety is a sensitive issue in construction, especially when the focus is on ‘unsafety’ rather than safety. It could be argued that for the industry to improve and to save future lives, it is ethically correct for all information to be disclosed for the ‘greater good’. However, this study adopted an approach where many steps were taken to protect the project and the informants
involved, while still providing insights which could help the industry improve its health and safety performance. This approach meant that some information was withheld. The ethnographic vignettes were carefully constructed to pass on potentially valuable insights for the industry to prosper but also to protect those involved. This approach was finalised following attendance and discussion at a research ethics clinic at a LERU (League of European Research Universities) Summer School in the summer of 2014. As well as consulting the School of Engineering’s ethical procedures, in order to provide a more thorough ethical approach, detailed procedures from the School of Humanities were adhered to (see Appendix B for Ethics Form).
3.8 Research Philosophy and Methodology

Summary

Dainty (2008) and others have raised questions about the narrow ontological and epistemological standpoints in construction management research and the ability of the research community to be able to provide a rich and nuanced understanding of industry practice. Therefore, it is worth considering different methodological approaches that could produce different kinds of knowledge (Pink et al. 2013, p.3). This study adopted a rationalist interpretivist theoretical approach and used a rare method in construction management research through ethnography.

Field access (3.3.1) was granted through a contractual agreement, following a Key Performance Indicator placed on the principal contractor by the client. Participant Observation (3.3.2) was used as a main research tool, with the participant aspect (rather than the observation) being predominant. The researcher was perceived as a student trainee H&S advisor, had H&S advisors as gatekeepers and used informants from many different positions during the study period. Data was gathered in different settings such as office meetings, H&S department office, construction site offices and the construction work areas. Triangulation techniques were used by gathering data from different informants in different settings and by using both principal and non-principal data.

The data was input into software application nVivo and coded to provide infrastructure for searching, retrieval and organisation. An iterative-inductive approach was undertaken and this led to the research becoming progressively focused over time in a ‘funnel’ structure. A thematic analysis approach was undertaken to reveal patterns and trends and to focus the recurring insights of interest to unsafe behaviours. The write-up was used as a form of analysis. The vignettes were written with potential audiences in mind such as constructional
professionals and academics. These ethnographic pieces were described as detailed as possible while still protecting informant’s anonymity. Hence, some details were withheld for ethical reasons.

Ethically, (3.7) the aim was to provide key insights to the industry while still protecting the project and individuals within the research setting. Sensitive incidents and accidents under legal privilege were not recorded, research topics were not discussed with informants that were dismissive and any paper publications were sent to the project for approval.

Internal reliability was tended to through triangulation techniques that included engagements with informants at different times and in different settings, but on the same or similar topics. The use of mechanically recorded data (3.4.1) such as SORs, meeting minutes, safety climate surveys were also used. Low-interference descriptors (3.4.2) such as mobile phone notes and writing on meeting minutes, reduced internal reliability threats by acting as refreshers.

External reliability threats include: the researcher’s identity, informant choices, social situations and conditions, analytical constructs and premises, and methods of data collection and analysis. The researcher’s identity (3.3.3) was discussed with the researcher being perceived as a student trainee H&S advisor. Regarding informant choices, (3.3.4) association with the H&S department was deemed appropriate because of: the access made available to all sites on the project, the data opportunities on health and safety issues, common interest with employees, insight could be obtained into the office work and site work on H&S matters and services could be offered back to FCBC. Descriptions of informant’s roles or positons were used to reduce informant bias, and discussions occurred with various informants of different positions on the same matters. Regarding data analysis, the analytical constructs, definitions and units of analysis should be clearly portrayed for the replicability of the research. Hence this study has outlined the key definitions (e.g. unsafe act), constructs (e.g. principal & non-principal data) and units of analysis (e.g. codes in nVivo).
The methods of data collection and analysis have been outlined (see 3.4 & 3.5).

Threats to internal validity include history effects (3.3.4.1), observer effects (3.3.8), selection (3.4.4) and spurious conclusions (3.3.7). A six stage protocol was established for reducing observer effect threats and establishing rapport. History threats were tended to through long-term existence in the natural setting allowing for time-sampling techniques. A wide range of informants of different roles were used and different types of data (primary, secondary, principal and non-principal) were used for selection threats. Triangulation techniques were used in attempt to overcome spurious conclusions.

The issue of external validity or generalisability was approached through a visit with industrial practitioners to share insights of findings on the Queensferry Crossing project (see Appendix A). This visit attempted ‘seek fit’ and give an indication where the findings from this study were relevant to the wider construction industry. While some findings appeared to ‘fit’ better than others, the important point to note is that since all the findings induced good comment and discussion, this suggests that the insights are to some extent relevant to the wider construction industry.

The following short Chapter (4) is an introduction to the three findings Chapters (5, 6 and 7) and is an example of the end product of the research design process. The detailed ethnographic vignette, which follows at the beginning of the next chapter, touches on many of the key findings that are discussed in more detail for the rest of the thesis including blame culture, production pressure, common sense safety, confrontation and the additional complications with a multi organisation.
Chapter Four:
An Introduction to
Ethnographic Findings

Figure 19 – In this chapter your scribe (pictured above) introduces the forthcoming findings chapters through an on-site accident investigation and brief summary paragraph
4.0 An Introduction to Ethnographic Findings

One crisp June morning I arrived in to the H&S department’s office. Before I had time to set up my laptop one of the H&S advisor’s explained to me that there had been an accident last night. I raised my eyebrows with a surprised and concerned look. The advisor added, the incident had been described to him as ‘minor’, but since the injured person had suffered a head injury, he was taken to hospital as a precaution. We began putting on our PPE in order to investigate.

4.1 Confrontation: ‘Why don’t you ask the people that were actually involved’

We left the H&S office and arrived at an open-planned site office close where the incident had taken place. The site manager was at his computer typing away, while one of the site foreman was wrestling through some paperwork and organising it into folders. The H&S advisor was interested to see if there were any details put into the accident book by one of the nightshift supervisors. The site engineer explained that it would not have been recorded because it was locked in his cupboard (so no-one would have had access last night). The site foreman dropped the paperwork in his hands onto the desk and stated in a confrontational manner: ‘why don’t you ask the people that were actually involved’. The H&S advisor was of the opinion that his demeanor was unnecessary. He felt he had just asked a simple question, and since the people involved were not yet on site, he thought he would make enquiries with the two supervisors.

At around eleven o’clock, the injured person (Bob) arrived on site, and the H&S advisor took a witness statement. The incident had occurred during the extension of the cables of a construction hoist, so that the hoist would be able to travel higher up. During the process the hoist was moved upwards in short jolts or bursts of 300mm. These short increments were used so that there was less chance
of the reinstalled cable getting snagged or damaged. In Bob’s witness statement he said that ‘this meant looking over the handrails and downwards to view the cables’. He described the accident as:

‘I was looking over the handrail with the hoist travelling upwards when a cable guide above me came into contact with my hard hat pushing my head down against the handrail. I let out a yell to Terry who was at the controls and the hoist carriage stopped immediately. I was [head] jammed between the handrail and cable guide and I couldn’t move until the carriage was lowered. Once released Terry called Gary (foreman) to inform him of the incident, after which the man basket was sent up and I was brought down to into the medical room, where my injuries were cleaned and dressed (cut to right cheek) and then I was escorted to hospital. At the hospital I was examined and the dressings were changed. I was brought back to site around 21.00 where I picked up my vehicle and drove home.’

Bob also admitted that he hadn’t attended the hoist training on extending the system but that he believed as ‘a steel erector for over 30 years’ he considered himself ‘competent to carry out this nature of work’. To check the cable was not snagging, Bob had placed his head over the handrail. The H&S advisor and I went to speak with a scaffolder that had recently completed the hoist training. The scaffolder confirmed this unsafe behaviour was covered in the training, but also claimed it was just ‘common sense not to look over the handrail while the hoists moving’. The issue of common sense was brought up again when discussing the incident with a site manager in his office. He disagreed with the scaffolder, saying that ‘there was no such fucking thing as common sense safety in construction’, as you would ‘be laughed out of court’.

4.2 Blame: ‘It was an act of god, could have happened to anyone’

At the end of Bob’s witness statement, he made it clear that he thought no blame should be proportioned to anyone. He stated that this ‘was just an accident’, ‘it could have happened to anyone’ and it was ‘an act of god’ and nothing could have
prevented it. The advisor tried to make it clear that in the worst case scenario, he could have been decapitated, if they had decided to go in bigger jumps than 300mm. The H&S advisor believed that one of the key factors contributing to the accident was that Bob had not been trained to safely work on the hoist system. Following the statement, the H&S advisor and I spoke with the general foreman, Gary who had sent him to work. Gary thought that Bob was ‘sound and a good worker’ but confirmed that he had not been on the 5-day training. He revealed that he had sent eight workers to the training; but six had since left, one was ill and another was unavailable as he was working elsewhere. As the trained workers had not been replaced, it suggests that the department had either suffered from a lack of planning, or perhaps a lack of resources.

4.3 Production Pressure: Hoist Engineer’s Witness Statement

Soon after, the hoist engineer and witness of the accident, Terry arrived on site. The H&S advisor was of the opinion that his witness statement seemed ‘very honest, but also very damming’. There was a major concrete pour due to happen on the nightshift and hence there was significant time pressure on the lengthening the cable system. The strength of the language in the daily logbook (for correspondence between day workers and nights) perhaps gave an indication to these pressures: ‘Fucking shite nite. Got fuck all done. Hoist wasn’t running till 11. Still need to get those slabs in. Catch you soon bro. Stay safe.’

Terry explained that he was asked if there was anyway he could have done a quick temporary job, and then come back at a less critical time and do a ‘proper job’. Terry hence tried to use all the slack in the cable system to make the cable reach the required height, but he found it to be one metre short and hence a ‘proper job’ was required. He admitted that he knew that Bob was not trained and that Gary also knew. Gary said he was the ‘best worker he had’, and if it was OK if Bob came up with him. He stated that he had worked with Bob before on similar tasks, that he was an excellent worker and was much ‘better than some of the other guys that
had been trained'; hence he was happy to work with him again. The fact that Bob had worked with the Terry on similar tasks before suggests that unsafe working had previously occurred i.e. a worker doing a job he was not trained for. Terry’s witness statement:

‘I always give the warning ‘going up’ prior to moving the carriage. We were both watching the cable to ensure it wasn’t being damaged. We had travelled approximately 20m in total when Bob shouted ‘stop’. This coincided with me hitting the ‘stop’ button and not purely because Bob shouted. The stop button is pressed as a matter of course every time we stop travelling. As I looked towards Bob I could see he was stuck between the handrail and cable guide by his head. I immediately pulled the stop button out and travelled down approx. 500mm to release Bob. I checked him out and other than a cut to his right cheek he seemed OK and he indicated he was OK. In fact he wanted to carry on with the task. I insisted he got medical attention. I then phoned Gary and shortly afterwards the man basket was sent up and Bob was taken down. I remained on the Hoist to make it safe. Bob was escorted down by the N/S banksman. I know Bob hadn’t received the Hoist 5 day training course. I have worked with Bob on a number of occasions and feel he is a competent man.’

In a discussion which followed the witness statement taking, there was a delay in getting him down because the incident occurred between day and night shift, which meant a crane operator was not present. This could have been of greater concern if the injury was more severe and the injured person needed attention urgently. Though it was not pivotal in this incident it, a weakness in the safety management system was highlighted. Fortunately this weakness did not manifest on this occasion, as Bob’s injuries were not more severe (e.g. major loss of blood). Despite being injured Bob had a desire to carry on working, which demonstrates a dimension of the construction industry’s well-documented macho culture.
4.4 National Backgrounds: ‘as the trained and competent worker delivering a specialist operation he should have delivered it safely'

Following the gathering of evidence, a meeting was organised with the head of section, who was from mainland Europe. The head of section generated a report that pointed most of the blame towards the subcontractor’s hoist engineer (Terry). He was of the opinion that 'as the trained and competent worker delivering a specialist operation he should have delivered it safely'; and that he should have given some form of training to Bob. The H&S advisor disagreed, suggesting that legally as the principal contractor they should be managing such situations properly, though he acknowledged Terry should not have accepted an untrained worker. This clash of opinion could have come from expected different working practices in different countries.

In an informal discussion prior to the meeting, the foreman, Gary admitted he was prepared 'to take a bit of wrath' or in other words, some form of disciplinary action, but as he sent him up with a trained and competent subcontractor (Terry), he wouldn't take all responsibility. He was keen 'to make a lessons learned and move on'. Though in the meeting there was disagreement on the accountability, they did all agree that the accident could have been worse. The H&S advisor made the point that had the hoist gone up in bigger installments, the injured person could have had his head 'butchered off'. Though the head of section made a light-hearted comment surrounding the word choice, he agreed it was a serious incident that could have been worse.

A few weeks after the incident, the subcontractor hoist engineer, Terry told the H&S advisor that he had been asked to do it again - do a job with a worker that wasn’t trained. The superior who asked him had not been involved in the previous accident, and explained they were under significant work pressures. Terry refused to go up with someone that wasn’t trained despite this pressure. For Terry
the accident had been quite upsetting; he had mentioned he felt 'bad' for Bob, and that he 'should have seen it coming'. Considering Terry refused to commit a similar unsafe act when asked by a manager, this suggests that his risk perception levels had increased.

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The above opening narrative describes an experience that formed part of this PhD research study. This ethnographic vignette introduces several topics that are unpacked and explored in the following chapters.

At the beginning of the above accident investigation, initial requests were met with a degree of confrontation. This study found that at times there was a confrontational nature present on the project and the safety-related consequences are discussed in more detail in Chapter Six: Unsafe Supervisor and Operative Acts chapter (6.1).

The lack of trained competent workers available for the task could suggest a lack of planning and training. This combined with the production pressure from the looming concrete pour, seemed to contribute to the accident. The implications of production pressure and cost are more thoroughly explored in Chapter Five: Unsafe acts by Management (5.2).

There were discussions surrounding whether it was 'common sense' to not look over the handrails while the hoist was in motion. 'Common sense safety' is relatively under-researched area of study, and this concept is discussed in the Chapter Six: Unsafe Supervisor and Operative Acts (6.2).

Throughout the investigation, there appeared to be a desire for a lack of blame for those involved, and in the end, nobody was held accountable for the accident. The blame problem is explored in the Chapter Five: Unsafe acts by Management chapter (5.1).
The debate in accountability could have derived from perspectives that were based on different national backgrounds. The implications of having a multinational workforce, in working practices and communication issues are explored in Chapter Seven: *Multinational Workforce*.

A typical way to try to encourage safe behaviours and reach targets on projects is the use of incentive schemes. In the following Chapter Five: *Unsafe acts by Management* (Section 5.3) both formal and informal schemes, that were present on this project, are discussed.
Chapter Five: Unsafe Acts by Management

This section primarily explores upper management (office-based management) who can create safer working environments through systematic changes. The first section discusses the prominent ‘Blame Culture’ (5.1) that was apparent throughout the whole research period. Managers have the opportunity to make decisions that create cultures such as ‘blame’ or a ‘just’, with the latter being more desirable (see for example Reason, 2008). The second section, ‘Safety, Time & Cost’ (5.2) outlines decisions that were made that were cost effective, yet appeared to increase safety risks. The final section, ‘Reward Systems’ (5.3) explores both formal and informal incentive programs. Some of which had production goals, which could have effects on safety performance; and others were designed to improve safety, yet came across unexpected and unanticipated challenges.
5.0 Unsafe Acts by Management

As discussed in Chapter two, there are different perspectives on unsafe acts. Two of these perspectives are known as the Person approach and the Systems approach. The Person approach tends towards individual error and blame, whereas a Systems approach focuses on the conditions in which individuals work, and tries to build defences to avert errors or mitigate their effects. The Person approach is intuitively appealing for organisations, as it uncouples organisational responsibility and individual unsafe acts as far as possible (Reason, 2008). However, this approach is inextricably linked to blame (ibid), which created a difficult learning environment, where workers were feared to make mistakes, and misreported accidents. On this project, upper management adopted a Person approach perspective on unsafe acts, which prompted a blame culture. The first section of this chapter discusses this blame culture that emerged, which was a common theme throughout the duration of the study. The second section explores the relationship between production pressures, cost and safety. While no organisation is in the business of being safe, there were times when the management undertook decisions to stay within budget or schedule that increased safety risks. This was acknowledged by the works managers, who believed that the budgets and schedules were too tight. One of the most obvious cost-saving strategies was to employ a multinational workforce. The findings gathered on the challenges associated with a multinational were significant, and hence to receive the attention it deserves, insights have been discussed within a separate chapter (Seven). Other cost-saving strategies on equipment, machinery and temporary working platforms are discussed within the second section of this chapter.

The third and final section of this chapter investigates incentive and reward systems that were used to try to improve performance through behaviour change. This section discusses both ‘formal’ and ‘informal’ schemes used on the project such as: the challenges of both individual and team safety reward
schemes, the adverse safety effects of ‘price’ contracts, and the undercover and informal schemes that were used by site-management.
5.1 Blame Culture

‘There is so much swept under the carpet, it has become a trip hazard’

FCBC Manager
2014
5.1 Blame Culture

Traditionally when a problem arises during a project, parties often begin to blame each other rather than looking for a solution (Bramble et al., 1990). Blaming individuals is emotionally more satisfying than targeting institutions (Reason, 2000), but this can create a blame culture where, according to the Dupont Report, (Health and Safety Commission (HSC), 2001, p. 70-72): ‘there is a tendency to look at the guilty party rather than the act and the reasons behind it’. Whittingham (2004) describes organisation with a blame culture as those which: ‘over-emphasise individual blame for the human error, at the expense of correcting defective systems’. In such a culture, blame is apportioned to the individual making the error rather than being allocated to the system, organisation or management process (Human Engineering, 2005).

This blame culture phenomenon was frequently evident in the research setting. In the following ethnographic vignette, ‘My gaffer is going mental’ (5.1.1), it is revealed that operatives were being blamed for mistakes by their managers; and that when something did go wrong, individuals and organisations were finger pointing at each other. The issue of trust and a fear of being blamed is raised in ‘the negative ones get chucked in the bin’ (5.1.2), while a fear of raising safety issues is highlighted in ‘we need ballot boxes for SORs’ (5.1.3). The segregation caused by the blame culture is discussed in ‘It is more than blame, it is an attack’ (5.1.4). The next two vignettes ‘We have method statements that can choke a horse’ (5.1.6) and ‘We don’t hold anybody accountable’ (5.1.7) are related to protection from and fear of compensation claims. The final vignettes in this section, ‘No way they would have recorded it as a near miss’ (5.1.8), ‘Well that is just the standard cover up’ (5.1.9 ) and ‘So much gets swept under the carpet it has become a trip hazard’ (5.1.10) detail how incidents and accidents would be mis-reported, under-reported and reported late.
5.1.1 Blame for mistakes: ‘My gaffer is going mental’

I was daydreaming in the back of the H&S department vehicle. Two members of the H&S department were chatting in the front of the vehicle while we made the short journey from a site inspection back to the main office. As we drove along the site road we noticed a long truck, a damaged site vehicle which belonged to the client and four individuals standing alongside. It appeared we had just missed a collision. We pulled over, got out and immediately asked whether any of the four involved (three in the client vehicle and the truck driver) were hurt. Thankfully they all said they were ‘fine’ and there were no injuries. The truck driver of a subcontractor, Sam had reversed into the front of the client’s site vehicle. He was reversing in order to make the appropriate angle to turn a corner. He said that he had checked his mirrors, but they must have been so close to him that he couldn’t see them in his mirror, and that he stopped when he ‘felt it’.

I asked Sam if he was alright and he said he was OK, but his ‘gaffer (manager) was going mental (mad)’ on the phone and had called him ‘an idiot’. He shook his head in apparent disbelief and said ‘these things would only happen to me’. He began to worry about the cost he may have caused and the potential claim against his company saying: ‘I’m fucked ‘cause there is three of them... nobody is going to believe me over them’.

I was asked by the H&S manager to collect the names of all those involved in the incident and following this I got back into the site vehicle with the two other members of the department and Sam. Soon after we began driving back to the main office, Sam started to defend his case: ‘I checked my mirrors but couldn’t see them, there is no way they should have been that close to me’. One of the H&S advisors in the department explained that we would get his statement all down on paper when we got back to the main office. He looked at me in the back seat, with a smile while shaking his head, again repeating ‘it would only happen to
me’. As we got out the vehicle at the main office, I asked him if he had been enjoying his job and he said the ‘jobs shit, long hours, shit money’ and the ‘travelling was a killer’ as it took him over an hour to drive to work. He then added ‘but a jobs, a job though’. He asked what my role was and I explain I was a ‘student researcher in the safety’, to which he responded ‘that’s good, hope it works out for you, there’s good money in safety’. We got into the H&S department of the main office and I sat with Sam as the H&S advisors prepared the documentation for the witness statement. Sam was of similar age to me and I felt comfortable in his presence. He turned to me and, referring to the office staff, said ‘after I hit him, I had never seen so many white hats’, and that ‘they all just seem to come out of nowhere’. Considering that I was one of the staff members in a white hat, I felt that this statement somewhat showed he felt comfortable in my presence. The H&S advisors were ready to take the witness statements so I said goodbye to Sam and wished him ‘all the best’ and ‘hope everything goes well’; to which he replied ‘cheers mate, I might need it, catch you later’.

Blind spots are a common danger on constructions sites (Fullerton et al., 2009) and to prevent obstructions being unprotected in blind spots, a warning system is needed that will quickly alert workers and equipment operators (Teizer et al., 2010). Pratt et al. (2001), found that the majority of vehicle-related fatalities occurred when a vehicle was in reverse mode; and attributed this to blind spots. Hence, previous research has outlined risks with blind spots in reverse mode. The unsafe behaviour by Sam in this scenario appeared to be a mistake (error), rather than a violation, yet the manager was still proportioning blame to Sam. This is perhaps unsurprising, as if something goes wrong it seems obvious an individual is responsible (Reason, 2000) and so can be blamed. However, from systems theory it can be understood, that by placing sole responsibility onto an individual, the concerns are likely to be hidden or covered up, meaning the underlying risk is not mitigated (Human Engineering, 2005). Sam seemed to display some fear, which was probably to be expected, considering the reaction
of his manager, who was quite happy to blame Sam for his error. Managers should have recognition that errors can occur, and this was one of the dimensions that helped develop a trust culture on the Olympic Park construction project (see Healey & Sugden, 2012). This recognition would make it less probable that front-line workers would fear making errors, as front-line workers are less likely to reveal all or any of the details of an error if they fear the consequences of raising it to superiors.

Sam was worried about the potential claim against his employer, and was aware his manager seemed to think he was responsible. He tried and shift blame to the other party involved, suggesting the client’s vehicle should not have been so close to him. This is tending towards the traditional approach, where parties often begin to blame each other when a problem arises, rather than looking for a solution (Bramble et al., 1990). This traditional approach appeared to be being reinforced by the perceived compensation culture. The compensation culture attributes blame, and rather than accepting that accidents can and do happen, somebody must always be at fault and financial recompense is seen to make good any injury (Lord Young of Graffham 2010). This means that when something goes wrong, instead of trying to solve the problem collectively for future incidents, different individuals and organisations finger point and attempt to attribute blame elsewhere.

In this ethnographic anecdote, Sam feared the reaction of his manager, and the possibility of a forthcoming claim. The next vignette reveals how the fear of health and safety blame on-site appeared to also be apparent at site-management level, a suggestion that came from a discussion on the misuse of the SORs (Safety Observation Reports) at a training session.
5.1.2 Trust: ‘The negative ones get chucked in the bin’

I arrived early to the training session with the health and safety consultant who was providing the training. The desks were laid out in a ‘horse shoe’ shape facing the white wall with the projected slides illuminated on. There were about sixteen seats available to take, and as the training was primarily for the supervisors rather than myself, I took a less obtrusive seat on the end of the horse shoe, rather than the middle. A van supervisor arrived with a pad of paper and a pen, and sat between near the middle of the horse shoe, at the opposite end to myself. I caught his eye, and he said ‘alright mate’. I raised my eyebrows in acknowledgement and said ‘alright buddy’. The consultant meanwhile was busy checking that the safety video for later in the presentation was fully functioning. Only a few minutes past, though it seemed longer due to the silence in the room. It got to five past two, five minutes after the training was meant to start. Still only the van supervisor and I were present for the training. I began to wonder if it would even go ahead, and if this was going to be a good use of time. Then the consultant said ‘well I guess this is us, we best get started. We should probably start with introducing ourselves... It shouldn’t take long’ (he smiles). The presentation began despite only two out of the twelve expected attending. The attendance rate for the series of behavioural safety supervisor sessions had been very poor throughout despite being mandatory safety training sessions. This could be interpreted as a lack of commitment to safety at management level, a factor which has been highlighted by many researchers as important for safety performance (e.g. Dester & Blockley, 1995). A discussion occurred at the end of the presentation, when there was a question in the feedback questionnaire regarding SORs (safety observation reports). The project had a safety observation reporting system, where employees could submit observations and corrective actions on a ‘SOR’ card. The SOR system was frequently used and there were thousands inputted. The van supervisor thought that the ‘SORs didn’t do anything’ and that you were ‘sometimes hard pushed to find your own one in the monthly SOR summary report’. This led him to believe
that he thought the SORs were ‘vetted’ and that some ‘negative ones get chucked in the bin’.

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Murchison (2010, p. 33) note that not all business environments are the same, and having access to particular areas such as a break room or training exercises, can be much more productive ethnographically, since smaller spaces may offer different sorts of interaction. Access to training exercises and other areas, as in the above vignette, were useful environments for collecting ethnographic data. On this occasion, the training room with few participants offered an opportunity to gain insights on the views of employees within a different setting. One of these insights was that the van supervisor appeared to be suggesting that site-management vetted the SORs to avoid any negative image portrayed or any blame from superiors. This highlights one of the negative aspects of a Person approach perspective and blame culture. It was believed that the fear of a negative reaction and blame of superiors, led to raised safety issues from SOR cards being removed. This meant that any negative problems would be invisible, and on the surface there would be no issues of note, yet deeper underlying problems were being covered up, creating an environment where it was difficult to improve.

While there appeared to be a fear from site-management to pass on negative SORs to superiors, operatives were also feared to pass on negative SOR cards directly to their supervisors. This concept became clearer from insights gathered at a safety rep meeting to discuss the safety climate survey, highlighting in the following ethnographic vignette. The idea of this meeting was to engage some of the safety reps, who are also operatives, to involve them in the decision making process and get their feedback; as workers that are actively involved in the decision-making process and problem resolution will be more committed to occupational health and safety (Vecchio-Sadus & Griffiths, 2004). These meetings often offered a good opportunity to gather ethnographic data:
5.1.3 Trust: ‘We need ballot boxes for SORs’

The meeting included three safety reps, a H&S advisor and myself. One of the questions in the safety climate survey that was being discussed revolved around SORs. As with the van supervisor in 5.1.2, they also believed that the SORs were vetted. Another dimension of the fear of blame was then raised by one of the safety reps, who said ‘we need to bring in ballot boxes for SORs, because guys are feared to hand SORs to their supervisor’. Another safety rep, agreed and said it happened on his last job as well but with safety surveys. He said: ‘I did my survey and put it in a brown envelope’. Another safety rep then interrupted ‘and you got a kitkat for it’ [they both laughed]. He then continued: ‘Aye [yes] we did, and the next year my gaffer [manager] said ‘make sure it’s a good one this year’ and I was like ‘what, so you read mine last year?’... so I refused to do it, what is the point in doing it if you can’t do it honestly?’

As the meeting carried on, we were going through the questions and results of the previous survey. One of the results was that 86% thought they can raise concerns without fear. One of the safety reps lay back in his chair and raised his eyebrows in seeming disbelief, and another just firmly stated after a couple of seconds of silence: ‘bullshit’. He added: ‘the main fear you have if you raise concerns is the GF (general foreman) phoning their boss saying that: this boy is causing trouble, get him to fuck’.

The next question surrounded challenging unsafe work areas/practices. One of the safety representatives said that ‘lots of boys don’t do it’ and another safety rep added that ‘you often get: ‘what the fuck’s it got to do with you?’ and that can even come from foreman.’ Another safety rep added: ‘there is no place for guys like that on site any more’ before entering a short anecdote: ‘I was on-site the other day and I was challenging a boy because he wasn’t wearing his gloves. While challenging him, the foreman intervened and questioned what I was doing and I said I’m a safety rep (taps his green hat) and that gloves are mandatory on the
site... he then stormed off in a rager [anger]. This confrontational nature appeared to be having an adverse effect on the health and safety performance.

Workers thought that SORs were being ‘vetted’ and this had led to calls for ballot boxes. This suggests that there was again a lack of trust between operatives and management, as operatives could not raise issues without fear of consequences. In 1993, Latham entitled his interim report ‘Trust and money’, signposting the importance of the lack of trust in the UK Construction industry. Almost two decades later, Fellows & Liu (2011) questioned whether anything had changed in a paper entitled ‘Trust and Money: 20 Years of (No) Progress?’. However, in 2012, one of the eight factors outlined in the wealth of good health and safety practices at the Olympic Park project in London, was health and safety trust (Healey & Sugden, 2012). According to Healey & Sugden (2012), organisations that do have a high level of health and safety trust are committed towards continuous implementation and improvement of their health and safety procedures. The lack of trust appeared to stem from the prevalence of the blame culture. Members of the organisation avoided raising negative safety issues to their superiors for the fear of being blamed for doing so, or for portraying a negative image of their site. However, these acts were a barrier to safety improvement, and in Khalfan et al.’s (2007) study ‘Building trust in construction projects’, they conclude that: ‘there needs to be a cultural change, a move from a blame culture to a problem-solving culture’.

The blame culture could also destroy relationships, create fears, tensions and segregate individuals and organisations that work together. A study by Probst (2006) suggested that the fear of job loss was a reason why under-reporting occurs, and Finkel (2015) acknowledged that fears associated with unemployment can push workers into taking risks. The blame problem could be amplified in the construction industry, considering it been known for being confrontational (see for example Smith, 1992; Loosemore, 1998). The following ethnographic vignette represents this confrontation amplifying blame, and damaging relationships.
5.1.4 'It is more than blame, they are an attack'

I had been out for lunch with two graduate engineers. We arrived back into the main office car park, and began walking towards reception. One of the graduate engineers began to wander off the pedestrian walkway onto the road. I politely reminded him to use the walkway, and the other graduate engineer said 'SOR him, SOR him' before beginning to laugh. The wandering graduate engineer returned to the pedestrian walkway and we then soon reached the main office. This was an indication to me that the SORs were being perceived by some as a tool for finger-pointing and blame. From an exploratory study on the SORs (see Sherratt et al., 2015) it was found that 37% of the SORs directly identify the individual by name or by the company they work for or by the registration number of their vehicle. This again suggested finger-pointing and an underlying desire to apportion blame.

Blame through SORs was revisited on multiple occasions, including near the end of my time in the research setting, when I was giving presentations to the Health and Safety Department and Senior Management. This did result in some interesting discussions following the findings I had raised. The issue of a blame culture was highlighted in one of my presentations and this led to a discussion on the use of SORs. The audience of informants agreed that they can be used as a blame tool, and one of the senior management said that some of the SORs were ‘more than blame, they were an attack’. The SOR system is a safety communication tool, and poor communication of potentially sensitive safety issues in a confrontational environment could have caused conflict. In the H&S office the SOR system was often described as being used as a ‘bitch-fest’ or being used to ‘fire shots at each other’.

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Conflict often arises through misunderstandings, which usually involves some element of poor communication (Whitfield, 2012). Communicating effectively on sensitive safety issues was challenging on a SOR card, which was impersonal and could be taken offensively or as an attack against an individual or organisation. This led to the ‘bitch-fest’ that was highlighted repeatedly by the health and safety department.

In previous vignettes it has been revealed that the blame culture created an environment where individuals would blame and attack each other, and that there was fear for raising safety issues amongst operatives and construction site managers. In the following vignette, the fear of the organisation being blamed and claimed against led to extensive paperwork measures:

5.1.5 Paperwork: ‘We have method statements that could choke a horse’

Sitting in the weekly H&S meeting one Tuesday morning, we came to an item on the agenda, the ‘Your Way of Working’ behavioural-based safety supervisor training sessions. One of the H&S professional’s outlined one of the purposes of the training: ‘One of the things these sessions are going to try and address is what supervisors need to do with respect to H&S. Supervisors have been more focused on paperwork, they need to be more focused on the goings on, and supervise the work. They need to be more supervisor-driven than paper-driven.’ Another member of the team stated: ‘That seems a move forward. The paperwork on this project is huge... it’s massive. The RAMS (Risk Assessment & Method Statements) are desk breakers... we have method statements that could choke a horse.’ A couple of H&S advisors nodded and raised their eyebrows around the table, before another stated: ‘Couldn’t agree more, we a living in a virtual safety world, where everything might be good on paper, but we need to replicate that out there.’ The excessive paperwork demands were something that was raised throughout many levels of the organisational pyramid. While sitting in a meeting with a
senior manager and my PhD supervisor, he gave an insight into the reasoning behind it: ‘Our method statements can be 300 pages long, but there are only two pages that are needed for its main purpose [the methods and risks for the workers]. The rest is just arse covering’. The length of the document appeared to be there for legislation and insurance reasons. It was clear that none of the workers doing the job were going to take the time to read a 300 page method statement before starting.

The ‘virtual safety’ world described by H&S advisors, was compounded by excessive paperwork in other areas. For example, the thousands of SORs that were input on the project. In the supervisor behavioural-based training session (see 5.1.2), this was highlighted by the van supervisor: ‘The SORs are quota driven by management, and mainly used by the management rather than the guys (operatives)... And numbers don’t mean safety’. I nodded in agreement with him, saying: ‘I think the volume of SORs can dilute the good information as well.’ He said: ‘Definitely, there is a wide range in SOR quality from PPE compliance, which is part of the job; to good practices like stopping the job when unsafe...Some of the SORs are about soap being in the toilets, yes that’s positive, but it just creates a meaningless paper trail’. A fear that was revisited on many occasions by the H&S advisors, was that the SORs could be used against them if a bad accident occurred. One advisor said: ‘There are many of the SORs that keep getting repeated, and if something goes wrong, the HSE could use this big bank of data to just hit us over the head with’.

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The excess paperwork appeared to be perceived as a waste of resources, and it had meant supervisors were become pre-occupied with paperwork in the office, rather than supervising the job on-site. H&S advisors had recognised this, and created training material which would encourage supervisors to spend more time on-site, in an attempt to improve safety performance. The paperwork demands on the supervisors came from documentation such as the method statements. Yet these documents were extensive in order to protect the
organisations against blame and claims. The HSE (n.d.) advise that a method statement is:

‘...a useful way of recording the hazards involved in specific work at height tasks and communicating the risk and precautions required to all those involved in the work. The statement need be no longer than necessary to achieve these objectives effectively. The method statement should be clear and illustrated by simple sketches where necessary.’

In a very large method statement, efficient communication is very challenging. However, the reason for the length appeared to be coming from the blame and claim fears, hence the attempt to mitigate most or all of the risks. The SORs were another demanding paperwork resource, that also had blame and claim fears associated with them, as H&S advisors thought the large bank of SOR data could be used against the organisation if an accident investigation by the HSE occurred. Interestingly, while incidents were underreported and misreported (see 5.1.7-5.1.9), the SOR system was used frequently to highlight safety issues of others (individuals and contractors), but individuals were feared of consequences when issues and incidents were raised in their own teams. The different forms of paperwork, both revealed fears of blame and claims. These fears were also visible through inaction, as sometimes there would be a lack of accountability held against individuals for fear of consequential claims, as the following vignette discusses:

5.1.6 Fear of claims: 'We don't hold anybody accountable'

The issue of accountability was one that was frequently discussed by members of the H&S department. In discussions within the H&S office, H&S advisors believed there was a lack of accountability, and frequently made statements such as: ‘we don't hold anyone accountable’. They believed there was a ‘fear’ with the possible repercussions of holding someone accountable, due to potential
compensation claims made. The fear of the compensation claims seemed to have an effect on the lack of accountability being placed upon employees.

H&S advisors admitted that there seemed to be a lot of ‘politics’ involved ‘especially with it being a joint venture project’. Another H&S advisor believed that the two operatives, who had recently been dismissed for a gross misconduct, ‘would still be here if they were FCBC employees and not a subcontractor’. However, advisors believed that this meant that it was ‘not a level playing field’ and ‘your one team one bridge culture goes out the window’. They expanded to say: ‘it depends who you are and who you work for’. They also acknowledged the additional complexities due to the multinational nature of the project: ‘it is subjective, especially with all the different cultures and nationalities on the project... it is all perceptions, and what somebody thinks is safe, someone else thinks is unsafe, and what someone thinks is a red card, someone else thinks is a yellow’. There were occasions when ‘red cards’ or dismissals were rescinded to ‘yellow cards’. H&S advisors made comments in the H&S meetings such as ‘this has happened more than once’ and ‘is this going to be another red card that is rescinded to a yellow once the dust settles’.

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According to Cavill & Sohail (2005), accountability works by formalising expectations of action or behaviour, enabling trust, creating sanctions for failure, and providing the motivation and incentives to use resources efficiently and effectively. The development of accountability is central to tackling corruption (Sohail & Cavill, 2007), and that one of the elements of corruption in the construction industry was suggesting to being the close relationships between contractors (Sohail & Cavill, 2008). The different relationships between contractors appeared to make it more challenging to create a ‘level-playing field’ with accountability. For example, H&S advisors were of the opinion that there were times when direct employees appeared to be being treated differently to subcontractors with the disciplinary process. They believed it was partially due to the potential for a compensation claim against
the disciplinary action. However this could create feelings of unjust on the project. Improvements in safety responsibility and accountability can help improve safety performance (Erickson, 2000), and organisations should try and move away from a blame culture to a just culture, or one of accountability (Human Engineering, 2005). A ‘just culture’, rather than a blame, promotes an appropriate balance between learning and accountability (Dekker, 2008; Reason, 1997). Without this balance, there is a danger of misreporting, under-reporting and late reporting, all of which are further discussed in the following vignettes:

5.1.7 ‘No way they would have recorded it as a near miss’

Two members of the health and safety department walked into the office following a site visit. I asked them how things were on-site, and they mentioned they had witnessed a near miss. A steel bracket had fallen three flights of stairs and landed on the same level as them. Two operatives had been working on the piping on the internal staircase, and one of the operatives had accidently kicked the bracket down the narrow gap which allows for the piping to pass up through the floor level. There was no exclusion zone in place, but the operatives involved were doing the job during a tea break. One of the H&S advisors was of the opinion that there was ‘no way they [operatives] would have recorded it as a near miss’ if they had not witnessed it, and the other believed ‘we get the tip of the iceberg with near misses’.

There was other evidence which suggested a lack of reporting. For example, a telehandler had required over £700 worth of repairs. Upon inspection from a works manager and H&S advisor, the repairs were likely have been due to: ‘driving into something, reversing into something, shunting pallets with the forks and overloading the forks’. Yet there had been no reports of any incidents involving the telehandler.

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Without analysis of incidents, mishaps, near misses and other ‘free lessons’, there is no way to uncover recurrent error traps (Reason, 2000). A key element of reporting culture is trust (Reason, 2000), and the absence of a reporting culture within the Soviet Union was highlighted as a crucial contribution to the Chernobyl disaster (Medvedev, 1999). Accident under-reporting has been well documented in empirical literature (e.g. Glazner et al., 1998; Leigh et al., 2004; Pransky et al., 1999). For example, Rosenman et al. (2006) suggest that up to 68% of all workplace accidents and injuries are not captured in national injury surveillance systems set up by the Bureau of Labor Statistics (BLS) and the Occupational Safety and Health Administration (OSHA); and likewise Probst et al., (2008) reported that nearly 78% of all experienced accidents went unreported. The issue of under-reporting was met time and time again throughout the whole research period. As well as under-reporting, misreporting of events appeared to occur:

5.1.8 Misreporting: ‘Well that is just the standard cover up’

I was in an on-site office with a H&S advisor and a site engineer having a general chat. The topic of conversation then turned to a fire that had occurred a few weeks prior:

H&S advisor: *What is your understanding of the fire?*
Site engineer: *My understanding?*
H&S advisor: *Aye, [yes] what did you hear about it...*
Site engineer: *My understanding is that the flames were licking the chimney [he lifts his arm up in the arm as far as he could reach from his office chair]. I could be speaking out of turn here, but I believe it was quite a significant fire’
H&S advisor: *That was my understanding as well... that is what I heard. We had originally heard it was a... [he starts stomping the ground with his right foot suggesting it was a small smouldering fire]. But then the whispers started, and I heard it took several fire extinguishers to get it out. I would have loved to have*
seen the evidence, but not even a baton [wooden plank] was left. It was all taken away and replaced.

Site engineer: Well that is just the standard cover up.

H&S advisor: But why do you think they cover it up?

Site engineer: Probably just be going Gung ho, and they wouldn’t have been doing it right, they wouldn’t have had a hot works permit or something like that...and you guys are a pain in the arse [he says with a smirk]

{We all laugh}

H&S advisor: It is just frustrating, people try and change things to a non-event.

Me: And it seems that as soon as something does go wrong, there is so much effort put in to trying to cover it up.

H&S advisor: Aye [he nods], rather than using that effort to try and learn from the event. You need to leave the evidence so we can learn from it. And fires are dangerous, to think of all the stupid things we used to do as kids...

[the chat now went into fire-related anecdotes of when we were young]

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The site engineer believed the incident was a ‘standard’ cover up, suggesting that this was usual practice within the project. This reinforces the evident blame culture on the project, as a dimension of blame culture is when errors are ignored or hidden (Whittingham, 2004). The site engineer suggested that the reasoning behind not revealing the incident in full was because they were probably going ‘gung ho’ (production pressures are discussed in the following section), and that they wouldn’t have had all the correct documentation in place for the task. This could also be interpreted as another negative impact of excessive paperwork, as due to production demands, individuals end up not completing all their paperwork. Then when incidents do occur, as the ‘virtual’ safety world is not robust, a cover-up occurs in an attempt to avoid blame.

The previous couple of vignettes, have highlighted how incidents were under-reported and misreported. The following vignette explains the implications this
meant for the project, and the challenges that H&S advisors found themselves in, as an environment in which learning from incidents was not created:

5.1.9 Reporting Incidents: ‘So much gets swept under the carpet, it has become a trip hazard’

At the beginning of the research period, H&S advisors in meetings would discuss their concerns regarding what they called a ‘silent culture’ and ‘where incidents are changed to a non-event’. In one of the meetings an incident had occurred where four handrails were being lifted. While removing the sling, the handrails fell with two going in the water, one in the caisson foundation and one on a gangway near an operative. The event occurred on a Saturday and the health and safety department were not alerted. On the following Monday, the client was informed, and thereafter notified FCBC. Members of the team said: ‘It has become tiring having the client saying to us: that you probably already know about the incident that occurred...and we have no idea about it’. Members of the department said that ‘it is difficult to react 2-3 days later after an incident’ as the accident scene changes, and that they were ‘not getting the information from the people involved’, the ‘stories change 3 to 4 times’ and that the reports were being ‘sanitised at various different management levels’. Under-reporting, late reporting and multiple versions of events were creating a difficult environment to learn from. One H&S advisor was of the opinion that he had ‘never been on a project where it has been this bad’ for reporting and he thought it was because much of the work was in the middle of the River Forth and unlike an urban construction project, out-with the public eye.

Comments from the safety climate surveys also suggested a lack of reporting, for example: ‘More communication of near misses and accidents/incidents that occur on site. Learning from mistakes and understanding how a previous incident occurred helps others to avoid it in the future’; and ‘Tell the workforce and staff about incidents, don’t attempt to hide under the radar.’ The reporting issue was
revisited again and again in meetings, with the meeting minutes stating: 'Incidents are still not being reported when they happen, we are getting information from the client before we receive information from our own workforce.' This led to a discussion on why workers were 'sticking a nail on the end of a stick for the client to hit us with'. One member of the department thought it was to 'drop their supervisor in the shit' and before others added input an idea was raised that we should perhaps have an anonymous text service that workers can use to easily send information. However, it was thought that this service may be abused and that the contact details of the H&S department are available anyway so it would not be adding to the system in place.

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According to James Reason (1997), effective risk management depends crucially on establishing a reporting culture. Creating a no-blame (just or open) culture is the first step to solving problems (Meng, 2012) and an essential early step in creating a safe culture (Reason, 2000). In organisations where errors tend to not be punished and are accepted as part of work, individuals have a potential reduction of the cognitive demands of errors as there is less need to cope with the negative self-image of blaming others or hiding errors (Hockey, 1996). According to Van Dyck et al. (2005), since strain is likely to lead to additional errors, such organisations are more likely to avoid secondary errors and the error handling is completed more effectively leading to better firm performance. They found that the fear of being caught while making a mistake is an important issue and that people put a lot of energy into hiding the fact that they have made errors. These behaviours typically occur in an organisation with a blame culture, where staff try and conceal errors (Whittingham, 2004). A study by Probst & Estrada (2010) found that 54% of employees, across five injuries with above average risk for injury, had experienced an accident and failed to report it within the previous year. This suggests that is a challenging problem, not just within the construction industry, that is yet to be solved.
5.1.10 Blame Culture Summary

The above ethnographic insights suggests that a blame culture was evident throughout the duration of the research study. At times, managers were seen to blame operatives for mistakes (see 5.1.1 ‘My gaffer is going mental’); there was a lack of trust between operatives and managers, as operatives feared raising issues (see 5.1.3 ‘we need ballot boxes for SORs’); and managers feared negative issues that were raised to superiors, who allegedly put these raised issues ‘...in the bin’ (see 5.1.2). Fears of blame and claims were evident on an organisational level, where excessive and impractical paperwork was used in an attempt to protect the organisation (see 5.1.5 ‘We have method statements that can choke a horse’). There were also fears of repercussions with claims from individuals against the organisation, which led to feelings that ‘We don’t hold anybody accountable’ (5.1.6). The blame culture also created segregation and it some cases it was perceived as ‘more than blame, it is an attack’ (5.1.4). One of the most frustrating issues for H&S advisors was that an environment was created where it was very difficult to learn from incidents. Incidents would be underreported, as in ‘No way they would have recorded it as a near miss’ (5.1.7); and misreported, as in ‘Well that is just the standard cover up’ (5.1.8); with the extent of the issue being highlighted in ‘So much gets swept under the carpet it has become a trip hazard’ (5.1.9).

The project adopted a Person approach perspective to unsafe acts. This approach is intuitively appealing, especially in the UK, as it attempts to protect the organisation from compensation claims, by uncoupling the organisation from individual unsafe acts as far as possible (Reason, 2008). However, it is inextricably linked to blame (ibid), and hence promotes a blame culture. This blame culture was evident throughout the entire research period at the QC, and led to many challenges and unsafe behaviours that have been outlined above. As discussed within this chapter, the fear of compensation claims was evident at many different levels and in many different forms, and prompted the blame
culture on this project.
5.2: Safety, Production & Cost

‘They want the job done yesterday’

FCBC Works Manager
2013
5.2 Introduction

In the construction industry, the competitive tendering process means that there is little room for error (Morton & Ross, 2007), and despite guidance from the government that the lowest price should not determine the cost of the contractor, the vast majority of work is still secured on this basis, particularly in the public sector (Proverbs et al., 2000). The following chapter explores the management decisions relating to production pressure, cost and safety.

The first vignette in this chapter reveals how production pressures can affect safety performance (see 5.2.1 ‘Because that is [he lifts his arm in a triumphant fashion and says with emphasis]... production’). The production pressures were acknowledged at every level within in the organisation: the operatives revealed that ‘The phrase understood on-site is ‘just get it done’” (5.2.2); Work’s managers acknowledged that additional safety risks were being taken, suggesting the budget was too tight and ‘They want the job done yesterday’ (5.2.3); and senior managers stated it was ‘no doubt we are under significant production pressure’ (see 5.2.2). The second part of this chapter discusses issues with cost. Cost issues led to some restrictions with manpower as highlighted in ‘like a fiddle string out there, just getting tighter and tighter’ (5.2.4). Some of the equipment was raised as being cheap and poor quality, as in ‘I’d never been set on fire in the last 25 years till you gave me a fire-resistant overall’ (5.2.5). In colourful language, operatives explain additional dangers with cheaper tools (see 5.2.6 ‘it kicks back at you like a fucker’). The design of cheap temporary structures was highlighted as an additional risk by a H&S advisor in ‘You get what you pay for’ (5.2.7). Some construction machinery believed to be cheap and poor quality was suggested to causing the near miss incident in ‘I was ready to meet my maker’ (5.2.8). A site manager revealed he believed that one of the biggest problems with the project is that ‘across the board everything is cheap... add shit with shit, you don’t get roses’ (5.2.9). A H&S advisor explained that cost issues were restricting the service desired in ‘we’ve got money for a Fiat Punto and they want...
Finally the link between cost and production is emphasised in 'cost, cost, cost, programme, programme, programme’ (5.2.11).

5.2.1 ‘Because that is [he lifts his arm in a triumphant fashion and says with emphasis]... production’

A H&S advisor came back in to the office and sat in at his desk. I could tell he wasn’t happy as he exhaled loudly at the desk shaking his head. I asked: ‘Jim, how are things?’ He replied: ‘Frustrating. Every time I go out I ask the guys to do something, and every time I go back it is not done.’ I asked him: ‘What sort of things haven’t they been doing?’ He replied: ‘For example, every time the formwork gets put up they don’t put the wooden boards between the formwork and the concrete structure.’ The wooden boards are put there to prevent objects from falling. ‘It would take them all of five minutes to put the wooden boards on, but the guys go straight for the steel rebar instead because that is [he lifts his arm in a triumphant fashion and says with emphasis]... production’. He added: ‘It is obvious when they have done a pour as well because there housekeeping just goes to shit’.

The H&S advisor seemed to believe that the emphasis on production was at times affecting the safety performance. Shortcuts with safety such as the one described were not uncommon, and would often frustrated the H&S advisors. Perceived production pressure leads to a higher chance that workers will undertake unsafe behaviours (Seo, 2005). Considering unsafe behaviours have been reported to attribute to over 80% of accidents, it is not surprising that the link between production pressure and safety has been noted by many researchers (see Hinze, 1997; Rundmo et al., 1998; Brown et al., 2000; Mohamed, 2002; Seo, 2005; Mitropoulos et al., 2005; Hinze & Parker, 1978 Goldenhar et al., 2003; Mitropoulos & Cupido, 2009; Oswald et al., 2013). The emphasis on production pressure or perceived production pressure could filter
down from management level to the operatives, as the following ethnographic insight details:

5.2.2 ‘The phrase understood on-site is ‘just get it done”

A safety stand down was being organised for all employees. This involved the stopping of work for about an hour, while key safety messages were reiterated. Safety stand downs were easier to organise when accidents had occurred. For example, a pro-active safety stand down was planned but there was resistance against it. A member of the H&S team explained that senior managers were asking ‘why are we having a stand down when there’s not been any accidents’. Following this resistance it became renamed a ‘safety briefing’. However, according to H&S advisors in the office it had become a ‘do it if you can effort’, where some teams did it and others didn’t. The H&S advisors were discussing which teams in their areas had done a ‘safety briefing’, and concluded that it seemed like the teams who were under production pressure did not do it. The emphasis on production can also make proactive safety management efforts harder to implement, despite many researchers (see for example Hallowell et al., 2013) claiming that proactive safety management efforts have a strong, positive influence on performance.

Some months later there had been a flurry of accidents, and a safety stand down was organised for all employees. At one point, a member of senior management was speaking to a large group of employees at the stand down. He acknowledged that ‘there is no doubt we are under significant production pressure...’. This pressure can filter down to the operatives, and during a safety rep meeting this was acknowledged. The meeting consisted of a H&S advisor, three safety reps (and operatives) and myself. We were discussing the questions in the safety climate survey and one of the questions asked ‘are you instructed to work unsafely’. One of the operatives said, ‘the phrase understood on-site is
'Just get it done’ and sometimes they don’t even need to say it, they just give you that look and you know’. Both other safety reps were nodding in agreement.

The prioritisation of production over safety is the experience of many workers, despite company rhetoric about putting safety first (Hopkins, 2006). The phrase ‘get the job done’, or a ‘finish-the-project focus’ as described by Anderson in 1999, is a stock of the industry and a phrase often used to justify the cutting of corners in safety (Paap, 2003). Ethnographic data gathered on a construction site by Paap (2003) found that there was two different versions of safety training, the official version and the actual operating procedures. She explains that: ‘Workers are provided with an official version of safety in which standard regulations are followed and enforced, and then are subsequently given a set of Actual Operating Procedures in which safety is often compromised in order to ‘get the job done’. According to Paap, the Actual Operating Procedures were ‘communicated by workers and supervisors in informal, unwritten, and often unspoken ways’, in a similar way to how operatives revealed they were communicated to in this study in order to ‘just get it done’. The operatives in this study were under pressure to complete the job, a finding which relates to Choudhry & Fang’s (2008) study, where operatives revealed that there simply is not enough time to perform work safely. The production pressures were also acknowledged by Works Managers, who in the following discussion, revealed that they believed the budget was too tight, and additional safety risks were having to be taken:

5.2.3 ‘They want the job done yesterday’

A focus group that occurred near the beginning of the research study, with the views of two work managers (from different departments), a H&S advisor and an operative on scheduling, time pressure and unsafe behaviours were captured. The focus group examined ten safety-related case studies
(photographs and descriptions) and sought to explore and examine the factors which attributed to the unsafe acts in the case studies (see Oswald et al., 2013). The focus group comprised of two stages, firstly each participant individually determined if the factors were 'likely', 'could be' or were 'unlikely' to be influencing safety behaviours in each of these case studies presented, if the participants felt that from the data provided they were not able to comment, there were able to select a 'not possible to tell' option. After this task was completed, the group then discussed the case studies collectively, and came to a general consensus of the influence of the factors on the case studies presented. Time pressure was highlighted as the factor which had the most influence on accidents. In the focus group, the participants made statements such as: 'they want the job done yesterday'; 'we all want to save time by taking risks'; 'it is time nowadays, everything is time'; 'we are having to put things together as a budget and a cost and we are cutting it too fine to be fair. We are not given enough time' and 'here we go again, it is time. Time is the first one [factor] guaranteed'.

Pressure is induced from a constrained duration set by the client or project management team, and this leads to problems that influence accident occurrence such as reduced attention to detail, crowded work space and the prioritisation of production over safety (Mayhew & Quinlan, 1997; HSE, 2003). The above evidence has highlighted that production pressure was recognised at many different levels of the organisation, and that this can have adverse effects on unsafe behaviours. As well as pressure from production, there are other stresses on organisation that related to finance. Safety can represent a significant cost to employers (Finkel, 2015) and the following sections relate to the implications of cost cutting and safety. The following ethnographic vignettes will discuss how financial costs affected manpower, equipment, design and machinery, and how at times this influenced safety:
5.2.4 Manpower: 'like a fiddle string out there, just getting tighter and tighter'

When I arrived in the site office, one of the H&S advisors made me aware that he was going out to a weekly site inspection. For experience, he was bringing a young female member of the safety department who had aspirations to become a H&S advisor, and I was also asked to accompany them. When arriving to the site, we were offered a cup of tea and a biscuit by the site manager. The H&S advisor joked that it he didn't usually get this treatment when he came alone and thought it must have been because there was a young female present. During the cup of tea, we got chatting and I asked the site manager how work was going. He explained to me that it was going well but there had been some difficulties. The main difficulty at that moment was getting structures 'signed off' because a group of scaffolders had just left the project. I asked him why a group had suddenly left, and he said it was for more money - 'not much more, but more'. He explained that the workers usually discussed what wages they were on with each other, and that money was 'one of the biggest drivers' for the guys, 'but who wasn't it a driver for?'. He did acknowledge it was a problem especially as 'scaffolders are a rare breed on this project'. From a production point of view this was not ideal, and from a safety point of view, scaffolders had tasks such as determining structures were safe for access. Months later this issue appeared to remain unresolved as during a health and safety meeting, an advisor raised concerns that: 'we are already light, especially on a Monday due to rotations, and two scaffolders have just left'. There was a high turnover of workers on the project, and being 'a good attender' was recognised by site management. The H&S advisor added that it was 'like a fiddle string out there, just getting tighter and tighter'. Another advisor believed that understaffing in the industry was usually a problem anyway and that tight budgets had meant projects were often understaffed.

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There appeared a high turnover on the project, which was creating temporary voids. A high turnover is often an attribute connected to a blame culture (Whittingham, 2004), and is associated with higher accident rates due to a lack of stability (Gherardi & Nicolini, 2002). These voids sometimes lasted months to be filled, and there were suggestions that there were areas of the project that were under-resourced. Back in 1998, a report by Egan for the deputy prime minister, suggested that the industry was under-resourced. More recently the HM Government (2013) released ‘Construction 2025: industrial strategy for construction - government and industry in partnership’ which documented a long term vision for the industry. Within this document it was noted that one of the benefits of a clear understanding of future work opportunities would be ‘strategic resource and skills planning’. This suggests that the use of resources is still an area for development and improvement in the industry.

The ethnographic evidence in this chapter suggests that resources are to some extent driven by tight budgets. Tight labour supplies and a rush for completion can easily lead to fatigue, miscalculation and injury (Finkel, 2015). They can also lead to hiring cheap subcontractors, which can have an adverse reaction on safety (Lingard & Rowlinson, 2005). A lack of direct control or inability to co-ordinate the activities of subcontractors (Debrah & Ofori, 2001) can have an effect on site safety. Furthermore, when contractors rely mainly on subcontracted workers who are of different nationalities, the risk of accidents at the work site is compounded (Debrah and Ofori, 2001). This was the case here, and is discussed further in Chapter Seven.

5.2.5 Safety Equipment: ‘I'd never been set on fire in the last 25 years till you gave me a fire-resistant overall'

In the health and safety departments’ office, H&S advisors were discussing a couple of similar fire incidents that had recently occurred. One of the advisor’s made the comment: ‘Do they know that it is fire resistant not fire proof?!’. The advisors were concluding that risk-taking behaviour had occurred and in
combination with poor quality protective clothing, had resulted in the incidents. Two operatives were deemed to have carried out risk-taking behaviours after being given an additional safety measure (a fire resistant overall). The investigation into the incident by H&S advisors found that the operative's risk-taking behaviour and the poor quality of the fire resistant overall resulted in the fire. The quality of the fire resistant overalls were not the only items of clothing being commented on as there were also complaints from operatives about the quality of other PPE e.g. safety glasses being uncomfortable, harnesses being loose and boots deteriorating and making feet bleed easily. Following the complaints about the quality of the boots, I asked one of the H&S advisors what he thought. He said the 'boots are shit quality' and believed it was a contributory factor to why there had been ankle injuries. He expanded with to say that they offered a 'lack of protection', they 'barely cover the ankle' and that if they were '2-3 inches higher that would give more protection'.

The H&S advisors determined that risk-taking behaviour had occurred with the incidents with the fire-resistant overalls. This could have been an example of risk compensation theory, as H&S advisors recognised the worker had adopted a riskier stance than normal, after being provided when fire-resistant overalls. They also thought that the overalls were poor quality, and that therefore there was an increased risk with catching on fire. As well as the fire-resistant overalls, there were also suggestions that other items of PPE were poor quality, such as the safety boots. Olson et al., (2009) recommend that one way to encouraging majority usage of PPE is to increase the availability or quality of PPE. The quality of the PPE may not only increase usage but also defend individuals against potential injury. One of the items of PPE that was contentious throughout the project was wearing safety glasses, and this issue is further explored in the 'common sense’ safety section within Chapter Six (See 6.2). As well as cheap and poor quality PPE, there were also suggestions that the construction tools were cheap which created additional stresses on safety management, as discussed in the following vignette:
5.2.6 Construction Tools: 'it kicks back at you like a fucker'

A H&S advisor and three operatives, who were also safety reps sat down to discuss the safety climate survey and I was lucky enough to be involved in the meeting. At one point one of the operatives said 'have you got any questions in there about tools'; because he thought the 'tools we get are obviously bought 'cause they are cheap'. He added that 'all the tool are in red tags' or in other words, high vibration tools which are usually cheaper but acceptable if managed correctly. The operative believed it 'becomes a problem if you have to finish a job, but you’re only allowed to use the tool for two hours'. Another operative agreed and gave an example of the wacker plates on site. He said 'they should all be an electric start'. The H&S advisor agreed saying that one he walked past recently looked 'older than me (50+)'. The operative added that the non-electric wacker plates are 'lethal' and that 'it kicks back at you a fucker'.

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Though the cheap tools could be simply attributed to reducing cost, according to Zeng et al. (2008) one of the main reasons for poor safety performance is low safety awareness amongst organisations, and therefore insufficient resources including on-site safety equipment and facilities provided. In this case, the operatives were explaining that the tools they used were cheap, and this restricted work and meant they had to be well-managed to avoid health and safety issues. In addition to cheap tools, there were instances where the poorer quality temporary structures were used as they were cheap, as highlighted below:

5.2.7 Design: 'You get what you pay for'

Recently, large temporary steel structures had been deposited on-site. The structures had arrived by boat, and had been moved to land through the night.
The following morning, I asked one of the H&S advisors if he knew how the works had gone. He said: ‘As far as I’m aware it all went swimmingly well, the structures are all safely on land. Though apparently some of them were lighter than expected, so I’m planning to go down and have a look. Fancy joining?’ I replied: ‘Yea sure’. We set off in the H&S advisor’s car to make the short journey to the dock yard. As the structures had arrived lighter than possible, I asked the question: ‘I presume there must be some steel missing if its arrived lighter than expected?’. The H&S advisor responded: ‘That seems the most likely reason to me.’ We arrived in the dock yard, climbed up a short onto the large steel sections. The sections were to be lifted up onto the towers to act as access at deck level. We noticed that there were parts missing and grids on the steel mesh that did not align; meaning in some cases, there was no lateral restraint. The H&S advisor inspecting the steel structures used a well-known phrase: ‘you get what you pay for’. It took time and resources before the structure was deemed safe and was lifted to deck level.

Figure 20 – The steel mesh grid at deck level
To get to deck level, there was a hoist available, or it was also possible to take the internal staircase. Climbing the internal staircase you could hear drilling, hammering and the odd shout of construction worker that echoed down from near the top of the staircase. It was dusty and there were small chunks of concrete scattered all across the stairwell and the landings. On a steel staircase the H&S advisor noticed that there were gaps, which meant that objects could potentially fall on workers below. He stated that this ‘wasn’t best practice and the staircase was a cheap design’.

Figure 21 - The internal steel staircase within one of the towers

The above vignette explains how some of the cheaper options incurred additional safety risks. While no organisation is in the business of being safe (Reason, 2008), and some risks will be taken during construction, it is important that these risks do not exceed acceptable levels. In the case of the steel staircase, the H&S advisor recognised it in the sense of minimum requirements it was acceptable, but it was some way short of best practice. This is an example where additional risks were taken to save costs. Additional risks undertaken with cheaper tools, equipment, structures and machinery raised
concerns when significant near misses occurred, such as in the following example:

5.2.8 Construction Machinery: 'I was ready to meet my maker'

One morning I arrived into the H&S office to hear that there had been a crane incident. One of the H&S advisors was out at the time and witnessed the crane incident. He said he saw the crane flip back and forward in a pendulum motion.

An extract from one of the crane operator’s witness statements read:

'We then picked up the test lift weight for setting the moment safety limit switch. During the manoeuvring of the load to the required radius the load hit the deck, followed by the hook block and all the excess rope from the drum; on investigation the hoist gear box failed and blew a component out and the oil. Fortunately nobody was hurt.'

Once the crane eventually stopped moving, one of the operators began to climb down. The other waited half an hour before moving because he was in so much shock. When the first operator arrived back at ground level, the first thing he said to the H&S advisor was: ‘I was prepared to meet my maker’. The H&S advisor said they looked ‘sheet white’ and when he asked for the crane operator’s phone number ‘he gave his partners by accident because he was in shock’. When arriving into the office after the incident, he was still in so much shock the security officers thought he seemed ‘drunk’. However, both the crane operatives insisted they were OK, refused rest, gave their witness statements and left for their next job. The H&S advisor believed the cause of the near miss was the poor quality crane, which had been sent from abroad. He stated: ‘I’m sure it would have gone through an exhaustive gearbox test… and by exhaustive, I’m guessing very little or none’. A couple of months prior a crane motor had burnt out despite only being on the site for three months. A works manager thought it must have been poor quality because they ‘had only had it since April’. 

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Statistics suggest there are serious risks associated with crane use in construction. For example between 1992 and 2001 there were 137 crane-related fatalities in the United States (Kang & Miranda, 2007), and in 2006 alone Japan recorded 41 fatalities resulting from crane accidents (Kawata, 2007). Tower crane accidents are not only threatening to construction site workers, but also pedestrians (Shepherd et al., 2000); and one of the major causes of fatalities in construction is the use of tower cranes during lifting operations (Beavers et al., 2006). Hence, previous research has indicated the dangers of cranes, and perhaps on this occasion the additional risk levels, in order to save cost, reached unacceptable levels. There were individuals on the project that thought cost cutting was occurring across the whole project, and that this was a serious concern:

5.2.9 'across the board everything is cheap... add shit with shit, you don't get roses'

One afternoon I was in a site office with a H&S advisor, and a site manager, who was due to leave the project in six weeks time. We were having a good laugh and then discussions led to project. I asked the site manager what he thought the biggest challenge or problem with the project was. He said that 'across the board everything is cheap... tools, equipment, labour... add shit with shit, you don't get roses'. He expanded to say that: 'we are lacking experience. This is the largest three towered cable stayed bridge in the world, we need guys with experience.' He hoped that nobody got seriously hurt because of it as 'he wouldn't wish that on his worst enemy' but was concerned.

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As one would expect, experience appears to increase an awareness of risk (Haines et al., 2004). In previous ethnographic studies, Aboagy-Nimo et al., (2015) explain that experienced workers can pass local knowledge to less
experienced workers through on-site training; and Baarts (2009) revealed that experts and experienced construction workers have practiced and observed for long enough to know about different situations, and therefore can anticipate and thus manage looming dangers on site. Hence experience can be an important in accident prevention, and the site manager’s concern about a lack of experience is therefore perhaps not unsurprising. He indicated that as well as having cheap inexperienced labour, that across the project there was cost-saving, which was affecting safety performance. This issue of cost restriction affecting performance was raised by a H&S advisor in the following ethnographic vignette:

5.2.10 ‘We've got money for a Fiat Punto and they want a Range Rover’

The issue of the power struggle between safety, cost and time was discussed regularly in the H&S department, as cost and programme appeared to have negative effects on safety performance (see the following vignette 5.2.11). One of the members of the department summarised his thoughts using a car analogy: 'until the UK construction industry changes, and doesn’t shave you down pound by pound, you won’t get the Range Rover product that consists of adequate supervision, best practice, the right equipment and going above and beyond the standards. Only then you get the product you want, with it being delivered safely – but that comes with a cost. We’ve got money for a Fiat Punto but they [client] want a Range Rover.’

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The overall 'value' of the service provided by the contractor, should include occupational health and safety performance; not least because poor health and safety performance reflects badly upon construction clients (Lingard & Rowlinson, 2005). However, in order to gain business acceptance there must be a levelling of site safety costs for competitive reasons (Finkel, 2015). This then
puts financial strains on safety costs, which can lead to the challenges and extra risks outlined in the above ethnographic vignettes. Main stream economic theory argues that for employers there must be an economic incentive to accept technologies, regulations or installation methods (Finkel, 2015). Thus, every pound spent must produce a minimum of a pound in revenue (ibid). A way to view expenditure on safety is that it can result in lower insurance premiums. Such investments in safety can be attributed to lower lost-time accident records. According to Finkel (2015), though there has been minimal analytical work in this area, there is an indication of positive returns for employers and employees (see Sider, 1983; Arno, 1984). Safety costs can also be expressed through the benefits of production, since productive capabilities are enhanced as workers are not interrupted with accidents and injuries (Finkel, 2015). This suggests that cost and production are linked, as also highlighted by the following vignette:

5.2.11 'cost, cost, cost, programme, programme, programme'

One Tuesday morning I was present for the H&S department team meeting. In the meeting there was a discussion of a recent first aid incident that had occurred. An electrician had been hit on the shoulder by a falling hammer. The hammer was pushed out of a joiner’s tool belt as he knelt down to fix the gaps with plywood (to stop falling objects). The area below should have been an exclusion zone, but it was not in the ten minute brief (until it was amended after the incident) and there was no signage. The department discussed that the primary defence should be stopping tools from falling and that tools should be tethered. However, a member of the department said price of tethering tools was met with a ‘frosty reception’ and another member stated that all everyone thinks about is ‘cost, cost, cost, programme, programme, programme’. There were concerns raised about subcontractors bringing in their own tools as some workers didn’t want their own tools tethered and advisors had observed workers using poor quality tools e.g. a poor quality tool with duct-tape on it to
support it. The issue of programme pressure was also discussed following incidents such as: foremen pressuring crane operators to lift against their judgement, delivery drivers speeding on site, telehandler operators lifting too much steel and impairing their vision and operators jumping on and off the back off wagons with no edge protection. This was a concern for the safety team and one member stated that ‘we know shortcuts are being taken but we don't know to what degree’.

The conflict between safety and cost/programme was one that was often discussed in the H&S meetings. Safety is one of the performance and delivery requirements for a successful construction project, alongside time, cost and quality (Han et al., 2014) and it should not be isolated from these other project elements as safety is an integral component of a construction project (Hinze, 1997). Hence, it is important that goal conflicts with safety and other project elements are to be understood to prevent accidents and improve production (Han et al., 2014). It has been highlighted by researchers that workers are more likely to take shortcuts when they face pressures to perform, and hence workers will forgo safe working practices when there is a perception of the need to perform quickly (Mullen, 2004). Contractors have to bid very hard to win contracts and then have strong incentives to maximise profits by cutting corners (Sorrell, 2003).
5.2.12: Safety, Time & Cost Summary

The project was perceived by participants as being under production pressure from the early stages to the end of the research study period. Production pressure was acknowledged at senior management level, and this also appeared to filter all the way down the hierarchical structure to the operatives; who explained the phrase used on-site was 5.2.2 ‘just get it done’ and sometimes managers just had to look at the operatives to get this message across. This meant there were times when shortcuts were taken with safety. Works Managers believed the schedule was too tight, and 5.2.3 ‘They want the job done yesterday’.

In some areas, the project had a high turnover with workers, which created temporary voids and unstable groups. This was weakness in the safety management system that could increase chances of accidents. There were suggestions that the financial implications meant that it was ‘like a fiddle string out there, just getting tighter and tighter’ (5.2.4) as in some areas FCBC were under-resourced with manpower. It was believed some workers lacked experience and the drive for a cheap workforce led to the employment of migrant workers (which is discussed in Chapter Seven). There were suggestions that some of the safety equipment (see 5.2.5. ‘I’d never been set on fire in the last 25 years till you gave me a fire-resistant overall’), tools (see 5.2.6 ‘it kicks back at you like a fucker’), designs (see 5.2.7 ‘You get what you pay for’) and machinery (see 5.2.8 ‘I was ready to meet my maker’) appeared to be cheap and poor quality which led to additional safety risks. This was noted by participants who thought that ‘across the board everything is cheap... add shit with shit, you don’t get roses’ (5.2.9). Some participants believed the problem was due to the competitive bidding nature of the construction industry, and the fact that the lowest-priced bid almost always wins, despite it not being the best value package (see 5.2.10 ‘we’ve got money for a Fiat Punto and they want a Range
Rover). The low price winner generates tight budgets, where extra safety risks appear to be carried in order to remain financially competitive.
5.3 Reward Systems

‘What happens in Vegas, stays in Vegas’

Figure 19: A view from the 57th floor of the Cosmopolitan Hotel, Las Vegas
5.3 Incentive & Reward Systems

From a health and safety perspective, the aim of rewards, incentives and recognition is to alter the ideas, values and practices carried out in order to achieve safety behaviours (Vredenburgh, 2002; Eiff, 1999; Wiegmann et al., 2002; James Reason, 1990; Zohar, 1980). A correctly designed safety-incentive program reinforces reporting of an unsafe act or hazard, while giving bonuses to fewer loss-time accidents (Vredenburgh, 2002). However, in practice this can be difficult to achieve as they can be perceived as opposing behaviours; since incidents are encouraged to be reported, yet the organisation are also rewarding fewer loss-time accidents. This was noted by Vecchio-Sadus & Griffiths (2004), who stated, with reference to incentivising low accidents schemes: ‘although these schemes help develop a collective concern to prevent accidents and injuries, employees may not report them when they occur which could lead to a recurrence.’

Upper office-based management staff on the project had the opportunity to make decisions regarding formal reward or incentive schemes; while in some cases on-site management took incentive schemes into their own hands and created informal and undercover reward or incentive schemes. The first part of this section focuses on the challenges associated with formal reward schemes found, and the second reveals the types of informal incentive schemes employed on the project.

In the first section challenges with reward nominations for individuals are highlighted in ‘safety awards only matter if you are in Tower & Decks’ (5.3.1). With few nominations, there was less competition, and it appeared to be the case that some of the winners of awards believed they did not deserve recognition believing they were ‘...just doing my job’ (5.3.2). The lack of formally recognised positive reinforcement through awards is reiterated through lack of use of green cards, (see 5.3.4 ‘What about the green cards?’... ‘HR as well... if we
There were unexpected challenges with team awards, which occurred due to a high turnover, as some workers qualified for the team award but many others didn’t (see 5.3.3 ‘but you can’t give one sweetie to one kid and not one to another’). As well as safety awards, there can be incentives through contractual agreements. For example, contractual production incentives led to adverse safety performance in ‘they seemed desperate to keep going’ (5.3.5).

The second section of this chapter discussed informal and undercover incentive schemes that were used by site-based managers (e.g. works managers) who had little systematic influence of the organisation. An operative revealed that ‘it would be naïve to think it is uncommon’ (5.3.6) and examples of these schemes are shown in ‘they got paid a full shift for work that took two hours’ (5.3.7) and ‘what happens in Vegas, stays in Vegas’ (5.3.8). These schemes often rewarded operatives by, for example, doing overtime at a critical time, or completing work within the required deadline or target. This concept of informal and undercover reward within organisations, has been dubbed ‘Vegas Time’ by this research study, after ethnographic experiences described in ‘what happens in Vegas, stays in Vegas’.

Incentive schemes generally present bonuses, gifts or prizes to employees or groups of employees for achieving certain target levels of injury or accident free working hours (Vecchio-Sadus & Griffiths, 2004). The QF project had H&S awards for individuals and teams. Individual prizes usually were £50 vouchers (though sometimes iPads if deemed appropriate) and team awards were t-shirts with either 100 or 365 day accident free. At the end of some months it would come to light in the H&S department meeting that there were only one or two nominations for the month. One of the key characteristics of a well-designed incentive program is that the program receives a high level of visibility within the organisation (Vredenburgh, 2002). In a safety climate survey, 77% agreed that Individual and Team Safety Award winners and nominations were communicated to workers, suggesting visibility was perhaps not the greatest barrier to nominations. In the same survey, only 19% of employees said that they had nominated individuals or teams for the Bridging the Forth Safely
Award Scheme. The following ethnographic vignette is an example of the attitudes towards nominations for the reward schemes.

5.3.1 Reward Nominations: ‘Safety awards only matter if you are in Tower & Decks’

I was out on-site with one of the H&S advisors, Harry. We were walking up a set of external stairs towards the site engineer’s office. Harry was in front of me leading the way. There was an operative, Mark at the top of the stairwell and he engaged in conversation with Harry. With the wind howling I didn’t hear the beginning of the conversation, but as I reached the top of the stairs (where they had congregated in passing) I realised they were talking about a recent winner of the H&S award. Harry’s mobile phone began to ring, and he started to walk to a safe place to answer the call. I decided to carry on the conversation, asking Mark if he had won an award before. He said: ‘not me son, yet to make the nominations’. I responded: ‘think we sometimes struggle for nominations, have you put anyone forward before?’. He replied: ‘Na mate, let’s be honest here, safety awards only matter if you are in Towers & Decks’. Tower & Decks were another team from his, and he seemed to be suggesting that they were the team that cared the most about the awards.

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In well-designed incentive programmes, recognition is offered, which can help modify behaviour (Vredenburgh, 2002). The struggle for nominations suggests that at times there may have been a lack of recognition. As well as challenges surrounding nominations, somewhat unexpectedly, there were also challenges surrounding the nominated winners of the rewards. The following ethnographic vignette gives further insight into such challenges. The insight comes from an encounter in a behavioural safety training session. Training rooms can be insightful places for participant observers (Pole & Morrison, 2003), as was the case on this occasion:
5.3.2 Reward Winners of Incentive Programs: ‘I was just doing my job’

At the same supervisor training session, where only the van supervisor turned up for the training session, (see 5.1.2) there was a discussion on SORs between the consultant, the supervisor and I following a question in the short questionnaire that was distributed. One of the questions related to the H&S award scheme, which promoted the van supervisor to raise it. ‘See the safety award...what are you meant to have to do to get it?’. The consultant responded that ‘it was meant for those that go above and beyond’. The van supervisor said, ‘well I’m confused...cause see I actually won an award... but I had done nothing special, was just doing my job.’

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It appears that it was important to have clear criteria of what constitutes reward to avoid such unintended negative reactions to awards. It is also important for participants in the program to be able to understand what the incentive program is designed to accomplish and how their performance is being measured (Halloran, 1996). This was an unexpected challenge associated with the individual winners of the reward systems, but there were also unexpected challenges associated with team rewards, which the following vignette explores. Teams were rewarded for fewer loss-time accidents, in an attempt to encourage safe behaviours and lower accident rates.

5.3.3 Team Reward Systems: ‘But you can’t give one sweetie to one kid and not one to another’

I had just finished having lunch in the main office canteen, and wandered through to my desk in the health and safety department. There were two H&S advisors working in silence on their computers, until another member of the
H&S department entered the office. He opened with: ‘four out of 22 of the guys have been there a year and they want t-shirts for all of them’. I realised this must have been something to do with the team H&S awards since team t-shirts were a reward for a year without a loss-time injury. The member of the H&S department had been on-site to check the team had qualified for the award and to make preparations for distributing the t-shirts. However, since only four out of 22 workers were present for the whole year, it was suggested by the H&S professional that only these four would receive a t-shirt. Apparently this had not been well received with one of the workers saying: ‘you can’t give one sweetie to one kid and not to another’. This suggested that he didn’t think it was right some members of the team would get an award and others wouldn’t. In the end it was decided at management level that no t-shirts would be issued.

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This is an example of how unintended behaviours can occur within incentive systems. In this case, a high turnover of workers meant that the majority of workers did not qualify for the team award. Worker’s highlighted feelings of unjust if some workers in the team were recognised for the team award but others weren’t. This led to no member of the team receiving an award despite qualifying for it. Vredenburgh (2002) highlights that distributing prizes and money without a clear and consistent set of contingencies, can reduce the potential to obtain the desired outcome. This may even increase undesired behaviours and more accidents (Swearington, 1996), through acts such as underreporting; with Pransky et al. (1999) finding that the loss of workplace perks was a reason for underreporting, and Probst & Estrada's (2010) work reiterated this suggesting that the most frequently endorsed consequences of incident reporting was that your group lost scorecard points.

The individual and team awards attempt to use positive reinforcement through reward to try and change behaviours. Positive reinforcement is the most powerful and under-utilised tool that managers and employees have (Vecchio-Sadus & Griffiths, 2004). Members of the workforce and especially the line-
management should encourage the behaviours necessary to encourage safer working procedures and should be positively acknowledged (Earnst, 1997). Positive acknowledgement on this project could come in the form of green cards. Green cards were a positive reinforcement tool, which could be issued to individuals that showed good safety behaviours. They were used in conjunction to the yellow and red cards, which were distributed for unsafe behaviours. The following ethnographic vignette explores the usage of these cards.

5.3.4 Positive Reinforcement: ‘What about the green cards?’...
‘HR as well...if we get any’

One Tuesday morning I arrived into the H&S department at about twenty past eight in the morning. It was ten minutes until the weekly department meeting, and since there was little point in starting up my laptop, I spent the time having a catch up and a joke with the H&S team. One of the actions was assigned to me in the meeting minutes, as it was in relation to the safety climate survey results which had just been released. Following the meeting, I began to look through the results. In the meeting, the H&S manager had asked me to see if I thought there was anything of interest and let him know. One of the questions had asked whether the respondents ‘believe that the Bridging the Forth Safely Award Scheme (red, yellow & green cards) encourages everyone to work safely’. 75% of respondents had strongly agreed or agreed with this statement. Curious about the system, I asked one of the H&S advisors: ‘are all the red and yellow cards recorded by us?’ The H&S advisor responded: ‘No they get recorded by HR.’ I replied: ‘Ah, of course, and what about the green cards?’ To which I got the response: ‘HR as well... if we get any’. This prompted a discussion were four other H&S advisors in the office all said they had either seen one or two, or none at all. One of the H&S advisors thought that ‘guys are reluctant to give green cards cause it isn’t normal... people would be surprised and be like, what’s this for(?)... if they got one...and of course there is the macho element as well’. The other advisors appeared to nod in agreement, before a H&S advisor added: ‘Foreman
and supervisors can be reluctant to give yellow and red cards as well, because often the guys are close... they are mates, so can turn a blind eye.'

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Maintaining one’s image is extremely important to individuals in the workplace, and this can lead to non-compliance with safety equipment among employees, to avoid their macho image being jeopardised (Mullen, 2004). The yellow and red cards were much more common, despite that safety-incentive schemes should be directed at the prevention of accidents, not the punishment after the accident occurs (Peavey, 1995). The SORs also appeared to focus on negative, rather than positive reinforcement, with 69% of the reports being characterised as ‘unsafe act’ or ‘unsafe condition’ and 31% characterised as ‘good practice’. This suggests that formally recognised positive reinforcement was underused.

Rewards and incentives can also be within contractual agreements between the principal contractor and subcontractors. Cost overruns and project delays are problematic for many projects, hence the use of incentive/decentive contracts (Bubshait, 2003). The following ethnographic anecdote represents the challenges created from a ‘fixed price’ contract (i.e. they are not paid by the hour, but paid a fixed-price for doing a job), where productivity is rewarded; however, this can also create an environment that induces risk-taking.
5.3.5 Construction contracts: ‘they seemed desperate to keep going’

![Figure 20: Subcontractors working on a ‘price’ contract breaking work at height regulations](image)

It was the middle of the afternoon, and I was writing up ethnographic fieldnotes from an encounter earlier in the day. The H&S office was quiet, with only a couple of H&S advisors working in silence. One of them stood up, began to put his PPE on and said ‘well let's go and see how these guys are getting on’. Naturally I looked up and responded: ‘which guys?’ The advisor said with a sarcastic smirk on his face: ‘The client’s best friends’. I began to respond: ‘I guess they aren’t happy...’ before the advisor waved me over towards his desk. ‘Have a look at this’ he said. He showed me a photo (see figure 20) of workers ‘tight roping’ on the steel rebar and walking on planks of wood with no edge protection. This photo had been sent to the H&S department by the client, following their concerns. I said: ‘That is not ideal...what is the latest?’ The advisor explained that they had contacted the subcontractor involved, and at about ten o’clock this morning attached a photograph of the work site and communicated that the issues had been addressed. I thought about asking to accompany the advisor to the work site, but also wanted to complete my ethnographic notes from earlier while they were fresh in my mind. It sounded like the ‘action’ had happened and
I decided to return to my ‘low-interference descriptor notes’ and complete my ethnographic notes. Just before the end of the day, the advisor returned. As he reached his desk, I asked: ‘how did it go?’. He turned to look at me, shaking his head, and said: ‘they had done nothing’. I gave a confused look, as the contractor had stated they had addressed the issues. The advisor explained that the photo the contractor sent appeared to show a safe work site, but had been deceitfully taken and the image didn’t include unsafe areas. He said: ‘When I got there, I had to stop the works... but even after stopping them, they still seemed desperate to keep going. They were saying that they just edge protect one area, and only work in that area. That wasn't happening.’ The H&S advisor only let work commence once the whole work site was in a safe condition. It only took the subcontractor a couple of hours to do so. With it being right at the end of the day, the H&S department was full with eight professionals in the office. In the discussion that followed they seemed to be in a strong agreement this was a clear disregard for health and safety. Some of the advisors believed it was a gross misconduct and the subcontractor should be removed from site; though the department has no power to make such decisions as a support team in an advisory role. They thought that because the subcontractor were on ‘price’ they were in a rush to get the job finished to save time and money.

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Contracts and management reward systems are planned and formal systems that attempt to perform well while completing the job. As Paap (2003) describes:

‘What is required to get the job done’ is clearly a subjective determination of how work should be done, a set of decisions made by management and the upper levels of men in the field. These decisions are primarily determined not by what safety requires, but rather by the contract negotiated with the customer – the date on which the project has been promised to be completed, the fines for finishing late, the bonuses for completing the work early, and the difference in labor costs between doing the work quickly versus somewhat more slowly – and perhaps safely.'
Contracts and agreements need to be carefully thought through, in order to initiate the desired behaviour without repercussions. In a payment-by-results system, where payment is based on the amount of work done rather than the time period spent on the worksite, returns are enhanced by fast completion of the task, which can result in subcontractors pushing themselves hard, working excessive hours, or side stepping safety where it impedes production (Mayhew et al., 1997). Sawacha et al. (1999) found that productivity bonuses and poor safety performance have a strong relationship and safety management systems should avoid such strategies; and the above anecdote supports this theory. The desire to continue despite the safety failings outlined could be interpreted as a lack of management commitment to safety, which according to Mullen (2004), is an important value that reduces the likelihood of the workers exhibiting commitment to safety. The ethnographic anecdote highlights how incentives within contracts can affect safety performance if there is too much emphasis is placed on incentivising production. The following ethnographic vignettes explore a similar concept (reward emphasis on production which could then affect safety), but through informal and undercover reward systems were being used on this project. The first time I was introduced to this concept was by a worker soon after the return from the Christmas holidays:

5.3.6 Informal Reward Systems: ‘It would be naïve to think it is uncommon’

One cold afternoon I was having a discussion with an operative in early January. He had just finished a site walk-around with one of the H&S advisors, and was walking back towards the welfare units. I asked him how his Christmas break had been, and he had said it had been good to get some time off, though he and others had to come in a few days to catch up with schedule. He explained that they were only in four-five hours each day, but got paid a full shift (generally 12 hours). The quicker they got the work done, the quicker they got to go home,
and would still get paid the full shift. When I later caught up with the experienced H&S advisor that he had been on the walk-around with, I discussed this concept with him. He was aware of similar strategies on other projects he had worked on and it would be ‘naïve to think it is uncommon’.

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The ethnographic vignette above highlights that workers would sometimes be asked to work overtime or extra days in order to complete a task or catch up with schedule. In return, site-based managers would pay them for more hours than they worked. While this could be perceived as being fair to the operatives for doing extra work, and could improve relationships between operatives and site-based managers; this incentive scheme, just like in 5.3.5 ‘they seemed desperate to keep going’, also places greater value on production, as the quicker the work is completed, the earlier the operatives can leave, and they will still be paid for the entire shift regardless. The following vignette describes another example of this, and further explores this concept:

### 5.3.7 Informal Reward Systems: ‘They got paid a full shift for work that took two hours’

A H&S advisor and I were spending some time checking the risk assessments and method statements of an operation. The advisor had a query about the scaffolding and hence we went to try and find the scaffold foreman. We entered the site foreman's office and the H&S advisor made a cheeky comment about the untidiness of his desk:

H&S Advisor: ‘Is this how you live?’

Foreman: ‘some of us were busy over the holiday weekend’.

H&S Advisor: ‘How did the lift go? [over the weekend]’

Foreman: ‘We got it done’

H&S Advisor: ‘Good. I felt there was an uneasy atmosphere on Friday... when the guys knew it was going to be a late finish.’
Foreman: ‘Don’t think they will be complaining now. They got paid a full shift for work that took two hours.’
H&S Advisor: ‘That is alright, isn’t it!’
Me: ‘How many guys were working?’
Foreman: ‘About a dozen, and a couple of foreman.’

Following this conversation, the H&S advisor and I left the foreman’s office and I discussed my interpretation of this event with him. The fact that they were prepared to pay such rates suggests that they were desperate to get the lifting operation complete, and he agreed. I also mentioned that we had experiences of problem with contractors on ‘price’ (see 5.3.5) and that there is an incentive to work quickly and cut corners with health and safety. He nodded in agreement. I expanded that paying a full shift, with a ‘you can leave when the job is finished’ approach, is the same concept but in an informal way. It incentivises working quickly and taking shortcuts. He acknowledged the point I was making, and said that while he didn’t think they would shortcuts when performing the lift, he thought that where they may cut corners is when they are coupling the lift cage into place. He gave the example of not always clipping on with their harness, as always having to clip on can be awkward and slower. Langford et al. (2000) suggest that incentive schemes are carefully thought-out so that supervisors don’t turn a blind eye to safety, as pay and reward systems for productivity are seen as a major factor in risk taking. When on such a critical path that workers are required to work additional hours, supervisors may be more likely to turn a blind eye to safety, for scheduling reasons.

The following vignette suggests that this informal and undercover reward concept was not uncommon, considering that some workers had named it ‘Vegas Time’. Hence, this study proposes the concept of ‘Vegas Time’, which is an unofficial and covert reward system used in the construction industry. The foundations of the ‘Vegas Time’ strategy are based on an old saying about Las Vegas in Nevada: ‘what happens in Vegas, stays in Vegas’. Some holiday-makers that travel to Las Vegas, are subject to excessive amounts alcohol and drugs
while partying. Although this can be enjoyable, it can lead to misdemeanours such as unprotected sex, arrests and gambling misfortunes. Such judgement errors gave birth to this saying: ‘what happens in Vegas, stays in Vegas’. Or in other words, what has happened on this holiday is not to be spoken about outside of the holiday. Vegas Time was an undercover and covert reward system used when the members of a team had worked hard and achieved what was required before finishing time. What happened during Vegas Time, or the reward period, was to be kept quiet. This unofficial reward system is the birth of the proposed ‘Vegas Time’ concept.

5.3.8 Vegas Time: ‘what happens in Vegas, stays in Vegas’

On this project, ‘Vegas Time’ was born in one area of the project on night-shift. On night-shift there was much less supervision from H&S advisors or the client, which gave more opportunity for such systems. A construction worker involved in Vegas Time explained to me that ‘if we got the job done in 10 hours rather than 12, we get two hours Vegas’. During Vegas Time workers could do as they please, for example: drink tea, play on their phones and some went for a sleep. The worker explained that rumours had gone round that the place was ‘rocking’ during Vegas Time, but he said that wasn’t the case. A supervisor involved in Vegas Time perceived it as being ‘fair to the guys’. The guys (operatives) looked forward to it and often the first question would be: ‘are we getting any Vegas tonight?’. While this concept built stronger relationships between operatives and their direct superiors, this increased an incentive to behave unsafely. This strategy was undercover and covert, hence the name ‘Vegas Time’.

H&S advisors said they ‘knew’ someone must have been sleeping in the first aid room, but it was difficult to take any action without catching the workers in the act. These strong suspicions came from footprints on the bed of the first aid room, pennies dropped on the bed, a pillow on the bed and urine stains in the sink of the first aid room, where it was believed a worker had woken up in the
night. Construction projects are dynamic and hence this informal Vegas Time only last for a certain period until work, jobs and teams changed. There was other evidence to suggest that 'Vegas Time' schemes may have been present on other areas of the job. A mattress was found in a workshop, with an operative sleeping on it. A member of the H&S department believed that considering a mattress had been lifted into the workshop, this incident 'didn’t seem like a one-off' and 'there were probably others involved'. The same worker found in the workshop had been previously caught putting his hands through the barrier, swiping in with his ID card, signing the log-in book and then 'going for a sleep'.

According to supervisors, operatives 'would rarely turn down' an opportunity to work overtime, as money was a big driver for the workers. The issue of working hours was investigated by the H&S team as fatigue was a monthly topic, and it was discovered that some operatives were working 80+ hours 'week in, week out'. The issue of fatigue was also brought up in a meeting with three operatives (and safety reps), a H&S advisor and myself. The meeting had been called by the H&S advisor to discuss questions in the project's safety climate survey. One of the safety reps asked if there was anything in the survey about fatigue, as he 'always thought we get more accidents in the run up to Christmas is cause boys are doing overtime'.

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The Vegas time concept was considered as being 'fair' to the operatives by supervisors, and the concept could improve relationships between managers and operatives. This informal system could be used to reward workers for productive work, or for doing overtime at times when work was required to be completed. However, as highlighted previously, emphasis on production can affect safety performance, and according to Vredenburgh (2002), the effort to develop a strong safety culture is unlikely to be effective if the organisation is not reinforcing the desired behaviours or is rewarding inconsistent behaviours such as production rate.
In some cases, operatives were also being asked to work long hours or overtime, and in return would receive ‘Vegas Time’. In a review of literature in sleep loss and risk-taking behaviour, Womack et al. (2013) found that sleep loss was positively associated with risk-taking behaviour, and there was evidence that changes in sleep loss are causally related to changes in risk-taking behaviour. Rosa (1995) recommends that long work shifts should be issued with caution, and that extended work shifts should probably be avoided if experts in a certain industry or job already consider a job to be dangerous on an 8-hour shift. As these risks highlight, such undercover systems need to be just as well thought through as the formal systems.

5.3.9 Incentive & Reward System Summary

Incentive and reward systems are important concepts that can encourage safe behaviours if utilised correctly. There was a struggle to receive nominations for safety award (see 5.3.1 ‘safety awards only matter if you are in Tower & Decks’) and formally recognised positive reinforcement strategies were underused as ‘What about the green cards?’... ‘HR as well...if we get any” (5.3.4) highlights. Informants believed the lack of formally recognised positive reinforcement was because of the ‘macho’ element within the construction industry and that it was not part of the social norms. There also appeared to be a lack of understanding of the purpose or reasoning behind the reward systems. Some workers who won did not think they had done anything special to deserve recognition and were ‘just doing my job’ (5.3.2). With such a high turnover of workers on the project, there was confusion as to which individual’s qualified for the team awards, and if the new-starts deserved the same recognition as the workers that had been in the team for longer-term (see 5.3.3 but you can’t give one sweetie to one kid and not one to another’). As well as reward systems influencing safety behaviours, contracts can incentivise behaviours, and should also be carefully be thought through, especially if they encourage time-saving and therefore risk-taking (see 5.3.5 ‘they seemed desperate to keep going’). Such systems should be
carefully thought about and formally addressed by those qualified and competent to do so in the organisation. There was evidence of unofficial, covert and informal reward systems being used (see for example 5.3.6 ‘*it would be naïve to think it is uncommon*’ and 5.3.7 ‘*they got paid a full shift for work that took two hours*’). One of which was known as Vegas Time, (see 5.3.8 ‘*what happens in Vegas, stays in Vegas*’), and hence this study has dubbed unofficial, covert and informal reward or incentive systems as a use of ‘Vegas Time’. The Vegas Time reward systems used on this project may have helped improve relationships between workers and management; but could also encourage unsafe behaviours to save time, and encourage operative to work long hours, which could lead to fatigue and risk-taking behaviour.
Chapter Six:
Unsafe Supervisor & Operative Acts

The previous chapter focused on the decisions of the upper management that were unsafe or created an unsafe environment. This short chapter focuses more on the views and decisions of the operatives and site-based management with respect to H&S rules. The site-based managers including positions such as foremen and works managers; and have been termed ‘supervisors’, as they are in a supervisory role. The first part of the chapter primarily explores the actions and views of the operatives, and the second part, the supervisors.
6.1 Operative Views:
H&S Rule Violations

‘You have to admit, Health and Safety is a bit of a joke at times - it goes too far. You wouldn't be able to finish the job without sometimes breaking the rules. You just need to use your own common sense as a risk assessment sometimes...’

Construction Worker
2013
6.1 Operative Views: H&S Rule Violations

This chapter explores health and safety rules that were consistently broken, primarily with PPE compliance. In ‘The tail is wagging the dog’ (6.1.1), it is revealed how confrontation with safety rules can reduce safety compliance and make it more likely for safety concerns to not be raised. Many construction workers believed that there should be more of a common sense approach (see 6.1.2 ‘Encourage Common Sense’). Deeper ethnographic exploration revealed that some thought ‘You couldn’t do the job without breaking the rules’ (6.1.3) and that ‘Glasses cause more accidents than they stop’ (6.1.5). Operatives thought that blanket and inflexible site rules were impracticable and that sometimes the rules needed to be broken (see 6.1.4 ‘it is like having a rule which says you have to eat all your meals with a knife and fork, but sometimes it is better to have a spoon’). The vignette ‘We are delusional. We think we are safe but we are not’ (6.1.6) communicates how workers thought that they were safe through these excessive rules, but they were in fact not, and implied they had lost, what Reason (2008) calls, their ‘mindfulness’.

6.1.1 Confrontation: ‘The tail is wagging the dog’

The H&S professionals were my gatekeepers and crucial to the research project. They would introduce me to workers in their different site areas and make me aware of any events or on-goings that they think might be of interest to me. As a moderate participant observer I would not be at the research setting all the time, and even when I was, the site was so large that ‘action’ would be happening in areas where I was not present. Sometimes I would message one of the H&S professionals out of work hours to keep updated with any on-goings on site. This was the case for the following discussion.

Me: How was the rest of the week at work?
H&S Professional: Eventful
Me: Really?

H&S Professional: Really...sitting comfortably?

Me: Yea (I said fearing a serious injury or fatality)

H&S Professional: Then I'll begin... you remember Jimmy? Steelfixer.

Me: Yea... we were out with him recently.

H&S Professional: Correct.

H&S Professional: Well I was on-site and when I arrived out of the hoist I noticed 'no chin straps' and they were not clipped on etc... so...I asked politely:

'do me a small favour guys...put your chin straps on'...

(((boom)))... [representing exploding confrontation]

So I thought... fuck you! And asked why aren't you clipped on? An argument ensued...and then spoke with the foreman...still nothing doing. So!!! I said I was going down to speak with General Foreman.

Me: How can they argue against not having it on? What were they saying in the ((boom))?

H&S Professional: The General Foreman and Site Engineer were at the end of their rope trying to get them to work to the RAMS¹...

Well I said 'we're shying away from it if nothing is done' so I went to the Works Manager.

The (((boom))) was everything from my personal appearance to you only come here when it is sunny etc... That doesn’t bother me one bit.

The foreman pulled the teams in and told me it had been sorted... But after I’d left work the ‘goings on’ had reached senior management level, and shit start to fly (emails) between them.

Me: Worrying when the GF is struggling to get them to comply, why aren’t they working to the RAMS?

H&S Professional: They don’t even arrive on site with a harness... no intent to comply with the RAMS!! The tail is wagging the dog.

Me: That’s crazy! And worrying! So the guys aren’t wanting to wear their harnesses and we are struggling to manage that...

¹ RAMS: Risk Assessment Method Statement
**H&S Professional:** I got a phone call from the works manger the following day to explain one the senior managers was going nuts and "I'd lost a friend'. It got to senior management level and petrol was thrown on an already fierce fire which put me out in the cold.

**Me:** It should have been sorted way before it got to that stage (senior management level). It should be able to be corrected at foreman level.

**H&S Professional:** The foreman is the problem.

The next time I arrived to the research setting I thought I would try and catch up with the goings on. It was lunch-time in the H&S office, and I was eating in the H&S meeting room, a small meeting room attached the H&S department. The door opened and the H&S professional who I had been messaging entered. After a brief catch up or ‘small talk’, I asked how things had been since the other day and he explained not much more had been said, and the steel fixers had moved towers so had not seen them since.

**I said:** ‘I’m struggling to understand, why they don’t even intend to wear harnesses. Do they have anything?’

**The H&S professional explained:** ‘They have a tether to stop them from falling back and a harness to stop them from falling down’.

**I asked:** ‘And I presume they were working about 2-3 metres off the ground?’

**H&S professional:** ‘Yes’

**Me:** ‘Maybe since they are tethered they don’t perceive it as a risk?’

**H&S Professional:** ‘Possibly, but the bottom line is that they don’t want to wear them’.

**Me:** ‘Heard anything else from the foreman?’

**H&S Professional:** ‘No, he wants to avoid the confrontation; he doesn’t want to deal with it. But I told him that if one of them goes over the edge, he is in trouble. I spoke with him at the time, but the steel fixers could hear me talking to him, and were saying so much over the top they must have been breathing out of their ears. I just need to not react and watch what I say. Because if I respond to the personal comments, they could use it against me.'
Me: ‘Yea, definitely. The whole thing just seemed to blow up... and go viral.’

H&S Professional: ‘Oh yea, it went through the stratosphere, and it didn’t need to.’

Me: ‘What do you think will happen?’

H&S Professional: ‘Probably not a lot. Even though some of the management are at the end of their rope with them, they are good attenders.’

Me: ‘Good attenders?’

H&S Professional: ‘Yea, you know what guys are like in this industry, just don’t turn up sometimes. boozing at the weekends, missing Mondays and all that.’

Me: ‘I see, so that will be working in their favour.’

H&S Professional: ‘Definitely.’

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It has been recognised for a long time that the construction industry can be confrontational (see for example NEDC, 1983; NEDC, 1988; Newey, 1992; Smith, 1992). Latham (1994) found that a culture of confrontation, mistrust and individualism pervades the construction industry, and a recent publication by Loosemore & Lim (2015) suggests that this is still very much an issue for the industry to resolve. The above ethnographic vignette revealed how the confrontational nature of the workers on the research project can affect raising safety issues and safety compliance. The foreman in this case seemed to want to avoid confrontation from the operatives.

PPE compliance was a common challenge on the project, and one that could lead to confrontational arguments, as workers complained and protested against site regulations. This finding is in line with an Australian ethnographic study, where Iacuone (2005) found that many tradesmen believe involving oneself in an altercation is an acceptable means of resolving a grievance. In this case the steel fixers did not even plan to comply with the site rules and regulations by not being equipped with a harness. The H&S advisor believed that they just did not want to wear them and this was an opinion that was highlighted repeatedly by H&S advisors. For example, in a discussion on safety glasses following a
presentation that was delivered to the H&S department by the researcher, a
H&S advisor stated that: *they [construction workers] kick up fuss and come out with all the excuses simply because they don’t want to use them... but they don’t seem to complain when the sun comes out and they wear their sunglasses – that’s the only time there are no issues*. Choudhry & Fang (2008) found that one of the fundamental problems operatives have is they view PPE only as a job requirement and do not accept the concept that they should be motivated to wear PPE for their own safety. The advisor also acknowledged that they could have perhaps not recognised falling down as risk, viewing the rule as excessive. This was possible considering the height they were working at, and they already had a tether on to stop them falling back. The view that the site rules were excessive, was a common perception among workers, who believed that there should be more of a ‘common sense’ approach.

### 6.1.2 Safety Climate Survey: 'Encourage Common sense'

The survey was administered by an external consultant, comprised of 128 questions, took around 15-20 minutes to complete and had 475 respondents. Of the respondents, 92% were male, 55% labour force, 45% supervised others and 38% have less than six months on the project. The surveys had a mixture of 5-point Likert scales (strongly agree, agree, neither, disagree, strongly disagree), unbalanced 4-point scales (always, sometimes, rarely, never), 3-point scales Likert scales (high, medium, low) and forced choice ‘yes’ or ‘no’ questions. The survey results strongly suggested the presence of a common sense phenomenon: 75% strongly agreed or agreed that *my own experience will keep me safe at work*; the majority of worker’s *sometimes* (62%) *use their own judgement about following procedures* (always, 10%; rarely, 18%; never, 10%); and 78% strongly agreed or agreed that *using common sense will keep me safe at work*. When asked if workers would challenge a workmate for no gloves, 56% said 'always'; for no eye protection, 62% said 'always'; for use of a mobile phone in an unsafe place, 58% said always. Along with speeding (54% always)
and not clearing up (58% always), these five acts, out of a total of 19 acts, were the least likely to be challenged on site. This perhaps suggested these rules were questioned by workers or not perceived as important as others. The final open-ended question in the survey was ‘how do you think we could improve the safety on this project?’. The following answers were related to common sense safety:

‘Practical common sense Health and Safety goes out the window to protect persons by generating an exhaustive paper trail. Critical factors like competence go out the window and instead irrelevant rules are enforced’

‘Not presuming the next one is a hillbilly but prepare the risk assessment with more emphasis on the existence of common sense.’

‘Common sense approach required by safety team’

‘Encourage Common sense’

‘Everybody uses their common sense including safety advisers’

‘Give people more common sense.’

‘Use common sense and discretion.’

‘Common Sense’

‘More common sense approach. Client does not necessarily have the experience to determine what safety measures we as experienced contractors should employ.’

‘A more proactive approach is required. Make the workers apply common sense and judgement rather than drilling into them that everything is safe as they take their eye off the ball.’

‘Common sense of plant and equipment usage. Awareness of safety.’

‘Make the workers apply common sense and judgement rather than drilling into them that everything is safe as they take their eye off the ball.’

‘Look at the bigger picture. Gloves and glasses are not always the answer. Try looking at weather conditions, management, experience, foreign labour language barriers and most of all, common sense’

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The statistical findings suggest that workers believed in a more common sense approach and would use their own judgement when following procedures. The final open-ended question explored how workers believe safety can be improved, and the evidence suggests that there was desire for a more common sense approach. Small construction firms have adopted a common sense approach to safety on site for quite some time (Vassie et al., 2000); and while this large construction project relied more on official policies and practices, there was a demand for change. Many construction sites and projects are known to be dynamic and involve large, small and micro firms at different stages of the project (Izam Ibrahim et al., 2013). Due to the fluidity of the activities on construction sites, an overlap of approaches between strict and standardised safety measures and common sense safety may exist on large projects. This could create an opportunity for research of common sense safety operating alongside strict safety procedures within large project environments.

The ‘common sense approach’ that came to light in Aboagye-Nimo et al.'s (2013) study of small/micro construction companies, ‘enabled workers to informally and freely assess situations and subsequently come up with possible solutions on how to avoid or handle potential hazards on site’. The more formal and official policies and practices adopted on at QC project meant that such flexibility was not as available due to the strictness of the rules. However, many of the workers believed that more flexibility and common sense was required:

6.1.3 The Operatives View: 'You could not finish the job without breaking the rules'

One afternoon on site, I noticed there was a discussion taking place between one of the construction workers, Paul and a H&S advisor. Being curious, I approached to realise that the H&S advisor was asking Paul to fasten the crotch-strap for his lifejacket. Paul proceeded to do it but wasn't too happy about doing so, suggesting that the safety advisor ‘didn’t know all the positions he needs to get
and that the crotch-strap can often get caught on things, which is 'a hazard'. Once the crotch-strap was fastened and the safety advisor explained the reason for the crotch-strap being there (to stop the lifejacket not going over your head when it inflates on water impact). After the H&S advisor had moved on, I got the opportunity to speak with Paul, who I had met a couple of times before. I asked him how he was getting on and he smiled and said he was 'not bad, just avoiding trouble'. I laughed and said that it 'looked like he was causing safety some trouble', to which he laughed and then responded:

'Yea mate, but you have to admit, Health and Safety is a bit of a joke at times - it goes too far. You wouldn't be able to finish the job without sometimes breaking the rules. You just need to use your own common sense as a risk assessment sometimes... For example, sometimes your gloves are a hazard. They can get stuck on things. So if you're in an area where they might get caught on thing - take them off. Also, your glasses, if they steam up so you can't see clearly - take them off. The other day I was in a confined space with limited mobility and my hardhat was restricting vision and getting in my way, so I took it off.'

I asked: 'but what if you trip in the confined space and smack your head?'

Paul replied: 'well that is your own stupid fault'.

I said: 'But everyone makes mistakes now and then, no,'

Paul: 'Yea there is human error, but I've been in construction 40 years and not had a problem.'

I then asked: 'if he did see someone without an item of PPE on would he challenge them.'

Paul: 'Na, its nout (nothing) to do with me'.

The conversation with Paul was enlightening, and not an unusual opinion amongst construction workers on this project. Paul believed that wearing PPE all the time was too generic a rule for all situations, and that sometimes the rules needed to be broken. There were multiple occasions where workers were
found not to be wearing their PPE, and this was causing issues with the H&S advisors as they constantly had to remind workers to wear their PPE. This problem was noted in a site departmental meeting where the head of department had stated that the lack of PPE compliance was distracting them from the 'real safety issues'.

In Paap's (2003) ethnographic study, workers were given tasks that could not be completed without violating procedures. These tasks were also often given to them by the same foreman that trained them in the official safety procedures. Paap (2003) explained that in the construction industry safety should be interpreted in two forms: the official procedures and the actual working operations. A distinction that represents the difference between the rules stated and the rules that actually govern the workplace. This double-provision was described by Paap as ‘a Bait-and-switch, since it clearly serves to advantage the employers at the expense of the workers’. This represents a risk for workers as ‘in a worst-case scenario, contractors argue that workers are knowledgeable about the risks and procedures (given the official procedures and training) and thus should be held responsible for their own deaths’ (Paap, 2003). The workers on the QC project that broke rules believed that in some cases the rules needed to be more flexible, and to get the job done this would sometimes have to occur.

6.1.4 Rule Flexibility: ‘It is like having a rule which says you have to eat all your meals with a knife and fork, but sometimes it is better to have a spoon’

On a glorious sunny day a H&S advisor and I arrived in one of the caissons in the Forth. The concrete base had been poured and construction operatives were busy working within the caisson. As soon as we arrived the H&S advisor spotted an operative without his safety glasses on and walked towards him. While the H&S advisor intervened I took a moment to look at the work being carried in the
caisson. The tidiness or ‘housekeeping’ on the site was of a good standard, but then I noticed operatives stopping work to put on safety glasses as they noticed the arrival of the H&S advisor. Some of them would alert their work colleagues behind the H&S advisors back as he continued with his intervention. It was like a chain reaction as the operatives began putting on their safety glasses and alerting their colleagues. Once finishing his discussion, the H&S advisor wandered across toward a couple of workers who were using both hands for a task, while trying to smoke at the same time in a non-designated area. I caught eye contact with the operative that the H&S advisor had just intervened with and took a few steps towards him, before saying: ‘how things going mate?’

Operative: ‘No bad mate, just casually sweating my balls off’ (he smiled)
Me: (laughing) Aye, summer has definitely arrived.
Operative: Long may it continue, though it’s a bit of sun trap down here, can’t stop sweating, that’s why I was no wearing my glasses. They keep steaming up.
Me: Is that what John (H&S advisor) was talking to you about?
Operative: Aye mate, I agree you should wear them as a site rule, but it needs to be more flexible. I would be forever cleaning them in this heat, and would never get the job done.
Me: Yea, I see what you’re saying… you think wearing glasses should be risk assessed out on days like this?
Operative: There just needs to be more flexibility. It is like having a rule which says you have to eat all your meals with a knife and fork, but sometimes it is better to have a spoon… but that would be breaking the rules’
Me: Especially if you eat a lot of soup (joking)
Operative: On a day like this I think I would be using my spoon for some ice cream rather than soup! (joking)

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The operative believed that there were times when the rules needed to be more flexible. On this occasion, it was a warm summer’s day in the ‘sun trap’ of the caisson and his glasses were regularly ‘steaming up’. This insight with safety
glasses is similar to that of Löwstedt’s (2015) work, who undertook an
ethnographic study with two separate roles and perspectives; an observer and a
worker on a construction site operated by a large construction company. As an
observer he noticed how regulations were breached repeatedly, especially a
lack of compliance with gloves, jackets and glasses. As a worker he explained
that mist kept getting inside his glasses so he had to take them off to be able to
see. He continued to do this when necessary, learned that everyone in the group
did this and it was accepted. The issue with safety glasses compliance on the QC
project was a continuous battle:

6.1.5 PPE: 'Glasses cause more accidents than they stop'

Being a researcher attached to the H&S department, I sometimes helped out
with safety-related tasks when required. On one occasion I travelled around the
site with a H&S advisor to put the new monthly safety topic posters up in the
worker's welfare units. As we walked into a welfare unit, one of the workers
noticed the H&S advisor and immediately took out his safety glasses. He turned
to his fellow worker and said 'I've only had these three days and they are already
fucked'. The H&S advisor overheard this conversation and asked to take a look.
He suggested they might need a clean but the worker disagreed, saying he had
just cleaned them and they were scratched. At this point, another worker in the
welfare unit interrupted saying they were 'the worst things' and they 'cause
more accidents than they stop'. He gave an example: if they get dirty during a
concrete pour, then 'it is not like you have time to go and clean them, and you
aren't allowed to take them off'.

A study by Lombardi et al. (2009) found that a lack of comfort/fit and fogging or
scratching of eyewear were important barriers to PPE usage. This could suggest
the importance of PPE quality which was discussed in the previous chapter. The
workers wanted to have the flexibility to carry out a risk assessment based on
the tasks they were doing, yet workers were being enforced to comply with the site rules for all situations. This led some workers to think this made them ‘delusional’, as purely following the site rules would necessarily mean that they were safe.

6.1.6 Site Rules: 'We are delusional. We think we are safe but we are not'

I am not the most comfortable with heights, and have found that the best way to handle this is to not look down! However, on a construction site, sometimes you can’t avoid seeing the bottom. As I travelled up the construction hoist with a H&S advisor, I was a little nervous. Watching my step from exiting the hoist to scaffold board, I got a quick flash of the drop. However, once on the scaffold I felt more comfortable, as the perimeter was boarded up. There was another higher platform in the centre of the scaffold, which the H&S advisor wanted to check. My nerves returned as I climbed the ladder and the boarded perimeter no longer protected my view of the drop. Reaching the top one of the workers opened conversation with: ‘you are no good with heights are you?’. I smiled and said ‘was it that easy to tell?’. He joked ‘it sure was, and we are going to enjoy watching you go back down the ladder as well’. I asked if they were afraid at all of heights, to which they both said they weren’t. One of them expanded to say that ‘he had been doing it 15 years and always felt comfortable’ and that ‘you couldn’t do my job if you had any fear’. While having this discussion, the H&S advisor noticed a worker sitting on top of a rebar cage (at height without any protection), smoking and on his mobile phone (both in undesignated areas). He raised these issues with the worker saying ‘that is what you could call a hat-trick’ (three safety breaches at the same time). The worker that I had been talking with, then interrupted, saying that with all these safety rules and PPE we think we are safe ‘but we are delusional’. He expanded saying ‘what is his hardhat going to do for him there? If he falls off the rebar, it will just fall off his head? We think we are safe but we are not’.
The operative seemed to think that there were site rules that did not apply to all situations, such as having to wear a hardhat when there is nothing above the workers. He thought that the by just adhering to all the site rules meant that ‘we think we are safe but we are not’. He was suggesting that by adhering to all the site rules and wearing all the required PPE, workers perceived they were safe; but in fact this alone would not guarantee their safety. Reason (2008) points out that while many front-line workers have little chance of changing or making systematic improvements, it is important to give these workers some mindfulness, or mental skills, ‘that will help them avoid error traps and recurrent accident patterns’. By having excessive and largely inflexible rules, front-line workers are in danger of losing their mindfulness. These seems counter-productive especially on occasions where these rules are excessive or do not reduce safety risks. This was the case in the opening ethnographic exert of Paap’s (2003) study, where the researcher is handed a loosely hanging webbed safety belt and is told that it ‘won’t do you any good’ if you fall out but to wear it in case an OSHA (Occupational Safety Health Administrator) representative drives past. When the PPE issues were raised by the H&S advisor at the QC project, the operative appeared to also think that some of the PPE was being worn to satisfy rules, yet some of these PPE items would not be necessary for the task being undertaken.
6.2 Supervisors Views:
H&S Rule Violations

Mixed Views:

...'It is just a bit of common sense’

...'there is no such fucking thing as common sense in construction’

Construction Supervisors
2014
6.2 Supervisor Views: H&S Rule Violations

The site management were to some extent caught between the views of the operatives and the demands of their superiors with regard to the site rules. This was reflected in the mixed views of the supervisors. In ‘There is no such fucking thing as common sense in construction’ (6.2.1) the threat from compensation claims is realised, as site management feared using common sense as an approach believing it would not act as a defence in court. Yet in ‘It is just a bit of common sense’ (6.2.4) it is acknowledged by management that site rules are broken and sometimes supervisors do not challenge the workers. ‘You would be better off trying to learn about animals in the zoo’ (6.2.2) and ‘The gangway challenge’ (6.2.3) relate to reservations that could be had to giving workers flexibility to do an ‘on-the-spot risk assessment’.

6.2.1 'There is no such fucking thing as common sense safety in construction'

A minor accident had occurred on site, (see Chapter 4) and during the post-accident investigations a H&S advisor was discussing the contributing factors with the site manager. The incident occurred, while extending the cables of the construction hoist. The injured person had put his head over the hoist handrail, while the hoist was moving, to see if any of the cables were snagging. Unfortunately, his head got jammed between the handrail and a cable guide, causing a minor facial injury. One of the scaffolders had said that, even though he had not been trained to complete the task, it should have just been 'common sense' to not put his head over the edge. The site manager reacted firmly stating: ‘there is no such fucking thing as common sense in construction. You try and use that as an excuse and you would be laughed out of court.’
As well as concerns with the compensation claims, there were also concerns as to whether the operatives could be given more flexibility with safety rules. Common sense is based on individual’s experiences and perceptions, and therefore can differ between people. This has led to the saying ‘common sense is not common’ and hence sometimes rules may be required to protect people from themselves. Aboagye-Nimo et al. (2013) found that workers with extensive site experience believed that spotting certain risks and hazards would be difficult for some workers (particularly new ones) suggesting that work experience is likely to shape an individual’s common sense. From the Social Amplification of Risk Framework (SARF) theory, Oswald et al. (2014c) suggest that the nature of risks in the construction industry, leads them to be more likely to be tolerated and under-rated. Without a formal and thorough analysis of the risks, this theory illustrates dangers which could be associated with a common sense approach or those where ‘on-the-spot’ decisions are made; as according to Paap (2003) these are far more complex than following the official safety regulations. Paap (2003) explains that on actual operating procedures out in the field, workers must make continuous ‘guesstimates’ about the potential extent of costs and the likelihood of the hazards they face; balancing this with the push to complete their work as fast as possible. This concept touches on production pressures affecting safety performance, which was acknowledged as an issue on the QC project (see Chapter 5).

6.2.2 'You would be better off trying to understand the behaviours of some of the animals in the zoo than some of my guys'

After reading and signing onto the ten minute brief of a work area, I went to meet the site foreman with one of the H&S advisors. I hadn’t met this foreman before, so introduced myself as a PhD student researching safety. He asked what part of safety I was looking into and I told him that I was investigating the safety behaviours of the workers. He laughed and said ‘you would be better off trying to
understand the behaviours of some of the animals in the zoo than some of my guys’. I asked him what he meant, and he expanded to say that ‘some of them just aren’t all there’ and they ‘often do daft things’. He said he had this one worker that kept walking into scaffold poles and other objects, and every time he heard ‘a yell’ he knew who it was. The same worker once turned up early to start his shift, and proceeded to walk around the site with no PPE on at all. When the foreman confronted him, he believed he hadn’t done anything wrong because ‘he wasn’t working’. The foreman thought ‘that’s why we have site rules, to protect guys like that.’

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The foreman seemed to think that some of the workers were difficult to understand, they would do things that he didn’t perceive as sensible and that is why site rules were important. In a common sense approach to safety this could be a weakness due to the flexibility with the rules. There were also suggestions of on-site horseplay and disregards for safety that could have adverse safety effects:

6.2.3 Disregards for Safety: ‘The Gangway Challenge'

I was sitting on the boat as we were getting ready to be transported to the towers. There were many empty seats and plenty of room, but a H&S advisor and I had taken seats right next to each other. We were just chatting away normally and then the advisor said: ‘Did you hear about the couple of lads that got paid off?’. I shook my head. He expanded:

‘They posted a video on the internet of them dancing on the hand rails at deck level and it came back to bite them.’

Shocked, I asked: ‘So they could have fallen all the way from deck level?’

H&S advisor: ‘Because of the angle of the camera, you couldn’t tell how far they would have fallen. They also had clips of them sliding down the gangway… it is known as the gangway challenge. Have you heard of that?’
Me: ‘Yes I have, that and the hardhat challenge as well...’ (where workers try and land a hardhat on their heads by standing on a shovel in order to catapult up the hardhat from the ground).

H&S advisor: ‘Yea?’

Me: ‘Yea there are loads of videos of the hardhat challenge on the internet...’

H&S advisor: ‘I guess the internet could be adding to the problem’

The gangway or hardhat challenge could be considered as on-site horseplay. Horseplay is one of the examples of an unsafe act given in Holt's (2005) book, and encompasses playing minor pranks on people to more elaborate farces (Iacuone, 2005). The smartphone as a common possession and the power of social media in recent times has led to an increase in construction videos being created and viewed. For example, one social media group created for construction workers, which was founded in 2014, has had almost 400,000 followers. The group describes itself as being for ‘construction workers to share the funniest images and video clips of 'on site' banter’. Some of these videos of workers are unsafe, but are posted for entertainment of others. This could represent an unintentional consequence of technology change, which through ethnographies has been unravelled in other studies (for example Barley, 2015 found how the internet has made the purchasing of a car less loathsome). These unintentional changes with technology are usually slow but persuasive, and harder to predict. Construction workers using technology to communicate amusing but unsafe videos at work could be an example of such an unintended change with smartphone and social media technologies. These videos can represent a disregard for the workers own personal health and safety.

There were other examples of disregard as well such as items being stolen at the first aid kit. This was a consistent problem for many sites on the project. One of the H&S advisors explained that ‘they are at the bare minimum requirement as it is, then plasters get stolen, safety pins too. We’ve had guys emptying the contents
and taking the box to use it for fishing.’ Then he joked ‘even the eye pads will probably get stolen before Halloween if someone is dressing up as a pirate.’

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Though some of the site-managers displayed a fear for a common sense approach due to compensation claims and unpredictable behaviour, there were supervisors that adopted a more common sense approach at times:

6.2.4 'It is just a bit of common sense'

Having heard from some of the operatives on their views on PPE, I was interested to hear from a supervisor for his perspective. I asked a supervisor if his guys wore PPE all the time. He said that most of the time the guys were good and wore full PPE despite not all of them being used to it - some of the subcontractors would turn up without all the required PPE and had never worn some of it before (usually safety glasses). He did admit that there were occasions when the workers would take off items of PPE when they were on site, but not working. He was happy with that arrangement as it was 'just a bit of common sense'. He expanded to say that if the guys were enforced to wear it all the time it could damage his relationship with them and they would be more likely to take PPE off in other situations that could be higher risk. Though the supervisor did add that when the H&S advisor comes out he would make sure that all they guys have their PPE on, 'out of respect to the safety man'.

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Holding both professional and personal relationships with co-workers was highlighted as an advantage in a study by Conchie et al. (2013), who found that this often attributed to the fact that they shared similar views regarding safety and working procedures, and felt able to raise safety issues with little confrontation. Hence, by adopting a more common sense approach, the supervisor in this vignette acknowledged that it could help his relationship with
the operatives. Supervisors and operatives who adopted a more common sense approach and broke rules routinely were more exposed; as through the adopted Person approach perception to unsafe acts, the organisation had as far as possible, attempted to uncouple themselves from unsafe individual actions. To some extent this less desirable Person approach was being initiated by the fear of the perceived compensation culture. In the Lofstedt (2011) report, he indicated that excessive bureaucracy and red tape requirements induced by the perceived compensation culture, have been blamed for preventing individuals from engaging in socially beneficial activities, overriding common sense and eroding personal responsibility.
6.3 The Common Sense Safety Debate

In 2010, Lord Young of Graffham, suggested that a ‘compensation culture’ driven by litigation is at the heart of the problems that troubles health and safety in the construction industry. In his report entitled 'Common Sense Common Safety', Lord Young of Graffham (2010) hoped to challenge this notion of safety red tape:

‘The aim is to free businesses from unnecessary bureaucratic burdens and the fear of having to pay out unjustified damages claims and legal fees. Above all it means applying common sense not just to compensation, but to everyday decisions once again.’

However, five years later on, this research study suggests that problems caused by a perceived compensation culture are still very real.

Construction organisations are affected by compensation claims and higher than necessary insurance premiums (Gyi et al., 1999). The perceived compensation culture has created an environment where organisations attempt to eliminate all risks by all means, even though this objective is unattainable (Lord Young of Graffham, 2010). The fear of compensation claims prompted the QC to adopt a Person Approach perception to unsafe acts which, as far as possible, uncouples individual unsafe acts from the organisation. This approach is inextricably linked to a blame culture, and many of the undesirable outcomes of a blame culture were discussed in the previous chapter (Five). The fears of the compensation culture have led to strict rules and regulations in an attempt to help eliminate all risks, and many construction workers were of the opinion that these rules on the QC project were excessive and lacked common sense. ‘Common sense’ is defined as the ability to behave in a sensible way and make practical decisions (Ludhra, 2015). Previous ethnographic work has findings related to that of ‘common sense’ in construction. Waddick (2010) who studied 11 subcontractors from six different trades in Australia found that the most cited way workers learnt safety in the workplace was through common sense
and there was a growing culture of resistance to modern OSH legislation. Aboagye-Nimo et al. (2013) found a common sense safety culture to be prevalent among workers of small and micro firms. They explain that common sense in the case of construction site safety refers to more than basic level of practical knowledge but requires experience and long term knowledge gained through training, experience, experiential learning in new situations.

According to Paap's (2003) study, the official version of safety, derived from strict regulations, is a conservative one in which safety is paramount, yet these are not always the actual operating procedures that occur on site. These strict rules and regulations were debated by many on the QC project. Paap (2003) believed that because of the hypermasculine culture and the structural insecurities that pervade most of the industry, the pressures against strict conformity to official safety policies are ubiquitous.

These strict rules and regulations sometimes do not allow for the flexibility of a common sense approach that many of the workers desired on this project. This can result in a lack of worker engagement with workers being simply told 'it is a site rule'. In Wadick's (2010) he states that: 'It is only when site operatives (most of whom are sub-contractors) are engaged with the issue that a positive cultural change is likely to occur.' Strict rules and regulations with little flexibility tend towards the most basic stage of a five-stage worker engagement process documented by the HSE (2011): 'Individuals are simply told what to do regarding safety and/or health.'

A common sense approach was found to be effective in small and micro firms in a study by Aboagye-Nimo et al (2013). This brings about the question as to whether this approach could also have value on large projects. However, one key difference is that smaller firms are avoiding the compensation culture for a couple of reasons: the close personal relations in small firms would mean that claims could be seen as a betrayal and there is little money to be gained (Aboagye-Nimo et al., 2013). It is also worth noting, that in a common sense...
approach, construction workers may have more license to choose not to wear PPE because they simply don’t want to, rather than because they weren’t required to. Avoiding wearing PPE use for comfort or other reasons in situations when it would be beneficial for H&S reasons, would itself be an unsafe act.

Fears of the compensation culture appeared to have altered the views and actions from construction managers. For example, Manu et al. (2013) noted that one of the reasons subcontracting is practiced is to in an attempt to avoid workers’ compensation costs.

In a report to the Prime Minister, Lord Young of Graffham (2010) highlighted that a growing compensation culture in the UK construction industry has had adverse effects on health and safety and that it must be eradicated in order for common sense to prevail. He states that the ‘UK’s compensation system should focus on delivering fair and proportionate compensation to genuine claimants as quickly as possible – not fuelling expectations that injury means automatic compensation regardless of the circumstances.’ While this compensation culture exists it is recommended that large organisations try to create a culture of trust. Researchers found that the Olympic Park project managed to counteract the blame problem through worker engagement and trust (Healey & Sugden, 2012), highlighting that it can be successfully achieved in large organisations.
6.4 Chapter Six Summary

Many of the construction workers wanted a more common sense approach (see 6.1.2 'Encourage common sense'), which led to a lack of compliance among site safety rules with workers using their own judgement. Some workers believed 'you couldn’t finish the job without breaking the rules' (6.1.3), but such rule breaking was viewed by upper management as an unsafe act. Some construction workers also thought that the excessive rules made them ‘...delusional. We think we are safe but we are not’ (6.1.6), since simply adhering to the rules wouldn’t make them safe. There was particular lack of compliance with safety glasses, with some operatives of the view that 'glasses cause more accidents than they stop' (6.1.5). Workers believed that rules need to be more flexible (see 6.1.4 ‘it is like having a rule which says you have to eat all your meals with a knife and fork, but sometimes it is better to have a spoon’) and there were times when safety glasses needed to be removed to see; a finding which echoes and builds on Löwstedt’s (2015) work. H&S advisors believed at times the lack of compliance also led to distractions 'from the real safety issues' as emphasis was placed on complying with the rules, as they constantly had to remind workers about PPE compliance. This was sometimes met with confrontation and a reluctance to adhere to the rules; and in some cases, workers and supervisors would avoid raising safety issues in order to avoid such confrontation, which meant ‘the tail was wagging the dog’ (6.1.1).

The site-management on the QC project had a mixed view on the common sense safety approach, from showing clear fear of the compensation claims to admitting that sometimes rules are broken and common sense prevails. The bureaucracy through rules and regulations was unpopular, lacked worker engagement, caused frictions and damaged working relationships. Hence, there were times when a more common sense approach was used (see 6.2.4 ‘it is just a bit of common sense’). Using a ‘common sense’ approach would step away from the strict site rules, and give the workers more flexibility and responsibility.
However, other site-managers displayed reluctance in adopting a common sense approach for fear of compensation claims, (see 6.2.1 ‘there is no such fucking thing as common sense in construction’). There were also questions over whether operatives could be trusted with additional responsibility, with site management suggesting that rules were needed to protect some of the workers (see 6.2.2 ‘You would be better off trying to understand the behaviours of some of the animals in the zoo than some of my guys’ and 6.2.3 ‘The gangway challenge’). This research recognises this problem, acknowledging that operatives undertaking an ‘on-the-spot risk assessment’ could be dangerous. However, there could be more engagement with the workforce when planning future tasks, which could enable for discussion and more flexibility of the site rules for specific upcoming tasks.
Chapter Seven:

Multinational Workforces

In most countries, large construction projects employ significant numbers of ethnic minorities as labour and specialist subcontractors are drawn from the global construction market. This chapter first explores communication issues (7.1), before investigating other challenges through a study on a foreign subcontractor on the project (7.2).
7.1 Communication Issues

‘You feel like you are doing the Funky Chicken’

H&S Advisor

2014
7.1.1 Introduction

Communication within a multinational workforce was an obvious challenge that was raised by the H&S team in preparation for the arrival of migrant workers. Formal protocols (for example multi-language signage, wallet cards to be developed with common statements, and black bands on hardhats for English speaking translator) were put in place in an attempt to improve the flow of safety messages and communications. On the construction site, the project had a policy of having at least one English translator in every six non-English speakers, which is one of the remedial strategies adopted by construction companies (Bust et al., 2008). The translators or interpreters (these terms were used interchangeably on-site and in this document) were required to translate text or spoken words and were usually foreign workers who spoke English as well as their own native language. Tutt et al., (2013b) found a similar conclusion, that the same person was required to translate (written) and interpret (oral), highlighting a lack of appreciation of the different skillsets. As well as translating, the interpreters had their normal roles and responsibilities as employees such as operatives, foreman or site engineers.

This section uses seven ethnographic vignettes to demonstrate the communication issues on site. 'I spend 40% of my time on 3% of the job' (7.1.2) gives insight into the resource demands required for translations and the lack of co-operation from some translators. In 'They are being trained for everything' (7.1.3) it is revealed that translators were being trained extensively since they could communicate between different nationalities; and issues with translating training material is highlighted in 'If you pay me another salary' (7.1.4). Translators became highly trained, though not necessarily more safety aware than other non-English speaking migrant workers, as highlighted in 'hang on, you are giving the briefs in the morning?' (7.1.5). Extensive training, combined with a high turnover of migrant workers, as well as geographic restrictions, holidays and illnesses, also meant that the one is six policy was, at times, being
broken. In 'You feel like you are doing the Funky Chicken' (7.1.6) when
translators were not present, safety messages were attempted to being
communicated through noises and many body and hand symbols. 'It just came
out complete nonsense' (7.1.7) and 'I am given what I think is a Google translate'
(7.1.8) discuss the challenges and limitations with the use of technology for
translation.

7.1.2 Translation Resources: 'I spend 40% of my time on 3% of
the job'

After being on-site, I returned to the H&S office to write up some fieldnotes.
There were four H&S advisors in the open-plan office, but it was very quiet with
only the sound of keyboard typing and mouse clicking. One of the advisors,
George exhaled a large sigh and shook his head. I looked up from my laptop and
captured his eye, and asked: 'Whats up George?'.

He replied: 'Sometimes I just wish I didn't speak Polish.'
I laughed as a smile came to his face. He spread his arms and opened the palms
of his hands directing them towards his computer and added: 'I've just come
back from translating an induction, I need to do the briefs every morning and now
I've just received an email asking to translate something else. I feel like I spend
about 40% of my time on 3% of the job.'

The H&S advisors were not required to be at the morning briefs usually, but
George was required to attend to translate. He expanded: 'And I'm not the only
one frustrated, there are guys (workers) out there (on-site) that refuse to wear
their black bands (a band on the hardhat which identifies individuals as a
translator). One of the guys told me that his job description says steel fixer, not
translator. Though he understands English, if you speak to him in English, he will
just say 'que?' (he laughed).

I enquired: 'so he is just point blank refusing to do it?'.
George explained: 'well he would be willing to do be a translator, if he was paid
extra money to do so'.

I responded: 'That's not ideal... (he nodded... and there was a pause)...

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This ethnographic encounter gave insight into some of the communication challenges that were occurring on the project. There appeared to be significant time and resources being spent on the translation of safety briefs and inductions. This became even more time consuming when there were three of more different languages being translated. The bi-lingual employees were being distracted from their own work to help with interpretations which for some was frustrating and others even refused to co-operate. Tutt et al. (2013b) raised the question of whether the informal translation of health and safety documentation is asking too much of migrant workers, especially when they may not be paid for it and it has little long-term benefit on their upskilling, moving through the construction sector or other aspirations. The refusal to take on the interpreter role suggests that there were migrant workers of this opinion. As well as interpreting, the translators were given many additional roles and responsibilities due to their multilingual capabilities:

7.1.3 Translator roles: 'They are being trained for everything'

The H&S meeting was being dominated with discussion surrounding the challenges caused by the recent influx of multinational workers. I sat and listened as the H&S professionals expressed problems, frustrations and many questions without clear or obvious solutions. The meeting was fast flowing as H&S professionals said there piece in passionate but civilised and cooperative way. Then, at last, the meeting went silent, when one of the H&S advisors stated: 'we are relying on these guys to communicate important messages and we have little or no idea what they are saying or how much they are saying'. The silence seemed to suggest agreement with little or no ideas of how to overcome this challenge. Until another member of the team said: 'I know... and that's when the
guys (translators) are there... they are being trained for everything, and I don’t know about your areas, but Jim (Works Manager) thinks they have too much responsibility.’ As interpreters were often the only bi-lingual member of the team, they would regularly be put through lots of different types of training e.g. first aid. For some positions, such as the safety rep role, operatives are meant to volunteer but interpreters would often be asked.

Many additional responsibilities meant that the translators were sometimes busy and not present to help the communication flow within their teams. This unexpected challenge was one of the reasons why the one in six policy was not being adhered to at all times. When non-English speaking workers were isolated, this increased the safety risk on the project. For example, an incident occurred when two foreign workers entered an area, signed onto the briefing sheet without understanding it and went into the construction hoist. On the briefing it stated that the hoist was out of order. Neither of the workers were trained to use the hoist and ended up getting accidently locked inside. While in the H&S office, a H&S advisor told me that he thought that the one in six policy attracted 'lip service'. The policy became strained due to teams being split between the site and the office. In some cases, the management or engineers, who were mainly office-based were the recognised translators. Geographical fragmentations, training courses, a high turnover, holidays and illnesses were all could disrupt the communication flow that passed through the translator.

Another issue was translating the content within some of the training sessions. While the training presentations could be interpreted, other resources such as training videos required translation, which was more challenging:
7.1.4 Safety Training: ‘If you pay me another salary...’

There were plans to introduce behavioural-based safety (BBS) training sessions across the site and I was helping setting up a presentation in the welfare units before a behavioural safety session. This was one of the first sessions, and it was being delivered to English-speaking workers only. Though moving forward, an issue was recognised, as the safety training videos in the sessions were in English, and therefore would be of little use to the non-English speaking migrant workers. Translating the subtitles from English would be a very timely procedure, and one of H&S advisor’s asked a bilingual employee if he would translate the video. The bilingual employee joked that he would only do it if ‘you pay me another salary’. Due to the time it would take, the video was not translated.

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The vignette above describes a situation where language was providing barriers to training migrant workers. In 2007, Sells described communication as a ‘leading concern’ amongst migrant Hispanic trades workers; as with English not being their mother language, any understanding of the educational or training exercises will be significantly lower than for the native speakers. This reduction in understanding is similar to Brunette’s (2004) findings for Hispanic workers in the US, where non-English speaking workers gained less from training than English speaking.

This communication complication let to a reduction in understanding of training material, and added even more reliance on the translators to communicate acceptable working practices. While translators went through extensive training, they were not health and safety advisors, and could at times be found breaking the safety rules themselves:
7.1.5 A Multinational Workforce: 'hang on, you are giving the briefs in the morning?'

I joined an arranged walk-around with a H&S advisor, a H&S representative from the client and the works manager in the area. I was in the back of the group walking with the client’s representative, Bill. As we walked through the site we passed an oncoming migrant worker, and Bill said: 'Alright mate, how you doing?'. The migrant worker passed without acknowledgement and Bill turned, shook his head and said to me 'I could have been saying anything'.

Another migrant worker approached and he again tried to engage to prove his point knowing what the end result would be: 'Alright big man, how’s it going?'. Again the worker passed without any form of acknowledgement. He again turned and looked at me: 'See that. It’s frightening, we can’t even communicate with these guys. The only way I could get him to stop would if jumped in front of him waving my hands all over the place.' I nodded in agreement, and then he added: 'This is the biggest problem the project faces, and it is not just the communication issues, it is the different working practices. The photos speak for themselves. We have guys hanging out MEWPS, working at height on beams not clipped on or tied to blue rope; and some of these guys are the supervisors... and you are like, hang on, you are the guys giving the briefs in the morning?'

Although there was a mixture of different nationalities, with the project being in the UK, it was being built with accordance to UK health and safety standards. Bill thought that as different nationalities had different acceptable working practices, that the standards expected were not being met. Unsafe behaviours had been caught on camera, and had led to gross misconduct dismissals. He said that this meant that there were ‘holes’ in the safety procedures, and if an accident occurred, it could be difficult to defend the prosecution. This issue was also discussed in the H&S department on several occasions. One of the advisors thought that: 'I think there are too many nationalities out there that aren’t 100% sure what they are required to do'; and that the workers were often very quick to pretend they didn’t understand when he intervened. He was of the opinion that sometimes
they knew what they were doing wrong, as he had stopped them before the same reasons, but were ‘playing ignorant’.

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In the communication of health and safety messages, supervisors were found to being key personnel in effectiveness and impact of the messages in research on the London 2012 Olympics construction projects (Finneran et al., 2012). In multinational construction teams at the QC this was especially the case, as often the supervisor (e.g. foreman) was also the interpreter of health and safety messages to the migrant workforce. Due to the language barriers, H&S advisors raised concerns that it was almost impossible to know what H&S messages were being communicated to the workforce by the interpreter and in what manner this was occurring. In other words, were the H&S messages being communicated with stressed importance, being mentioned by the translators to ‘tick a box’, or even being discussed at all. The process of checking what messages were communicated was very difficult as most of the H&S advisors only spoke English and the migrant workers did not. The H&S advisors also had concerns that the only way for the migrant workers to raise safety issues was through their supervisor. If they feared raising safety issues to their boss, then these concerns would never be highlighted. To try and improve this situation the SOR cards were translated into different languages.

During the site walk-around, it appeared that the migrant workers could not understand what Bill was saying, so continued to walk past with acknowledgement. McKay et al. (2006) also found that some migrant workers had such poor English they could barely understand what was going on. They also revealed that in the site inductions the migrant workers were smart enough to head nod at appropriate times, and to work out the induction was completed when others started signing the induction sheet. Pink et al.’s (2010) also found that ‘similar tactics’ were used by migrant workers, who also had understanding difficulties and displayed a fear of asking questions and engaging. The worst case scenario of these site inductions is that critical health
and safety messages are not communicated (Pink et al., 2010), which would seem to render the site induction pointless.

The other issue highlighted by Bill was the confusion surrounding different work practices which he believed left 'holes' in the safety management system. Research in Kuwait (Kartam et al., 2000) found there were different labour cultures, work habits and communication; and that workers were preoccupied with their problems and emotionally vulnerable. These factors can affect the attention and concentration of the worker, which may contribute to mistakes (ibid). The issue of different working practices is discussed further in section 7.2.

Bill's greeting was straightforward and the lack of response was a clear communication issue, however it could also be suggested that the language he had used initially was itself unclear. Variations in how communications can be phrased, different dialects and slang can all lead to miscommunication in practice – even in something as simple as a greeting. In an operation being carried out by a Romanian and a Scottish worker a small steel structure was being lowered onto the back of a trailer, and once it had landed it was light enough that they could push it into place if it was slightly off-centred. The Scottish operative took the lead and said in a very broad accent: 'Wee bit maire on the eirrse of it'. Or in other words, 'move the back of the structure a little bit more in the same direction'. In this case, the health and safety advisor laughed at this, because he knew there was 'no way' the Romanian worker would understand. Broad accents and slang words that are commonly used on construction sites add another dimension to the communication problem. This particular task was eventually resolved through the use of hand signals between the workers. Hand and body movements were used on many occasions to try and communicate, and this became known as the 'Funky Chicken Dance' to some of the H&S professionals, due to the extreme movements that they felt they had to go through in order to communicate.
7.1.6 Non-Verbal Communication: 'You feel like you are doing the Funky Chicken'

The extent to which these hand and body movements were being used became clearer during a discussion with one of the H&S advisors in the office. He said: 'you feel like you are doing the Funky Chicken' to try to communicate with the foreign workers. The funky chicken is a popular rhythm and blues dance where dancers flap their arms and kick back their feet in an imitation of a chicken. He was insinuating that in order to explain what he was trying to say he would need to use many body and hand symbols. He explained that on one occasion he noticed a welder was working without a fire extinguisher close by. He asked him: 'where is your extinguisher', but the operative did not understand. Therefore he started trying to represent the size of the extinguisher with his hands, pretending to pick it up and make the sound of an extinguisher hosing down a fire. However, this 'funky chicken' dance could not be understood by the operative. The advisor tried asking again, but this time using 'fire extinguisher' rather than 'extinguisher':

**H&S Advisor:** Where is your fire extinguisher?

**Operative (loudly):** FIRE?!

**H&S Advisor:** No No No!

The operative had understood the word 'fire' but not 'extinguisher', leading to confusion. The H&S advisor then tried his 'funky chicken' dance again and on this occasion the message was understood - the worker then went to get a fire extinguisher before returning to work. Such methods of communication became known as the funky chicken dance to some of the H&S professionals, and though the message could sometimes be communicated, it was far from ideal to have use a 'funky chicken dance' to communicate. They also believed that by using only hand and body movements it was harder to intervene in a positive manner, as the hand signals (e.g. stop sign or 'cut throat' symbol) could be seen as abrupt.

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One of the major barriers to successful health and safety management is the inability to immediately communicate via the spoken word on construction sites (Bust et al., 2008). Haslam et al. (2005) reported that worker participation in managing safety was important to generate ideas and to build ownership and responsibility. However, if the numbers of different languages spoken increase on construction sites, this will become difficult to achieve (Bust et al., 2008). Major stakeholders in the construction such as the HSE, Construction Confederation and the Construction Industry training board have prepared documents to assist construction companies with language barrier problems, which demonstrates that the migrant worker increase is a matter for concern (Bust et al., 2008). For example, in 'Revitalising Health and Safety in Construction' (HSE, 2003) it was recommended that in order to engage the workforce, proposals for tackling language and literacy issues need to be developed. In 2008, Bust et al. stated that this issue was now taxing H&S manages in the UK, and evidence here suggests there are still many challenges remaining.

Tutt et al.'s (2013a) ethnographic study found that migrant workers used their 'own language' to communicate through a mixture of hand signals and languages. This was as part of a conglomerate of communication methods that also included a mix of different languages and the use of mobile phones. The funky chicken dance was not part of such a communication method; it would instead only be used when there were no other clear alternatives, which occurred when there was not a translator present. There were also occasions when technologies such as mobile phone translation applications were used, but with limited success:

7.1.7 Technology Use: 'It just came out complete nonsense'
A H&S advisor and I were walking through the office building through different departments to reach the exit of the building. We were going on a site walk-around. I led the way as we began walking in single file, since passers in the corridor walked the other way. I heard one of the passers stop and talk to the H&S advisor. Instead of turning around, I just kept going and waited outside for the advisor. I expected it to be a very brief conversation but it turned out to be a little longer. As I stood outside the building, I took out my phone, opened my facebook app and scrolled down my newsfeed in pointless time-killing fashion. I heard the door opened and began to put my phone in my pocket expecting it to be the H&S advisor. I turned around to see one of the site supervisors I had met on a few occasions previously. 'Alright mate’ he opened.

**Me:** 'Alright buddy, how is it going?'

**Site supervisor:** 'No bad, you?' as he began pulling on his tight gloves around his hands

**Me:** 'Good mate, how are things been going out there?’

**Site supervisors:** 'Same old really, though we’ve had a few new boys join last week.’

**Me:** 'They settling in alright?’

**Site supervisor:** 'Yea they seem to be, a couple of them are foreign lads so there has been some communication issues, but other than that no problems really.’

**Me:** 'How you getting round it? I presume like the rest of us your Czech, Croatian or Spanish isn’t up to much? (with a cheeky grin)’

**Site supervisor:** 'Two cervezas por favor is about as far as I go! (we laughed) But yea, the translator usually, but other than that we just been having to use lots of hand and body signals... they seem to get the idea so far. I tried using an app on my phone to translate…'

**Me:** 'Any luck?’

**Site Supervisor** (shaking his head with a big grin): 'No mate, it came out just complete nonsense!...like hamburgers, sausages, washing powder!’

**Me** (I laughed): You must have been just as confused as each other!

**Site Supervisor:** Yea mate (shaking his head).
At this point, the door opened again. This time it was the H&S advisor and he joked: 'Sorry for being popular, you ready to get going?'. I said goodbye to the site supervisor and we began on the short journey to site.

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An existing ethnography (Pink et al., 2010) found that mobile phones have an ambiguous status on construction sites. Though in some contexts they should be switched off, they can also often solve and support workplace processes to support safe working (ibid). According to Pink et al. (2010, p. 651), they need to be understood in relation to the huge variety of trade and work tasks in construction. The potential for mobile phones to also help with the communication in multinational organisations gives more reasoning for researchers to understand their use in construction. Despite seeming of limited use in this study, in Tutt et al.’s (2013a) study, the use of the mobile phone was revealed as part of the fine-grained coordination of the work at hand. As the migrant workers created their 'own language' that was a 'conglomerate of communication methods: a mix of different languages, gestures, simple hand signals and mobile phone links that together coordinated a complex task safely'. In this study, the use of technology for communication appeared more successful away from the dynamic conversations of the construction site, where it could be used for document translation:
7.1.8 Technology Use: 'I am given what I think is a Google translate'

While standing outside a welfare unit on-site, I spoke to one of the Czech Republican operatives and English speaking interpreter, Michael. He explained to me that he had been having no problems working on this site, and joked that 'the only problems were on a weekend night because we like party'. Regarding safety, he thought that it was 'very different' in the Czech Republic and that 'they do not care' about safety. To demonstrate safety attitudes in the Czech Republic, he gave the example of PPE. He said that in Czechoslovakia they are very reluctant to purchase PPE and that if you do get safety glasses and they get damaged or scratched, you would have to buy another pair yourself.

Amongst his normal day duties he had extra responsibilities such as delivering the ten minute brief to the Czech workers or helping translate the safety climate survey to Czech from English. Unlike in the previous vignette he did not seem to have a problem with the additional translating duties. I asked how the surveys were being translated and he explained: 'I am given what I think is a Google translate' (he smiled)...

I asked: 'And how is that?'.

He replied: 'Emm no no not good, the sentences...' (he moved his hands around suggesting movement)...

I interrupted: 'are formed in a different way?'

He agreed: 'Yes yes, I think that makes the Google translate not good.'

While I could understand Michael’s translation, he sometimes needed help completing sentences and used other gestures to do so. This was an issue that had been raised previously by H&S advisors; that there were different levels of English being interpreted by the translators. This variation was being attributed to the lack of standardisation of English translation levels.
Michael explained to me that the Czech workers had been told they would be given three months minimum, and if they were good they would stay, but if not, they would be sent home. He said some of the workers were finding it tough away from their wives and girlfriends, and had considered bringing them over to the UK, but it was difficult to find suitable accommodation. He thought the accommodation was very expensive in comparison to home and that the place he was staying in was very small. He described it as about the same size as the welfare unit next to us, which was about 5 metres long by 2 metres wide; and that was for him and his work colleague.

The approach used to translate documentation was to use simple technologies to give a basic translation, and then the documentation would be given to a translator to improve/correct the language. Though Michael believed the translations were not very good, he was able to complete the translation process. Michael also gave insight some insight into the living conditions and the challenges of being away from home. This is likely to have been a reason as to why there was a high turnover of migrant workers. The extent of the situation could be indicated by the fact some migrant workers were staying in nearby hotels initially, as due to the high turnover, especially amongst new starters, this became more resourceful. Holding a stable job in terms of having a permanent contract and, when working, being in a fairly stable team is rare for a construction worker (Pink et al., 2010).

The GlazaBuild team in Tutt et al.’s (2013a) study had a mixture of migrant workers, and was deemed 'safe' since it topped a Site Safety League Table. Considering that stable groups have been linked to lower accidents (Gherardi & Nicolini, 2002; Mars, 2005), it is not implausible to think that since the majority of the GlazaBuild team had worked together on curtain glazing jobs in the UK for at least two years and held permanent contracts with the company, this stability was important for their success. Indeed Tutt et al. (2013a) recognised that this stability allowed for 'the ongoing development of local knowledge and
the fine tuning of interpersonal communication between team members'. The value of their teamwork was recognised at supervisor level, and they knew they would be working together on a subsequent project (Tutt et al., 2013a).
7.1.9 Communication Issues Summary

A multinational workforce made it challenging to communicate health and safety messages on this project, and when messages could not be delivered the intended way this represented a safety issue. Interpretations of messages, such as safety bulletins, lessons learned and posters, used valuable time and resources, (see 7.1.2 'I spend 40% of my time on 3% of the job’) which meant it was difficult to translate all communications into all languages required, as in 'If you pay me another salary' (7.1.4). There was a significant reliance on the construction workers who were interpreters as any communication to their teams (of maximum six) would have to be translated through them. Despite being a very important communication link it was very difficult to assess what safety messages were being passed on, or how it was being delivered (see 7.1.5 'hang on, you are giving the briefs in the morning?’). It was realised that there were different levels of translating abilities amongst the translators, and this lack of standardisation was raised as an issue by H&S advisors (see 7.1.8 'I am given what I think is a Google translate’). The one worker/interpreter in every six workers policy was inflexible due to: work locations (site and office), resistance from migrant workers to act as interpreters, interpreters being very busy as they had many additional roles (see 7.1.3 'They are being trained for everything’), holidays, illnesses and a high turnover. Therefore, there were times translators weren’t available and communications were made through a 'funky chicken dance' or many noise, hand and body movements (see 7.1.6 'You feel like you are doing the Funky Chicken’). This was far from ideal as it led to confusions and difficulties in intervening in a positive manner (for example, stop symbols can seem abrupt). The use of technology was tried to communicate on-site with very little success (see 7.1.7 'It just came out complete nonsense’). It was more useful for helping to translate documents, though still required a translator to complete the interpretation (see 7.1.8 'I am given what I think is a Google translate’).
7.2 Safety Challenges with Foreign Subcontractors

'How do we check competence when we don’t know what they are doing?'

FCBC Works Manager

2013
7.2.1 Introduction

The quote above 'How do we check competence when we don’t know what they are doing?' (7.2.11) refers to complications with monitoring the competence of a foreign subcontractor, who were using their own working system that wasn’t recognised in the UK. This was just one of the many additional and unexpected challenges caused from working with a foreign subcontractor in the UK. The following vignette introduces the following section by touching on unsafe behaviours that occurred and unsafe working conditions being ignored in 'Why don’t you up it then?...Em no cause it is unsafe' (7.2.2). One of the reasons for this was put down to cultural differences by the foreign subcontractor management, who acknowledged they had a different way of working that was ‘much quicker but less safe’ (7.2.3). 'The divide is much bigger than you would expect from a British workforce’ (7.2.4) explores a difference in the power distance cultural trait that came to light in this study. Challenges of having a high turnover are explained in ‘We are going back to square one’ (7.2.5) while the operative’s viewpoint on the management’s value of production and profit is revealed in ‘They are more concerned about the bank accounts’ (7.2.6). This value is also illustrated through the extensive claims from the foreign subcontractor in 'You wouldn’t believe it, they claim everything’ (7.2.7). In a construction meeting the foreign subcontractor were confronted by the principal contractor surrounding their value on production and profit, see ‘What does this tell us? That concrete pours are more important than safety?’ (7.2.8). Issues with planning and paperwork are revealed in 'Putting everything aside that has ever been said in this room... that does not ever happen again’ (7.2.9); and compliance issues are discussed in 'When will the new ladders arrive?’ (7.2.10). There were suggestions that the foreign subcontractor would have to be removed from the project, which led to an additional full-time H&S advisor being appointed, and some improvements, as described in ‘I turn my back and they are swinging from the lights’ (7.2.12).
7.2.2 Ignoring Unsafe Conditions: 'Why don't you go up it then?'... 'Em no ‘cause it is unsafe'

James, one of the H&S advisors, was going out to do a regular workplace inspection on a foreign subcontractor’s site, and I had the opportunity to accompany him. On his previous inspection he found that the design of a 21 metre work platform had been incorrectly erected. There were pins and bracing that were missing, misplaced or not clipped on, while four operatives were working at the top. He had to stop the works. James seemed surprised at the poor workmanship of the structure. In his experience, as well as making sure it is structurally sound, scaffolders pride themselves on everything being aesthetically pleasing with all bars perfectly straight or diagonal perfectly in place. At first a member of the subcontractor’s management staff wasn't happy that the work had been stopped. The H&S advisors explained why the work had to be stopped, but he still didn't seem convinced. Then an advisor cheekily asked, 'why don’t you go up it then?' to which a member of the subcontractor’s management conceded, 'no, because it is unsafe'. On this visit, James was hoping to see improvements. During this visit, and other future visits, I began to observe the subcontractor's workplace behaviours. It became clear their behaviours were different to that of the UK workers I had seen on the project. The workers appeared to be more tolerant to taking risks: they would often walk behind moving plant without being acknowledged by the driver, use mobiles while driving and the housekeeping was not the same standard as on other sites on the project. Though UK-based workers were also observed taking unsafe risks around the project, it was not to the same frequency as the foreign subcontractor’s workers. James, the H&S advisor, was also of this opinion.

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There appeared to be an acceptance of unsafe conditions amongst the foreign subcontractor and ways of working that involved taking extra risks. Possible reasoning for these behaviours are further explored through the following
vignettes which explore issues such as production pressures, power distance between management and operatives, economic disadvantage and fear for a loss of job.

7.2.3 Management acknowledgement: ‘much quicker but less safe’

James and I were slowly walking around the site, due to meet one of the foreign subcontractor’s management staff to go around the site with. James explained he wasn’t too hopeful someone would turn up, because they hadn’t showed on previous occasions. However, this time, Pedro arrived. James introduced me to Pedro, and they began chatting about production updates on the project. The conversation stopped as James went to investigate an issue he had noticed with one of the workers. While James addressed this issue, I had a chance to chat with Pedro. Pedro explained that he was enjoying the project and was grateful to be there, but admitted he knew his team would need to improve their safety practices if they wished to stay for the long-term. Following my further questions, he continued to say that they had been receiving severe criticism for their safety practices and ‘they were right’ to be criticised but it was very difficult to adjust their way of working. They were used to their way of working, a way he described as ‘quicker and less safe’. He further explained that they were doing their best to reach the safety expectations but it was not proving easy.

This opinion was reinforced by another member of the subcontractor’s management, Cristian some weeks later. Cristian had previously worked on construction projects in mainland Europe, but had to move due to a difficult economic situation in the country he was working in. He therefore came to the UK to work in a bar and learn English. After two years the opportunity arose to return to the construction industry, working on this project in the UK. When I asked if there was a big difference in construction safety between UK and his home country, he explained that: ‘the culture is undoubtedly very different’, that
higher safety standards were expected in the UK and that the codes were more detailed. He gave the example that in his home country in mainland Europe ‘a ladder is just a ladder’ but in the UK there are required sizes and specifications. He noted that in his experience the smaller projects were less safety conscious, and the closest he had come to UK standards was when he had worked in high-speed rail. Just like Pedro, he said the work on the jobs he had done in his home country was ‘much quicker than here but less safe’ and that they could do ‘a lift a day’ – a very fast rate. He did go on to say that though the way of working ‘is less safe’, it is not a ‘disaster’ and he had not seen any major injuries. Cristian had found it very stressful working on the project and even said that at times he enjoyed working in the bar in Brighton (England) more than working on this large construction project. He explained that sometimes he thought it was very frustrating working with the principal contractor, especially as the subcontractor was reliant on their equipment. Sometimes Cristian would have five men ready to work but the principal contractor would impose an action that they must do before the works could be carried. But this action, a safety requirement or other, sometimes did not require all five men, which meant a greater cost. Cristian seemed to think that the principal contractor did not seem to understand.

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The foreign subcontractor acknowledged they had a more productive but less safe way of working. They would take more risks to get the job completed, and believed this difference was due to differences in national backgrounds. Davis & Gibb (2009) noted that migrant construction workers had different perceptions of risk from their UK counterparts. This variation in risk perception could have contributed to the faster but less safe way or working. Bust et al. (2008) explain that people from different nationalities understand behaviours in different ways, which are informed through specific sets of cultural knowledge and conventions, which can lead to misunderstandings and health and safety issues. This appeared to be the case in this study, where the safety behaviours of the
foreign subcontractor were perceived as too risky by UK employees of the principal contractor.

The economic situation in the home-land of the foreign subcontractor was difficult. Management staff felt grateful to be working on the project, and had made significant effort to escape the poor economic situation by moving to the UK to learn English in hope of settling for work. At the time of this study, Eurostat (2014) revealed that the unemployment rate of the foreign subcontractor was over three times higher than the UKs. Economic disadvantage has been used to partially explain why there is disparity in injury rates by investigators (see for example Pransky et al., 2002). This is often associated with the 'need for a job'. For example, in a study by Roelofs et al (2011), Hispanic workers in the US felt that their only option in opposing unsafe conditions was to leave the job, rather than 'speak out' against these conditions, and that the 'need for a job' was often a factor in tolerating the unsafe conditions. Mullen (2004) further explains the logic behind this:

‘If employees find themselves in what is perceived by them as being a “good position” such that the pay, benefits, and hours of work are desirable, it becomes much more difficult for them to give the position up. This is closely related to the factor of perceived risks in which the individual compares the perceived positive and negative aspects of the job. If the positives outweigh the negatives, the individual is likely to retain the current situation’.

This could have been partly an explanation as to why unsafe conditions appeared to be more willingly accepted by the foreign subcontractor. Although ‘speaking out’ may have been influenced by the difficult economic situation, in the following vignette, a cultural difference that came to light in the study is discussed, which is a trait that makes subordinates less likely to ‘speak out’:
7.2.4 Power Distance: 'the divide is much bigger than you would expect from a British workforce'

A new H&S advisor for the principal contractor, Dan joined the project. Dan had experience of working in the UK and abroad, and could speak multiple languages so was logically covering the area where there were foreign subcontractors was working. The first major incident he had to deal with came soon after his arrival. An inspector from the client spotted incorrect use of a 'one tonne bag' - a bag designed to transport material and then once the material has been removed from the bag, it is not to be used again. These bags were being used to transport steel:

![Figure 21 - A one-tonne bag being unsafely lifted](image)

The bag had not been designed to carry the load, and hence could have split, which would have led to steel rods dropping onto the work site. Following this incident, Dan called a meeting with all employees from the foreign subcontractor. He 'dropped the f-word in three different languages - so they got the message', before the employees 'sheepishly' walked out. Interestingly, and unprompted, he explained to me that one of the first things he noticed was there was a clear divide between the workforce and the management staff. He said that this divide was 'much bigger than you would expect from a British workforce' but this was 'normal' and a 'cultural thing'. He expanded to say that the management could be seen to be by some as 'quite arrogant'. Previous fieldnotes had recognised that as well as a geographical gap between
management and workforce, there appeared to be little interaction between superiors and subordinates.

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In Hofstede's seminal work 'Cultural Consequences: International Differences in Work Related Values' (1980) he developed four different dimensions relating to culture: power distance, uncertainty avoidance, individualism/collectivism and masculinity/feminity. Although there have been debates and critics on Hofstede's cultural dimensions, his work has remained influential (Mearns and Yule, 2009) and it is accepted as one of the most convenient structures to use in empirical research (Seymen & Bolat, 2010). One of Hofstede's four dimensions, Power distance (PD) is related to how the hierarchal structure of the organisation is interpreted. Reason (1997) argues that an efficient’ safety culture can be realised through eager and active participation from employees, which would make a low PD culture a more convenient structure. According to Ali's (2006) findings, cultural traits included collectivism, feminism and higher uncertainty avoidance are positive with respect to safety. Aside from power distance, the foreign subcontractor's in this study had high values of these positive traits in comparison to UK national cultural traits. However, the foreign subcontractor acknowledged their approach was faster and less safe. Though cultural traits can have impact on safety decisions (Ali, 2006), this finding suggests that there are other more important factors that influence safety behaviours. This corresponds with Mearns and Yule's (2009) findings that more proximal influences, such as perceived management commitment to safety, exert more impact on worker behaviour than fundamental national values.

The foreign subcontractor's workers appreciated emphasise on safety, but thought the managers were less involved in safety for financial reasons. In Roelofs et al's (2011) study a similar conclusion was found; that Hispanic migrant workers in the US were found to being under greater pressure to work fast, often to assure supervisors' bonuses. The workers in Roelof et al's study also took responsibility for not taking safety precautions themselves and 'going along' with it - again a high PD culture trait. Power distance could have been a
partial explanation for the acceptance of unsafe conditions as workers are less likely to 'speak out' against the hierarchy. This cultural trait could also partially explain why there was a high turnover of operatives in this study; as workers were more likely to leave than discuss their safety concerns or other problems. This high turnover was frustrating for the safety management that were trying to change and improve safety attitudes and behaviours:

7.2.5 High Turnover: ‘We are going back to square one’

At the end of the meeting, the project manager of the foreign subcontractor spoke with Dan. He mentioned he had concerns with the slinger signallers that had arrived on site recently. He explained that they had been trained according to the project’s minimum demands but their way of working was not up to the same standards expected here. The H&S advisor suggested integrating some of the slinger signalers that had already spent some time on this project with the new arrivals. This was not the first time that there had been concerns with the slinger signalers. In late January, work had to be stopped because of ‘safety concerns with lifting operations’. This resulted in a toolbox talk delivered to all of the foreign subcontractor’s staff, which included the following passage:

'It was highlighted today that the slinger/ signalers although trained in how to lift a load are not communicating with the crane driver. Communication with the crane driver is essential, he should be told what the load is that is to be lifted, the approximate weight and where the load is to be deposited on the site... 'Failure to follow these simple guidelines will result in disciplinary action being taken against the offenders.'

One of the H&S advisors believed that the reason behind the recent slinger signaller issues and the latest near misses was that the workers were being pressurised to cut corners and save time, although he thought they would not raise it as an issue because they were scared. They were scared as some workers had been sent home for 'quality and production issues, but not for
safety'; and they were scared to communicate as their only method of communication would be through their interpreter, who was usually their boss. There had been a high turnover of operatives within the foreign subcontractor, and the H&S advisors had found this frustrating. Since, as one advisor put it: 'we keep going back to square one'. Or in other words, they kept going back to the level they started at and any safety improvements being made with the workers were getting lost.

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This vignette emphasises the potential fear amongst workers for losing their jobs, as some workers had already been sent home. Stable groups are linked with low accident rates (Mars, 2005; Gherardi and Nicolini, 2002), and within a multinational organisation the importance of a stable workforce appeared to have increasing importance for communication flows and adapting to the working practices expected within a new country. The stability of the migrant workers in Tutt et al.’s (2013a) ethnographic study was recognised as a key benefit.

Across the project, the high turnover and dynamic nature of the construction site did bring about other challenges. In one instance, a worker was caught jumping from MEWP to MEWP, a gross misconduct, yet the foreman didn't use any disciplinary action because the subcontractor was leaving soon anyway. The high turnover of migrant workers also raised some security concerns. For example, there was a group of ten Romanian workers who arrived to work in the summer of 2014. Two of which were removed from site very soon after their arrival because, according to the foreman, they weren't up to the required standard. Both the workers returned to site on a few occasions after their dismissal. This was believed as a desperate attempt to get their job back, though this raised concerns with the security department, who were worried about potential thefts. By November there were only two Romanians left, one of whom had an accident with his shoulder, but according to a H&S advisor, had struggled to communicate what was wrong with him.
Workers of the foreign subcontractor were primarily being sent home for production and quality issues rather than safety, suggesting these values were of more importance to the foreign subcontractor than safety. The recognition of the value the foreign subcontractor had on production and cost is demonstrated in the next few vignettes.

**7.2.6 Operatives View: 'They are more concerned about the bank accounts'**

On another visit, I had the opportunity to go up one of the structures being constructed by the foreign subcontractor, with a couple of their representatives and members of the principal contractor including Ben, a safety rep in the section. Ben was moved to work with the foreign subcontractor in the hope that it would help to improve their ways of working. Ben had worked with migrant workers before so said he knew what to expect. He thought the migrant workers on the project were ‘great guys’ but he did admit it wasn’t as enjoyable as working with the UK workers, due to the restrictions with language barriers. The vast majority of the migrant operatives did not speak English, but Ben seemed to think their English was improving. He said to me that the foreign subcontractor’s operatives thought it was great that the principal contractor was so concerned about their safety and they had never had anything like it before. He expanded to say that it wasn’t the workers that were resistant to the safety demands, but instead the foreign subcontractor’s management who *were more concerned about the bank accounts*. Though the migrant operatives were happy for improved safety methods he didn’t think their behaviour had changed to become more safety conscious – they were still used to their way of working. Ben cared about their safety and had reported a serious breach by four of the foreign subcontractor’s employees: a manager and 3 operatives had ignored a physical barrier and a red ‘do not use’ tag on the access stairs to a pier. This occurred directly after the ten-minute brief, in which the contents had been
created by the principal contractors H&S Manager in an attempt to improve their perceptions. This resulted in a safety re-induction of all of the foreign subcontractor staff and an official written warning for failing to adhere to the principal contractor's health and safety standards.

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As discussed in Chapter 5, production pressures were evident across the whole project, and can have adverse effects on safety performance. This appeared to also be the case for the foreign subcontractor, who had such a strong desire to work fast. The view at operative-level was that the foreign subcontractor had a high value placed on profits, sometimes at the cost of safety. Operatives also explained that the value on profits could be illustrated through the extensive claims that were being made:

### 7.2.7 Segregation between contractors: 'You wouldn't believe it, they claim everything'

One afternoon I was out with Tim, a H&S advisor, and he went to see Simon, an operative who had been working in his section alongside a foreign subcontractor. Simon had injured his hand recently and Tim wanted to see how he was. Simon said his hand was 'no bad', though it had swollen up recently after he carried a pump across the site. Tim strongly stated that he shouldn't be doing any work with his hand as it could aggravate it. Simon said: 'I ken (know), but needed another pump and there was no-one else to help'. It became clear that he was reluctant to phone someone else to help him and there were five operatives from the foreign subcontractor waiting for the new pump to be able to do their work. When the H&S advisor suggested he should have asked one of the other workers from the foreign subcontractor to help carry the pump, he explained he was concerned that would have resulted in a claim against his employer. He said: 'You wouldn't believe it, they claim everything'. I started to laugh, as it seemed ridiculous to me and Simon said: 'You may laugh mate, but honestly it is unreal'. He admitted that it was not out of ordinary for such
construction claims, but that these claims were more excessive than he had experienced. I asked what sort of things they claim and he gave me a recent example. He had been working with the foreign subcontractor on the concrete foundation. His duty was to create tie holes, and a worker of the foreign subcontractor was putting the tie rods in. It was taking him longer to create the holes than it was the worker to put the rods in. Therefore, the foreign subcontractor’s worker suggested that he would cut some tie holes as well to make the operation quicker. It seemed sensible and logical, so Simon agreed, but the end of the process the foreign subcontractor put in a claim based on the time taken per tie hole (extra work they weren’t contracted for). These incidents meant that he did not want to ask for help with the pump, so just carried it himself despite knowing he shouldn’t be carrying heavy items with his hand. According to the H&S advisor, the excessive claiming culture resulted in a change of the foreign subcontractor’s contract, which was likely to have been costly for the principal contractor. Following the change of contract, due to a restructuring, employees were made redundant, including the foreign subcontractor’s H&S advisor and an assistant manager. The conversation regarding the foreign subcontractor’s claim culture continued with Steve and James both acknowledging it could conceivably have been a ‘suicide bid’.

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In an ethnographic study by Rooke et al. (2004), they explained that claims are sometimes planned at tender stage and sometimes during the course of a project; and that the prevalence of claims within the industry comes from the high level of competition within the industry at the tender stage (Rooke et al., 2004). Claims caused segregation and friction between contractors and employees. These segregations were not helped by the cultural and language barriers. It has been noted in previous work by Loosemore et al. (2010) that these barriers can cause segregations, as many operatives did not make an effort to talk with workers of different ethnic backgrounds.
Both participants in the above vignette acknowledged that this could have been a suicide bid. According to (Greenhalgh, 2013, p. 4) suicide bids occur when tenders are at their most competitive. It is where a contractor submits a tender that is less than the actual cost to improve the chances of winning the bid (ibid). It is then hoped that the margin will be recovered during the construction phase of the project through variations and claims (ibid). This can result in poor services and debates over loopholes in the contract wording in an attempt to charge clients extra (Brown, 2011), or even the contractor becoming insolvent (Prior, 2011). It has been attributed to the financial collapse of UK companies, including construction companies Rok and Connaught in 2010 (Brown, 2011). During the late-2000s recession, the Civil Engineering Contractors Association acknowledged that suicide bidding had become ‘rife’ in the industry, but blamed the public sector procurement process for focussing on lowest price rather than best value (Prior, 2011).

The principal contractor recognised that the value placed on profits and production by the foreign subcontractor were hindering safety performance, and this was raised in the weekly construction meeting between the principal contractor and the foreign subcontractor:

7.2.8 Productivity over Safety: ‘What does this tell us? That concrete pours are more important than safety?’

The mood in the meeting room was tense. And it had been like this week after week. It felt very edgy, many kept their heads down, and at times there were strong flashes of frustration and anger. For well over an hour the foreign subcontractor would be ‘hammered’ for their failure to comply in various areas. During my first meeting, I sympathised with the subcontractor’s employees, though it was clear others had lost their patience with them.
The meeting revealed some of the attitudes of the foreign subcontractor’s management. One of the most revealing examples revolved around a simple safety design that had been requested for months. A basic safety design was required since there was a 450mm gap between the toe-board and the handrail, which meant if objects were dropped, they could bounce on the metal walkway and over the toe-board. Hence, the toe-board was not sufficient and the principal contractor suggested using netting. On one occasion a chamfer was actually seen resting on top of a toe-board, meaning it could easily fall over the side - totally defeating the toe-board’s purpose. This basic safety design had been requested for months without completion, yet when a temporary design change was needed for a concrete pour to commence, the design was ready within two hours. The foreign subcontractor’s project manager was asked directly in the weekly meeting: ‘What does this tell us? That concrete pours are more important than safety? Why can you not get us this safety design?’. The project manager replied that he could not confirm a date as it was in the hands of an external designer and out-with his control. This answer led to raised eyebrows, shaking heads and eye rolling as members of the principal contractor did not seem satisfied with the answer. They found this answer hard to believe, especially when it was possible to obtain a temporary design for a concrete pour within two hours. This perhaps suggests that the foreign subcontractor did not want to spend time and money implementing netting around the working platforms and did not perceive it as an urgent or important issue.

Eventually, the foreign subcontractor managed to implement netting around the working platform to catch any falling objects. A few weeks later, Ben, a H&S advisor, and I noticed that these nets had accumulated a lot of debris that had fallen, far more than you would expect for accidental falls. During the construction weekly meeting with the principal contractor and the subcontractor, which I was fortunate enough to attend, this issue was brought up. The principal contractor had concluded that the nets must have been used as ‘a bin’ rather than a protective safety measure (the net is only meant to be there to catch something if it accidently falls). A further design to reduce the
The possibility of falling debris was insisted upon the reluctant subcontractor in the meeting.

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The lack of action of unsafe conditions frustrated the principal contractor, and there appeared to be a lack of trust between the principal contractor and the foreign subcontractor, as the principal contractor did not believe their answers and excuses. In both the Latham (1994) and Egan (1998) reports, trust was highlighted as a major factor leading to the success or failure of construction projects. In more recent times, good health and safety trust was achieved on the Olympic Park project (see Healey & Sugden, 2012), and this was one of the reasons for the success of the project. The lack of trust made it more difficult to resolve health and safety issues, which was concerning when significant near misses occurred:

7.2.9 Lack of Paperwork and Planning: 'Putting everything aside that has ever been said in this room... that does not ever happen again'

Sitting in the construction meeting with a foreign subcontractor I learnt of a near miss that had occurred. It happened when a shutter over one tonne was propped on a concrete slab with use of a scaffold board and no design connection. In the meeting, it was highlighted that two months previously the foreign subcontractor had been asked to justify storing shutters that were lying on inclined slopes, and then this shutter storing recurrence transpired. The H&S advisor made it clear that this was completely unacceptable: 'Putting everything aside that has ever been said in this room... that does not ever happen again'.

There was no mention of this storage operation – used for cleaning the shutters – in the method statement or risk assessment. Written warnings were issued to the supervisor and slinger for not following the method statement and creating an unsafe working condition. All carpenters in the method statement for
installation and shutter cleaning were re-inducted, and the foreign subcontractor was asked to review their shutter storage. The H&S advisor said that 'this wasn’t the first time the design had been changed on site from the approved documents' and that if the 'design needs altered on site, they often don’t get re-paperworked and approved'.

After the meeting, I was chatting with one of the members of the management staff. With the near miss fresh in our minds, we began discussing the incident. He explained that they had been struggling with the paperwork demands since they started on the project, and it was one of the reasons they were removed from site during the trial construction period. Elaborating he detailed how in their home-land they have risk assessments or something similar but they were the job of the H&S advisor to do. While in the UK, the construction teams are to complete these, and they are to be aided and checked by H&S advisors.

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Considering the paperwork demands were felt to be excessive by many (see 5.1.5), it is perhaps unsurprising that the foreign subcontractor, who were unused to the volume, and that it was now their remit rather than a H&S advisor’s, were struggling to reach expectation levels.

As well as incomplete paperwork, there appeared to be a lack of effective planning. It is widely recognised that effective planning can have a major role in project success (Hare et al., 2006) including contributing to the accident prevention of site personnel (Duff & Suraji, 2000; HSE, 2003). Rigorous planning can improve productivity of even routine work, (Horner & Duff, 2001), and there is no reason why health and safety performance should not also benefit from the same rigour (Hare et al., 2006). The lack of effective planning could have been linked to the fact that there was delay in the foreign subcontractor’s project manager receiving his UK site manager’s training, as highlighted in the following vignette:
Complying with UK law: 'When will the new ladders arrive?'

Many of the other safety issues were slow to being closed out including ladders on the access to the piers, which did not comply with the UK regulations. The ladders were being bought in mainland Europe and shipped across to the UK because they were less than half the price of ladders in the UK. This issue was raised in October and new ladders finally arrived in March the following year. The principal contractor was also demanding the foreign subcontractor’s project manager to plan the works, a legal requirement that was overdue. It appeared the project manager was perhaps struggling to complete this task because he was not trained to the UK standards (his UK site managers training was not for three months). He explained that he didn’t know what other subcontractors were doing around them, so for example he didn’t know which areas were available for loading/unloading. The plan of the works was also questioned with regard to concrete pours as many concrete pours were happening in the dark.

In some countries it is preferable to have concrete pours in the dark because the ambient temperatures do not get too hot (e.g. Texas, USA see Ullman et al., 2004). However, this isn’t regarded as best practice in the UK (due to lighting) and had led to concerns from the principal contractor. The inadequate and lack of work planning, as well as the delay in adhering to the legal requirements, frustrated the principal contractor. In this case, a lack of safety knowledge and value on safety appeared to be causing issues. Dainty et al. (2007) noted that migrant workers limited knowledge of UK health and safety systems was an additional challenge. In the above vignette, it appeared this limited knowledge was causing difficulties with planning and compliance.
Even in cases where the foreign subcontractor appeared competent and had all the documentation to suggest so, there were sometimes still challenges:

7.2.11 Work System Complications: 'How do we check competence when we don’t know what they are doing?'

There had been several occasions where a foreign subcontractor had not reached the safety standards expected and work had to be stopped. However, there were even challenges when the foreign subcontractor appeared competent. During operations the foreign subcontractor planned to use their own scaffold system; a system they appeared competent in and had all the required documentation to communicate that they were qualified and competent. Yet this system was unknown to the principal contractor. Sitting in a meeting with the Works Manager of the area and a H&S advisor, the works manager said: ‘how do we check competence when we don’t know what they are doing?’. It is a legal requirement in the UK for the principal contractor to monitor and check competence. In the meeting, it was concluded by the principal contractor that to be able to continue, the foreign subcontractor would have to use a system that was used and recognised in the UK in order to monitor and check competence. Through further investigation into the system being used, it was actually found to be out of date (it had been superseded since tender) and hence the system had to be changed anyway. Had the system not been superseded and had to be changed because of lack of knowledge in the work system, it would have been very frustrating for the foreign subcontractor.

The different systems used also brought about other unexpected challenges. For example, the foreign scaffold system below (see figure 22) uses only two planks of wood, but UK law requires spacing of three. The system was also missing a hatch (at ladder access) and internal toe boards to stop objects falling below. Therefore, though acceptable in the foreign subcontractor’s home country, the system needed to be reconstruction to adhere to UK law, which caused
frustrations. In these situations, the planning and changes took valuable time and a solution was not always straight-forward.

![Figure 22 - A foreign subcontractor’s working system that is legal in their home-country but illegal in the UK](image)


The difference in working systems and practices caused unexpected safety issues. In an attempt to solve these issues, reduce unsafe behaviours, and improve the general safety performance foreign subcontractor hired a new full-time H&S advisor:

7.2.12 Unsafe behaviours: ‘I turn my back and they are swinging from the lights’

There were fears from the works manager within the section that there would be a major incident, and he had therefore requested as much coverage as possible from the principal contractor’s safety team. The problems and issues had been noted by the principal contractor’s project director, who told the foreign subcontractor in a meeting that they had to improve. The foreign subcontractor feared they could be removed from their contract due to these
safety concerns, hence the employment of their own full-time H&S advisor. The new H&S advisor felt like a ‘policeman’, having to watch the migrant workers very carefully. He even stated that when he turns his backs they ‘are swinging from the lights’.

The safety performance did make improvements following his arrival. Even from the weekly meetings this was evident - safety discussions had taken over an hour, but as items got closed out from week to week, the safety aspects could be discussed within 20 minutes. A key factor in this improvement appeared to be the liaison between the foreign subcontractor’s new H&S advisor and their management. The foreign subcontractor appeared to feel more comfortable taking advice from their own employee, rather than the principal contractor, especially when it involved cost. The foreign subcontractor at times seemed confused as to whether the demands from the principal contractor were minimum requirements or pushing for best practice. Improvements occurred; but had they not, it would have put the principal contractor in a very difficult position. If they were to remove the foreign subcontractor, the dismissal process would have to be flawless, which would require time to gather all the evidence and issue formal written warnings. The principal contractor could also not afford to wait too long to make such a decision, as if an incident occurred and an investigation concluded that the principal contractor were mismanaging the subcontractor - by giving regular verbal warnings with no action, the principle contractor could be liable.

Following the foreign subcontractor’s improvements, the project director of the subcontractor was asked if he thought their ‘new’ way of working was beneficial by one of the H&S advisors. He believed that it was not beneficial. Though he accepted that the productivity had increased because safety had improved (e.g. housekeeping, organisation, clean and clear site and not being stopped often for safety issues), he stated that he had to invest money into safety that he had not expected, and therefore the financial figures have more or less balanced. One example of safety increasing productivity related to the netting around the

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working platforms of the piers. The foreign subcontractor admitted they would spend more time cleaning nets (nets that were previously suggested as being used as a 'bin') than fixing gaps. Though his viewpoint may be correct from a purely financial viewpoint, the risks of having a severe accident on site would have decreased with improved safety performance.

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The difference in nationality brought negative factors such as: lesser safety training and supervision, inadequate safety knowledge, communication and literacy issues; all of which were also identified in a study by the CDC (2008) as contributory factors for 200 Hispanic workers deaths in the US. The appointment of a full-time H&S advisor improved supervision levels and the safety performance also enhanced. Though the H&S Advisor believed that during periods of lesser supervision, the workers would return to less safe methods of work. Attempts to change behaviour of the workers revolved primarily around yellow and red cards - a punishment. When a person providing the punishment leaves a situation, the unwanted behaviour is likely to return (Stangor, 2014). Hence, it is possible that the H&S advisor’s belief was correct and that workers were returning to a less safe means of work during periods of less or no supervision.

The appointment of the H&S advisor also improved trust levels on safety issues, as the foreign subcontractor’s management appeared to trust their own H&S employee with experience working in the UK to advise them on UK requirements, rather than employees of the principal contractor. This meant that H&S issues were resolved more efficiently, as before the arrival of the foreign subcontractor’s H&S advisor, this was a recurring problem.
7.2.13 Safety Challenges with Foreign Subcontractors Summary

The principal contractor believed that the foreign subcontractor's value on production and profits over safety led to unsafe acts being committed and unsafe conditions being ignored. The principal contractor raised this issue on several occasions, as the vignette 'What does this tell us? That concrete pours are more important than safety?' (7.2.8) demonstrates. This value on production and profits was acknowledged by the foreign subcontractor's management (see '7.2.3 much quicker but less safe'), and could also be demonstrated through the extensive claims being made (see 7.2.7 'You wouldn't believe it, they claim everything'). This value had filtered down the operatives who believed 'They are more concerned about the bank accounts' (7.2.6). The foreign management believed the difference lay culturally, and this was the way they worked. A cultural trait that came to light in this study, power distance, was greater amongst the foreign subcontractor than UK counterparts (see 7.2.4 'the divide is much bigger than you would expect from a British workforce'). Within this cultural trait, subordinates are less likely to 'speak out' against superiors. This combined with the poor economic situation in the migrant workers home-land, could have contributed to the acceptance of unsafe conditions and production pressures. The fear of being sent home was acknowledged in this study, and a high turnover amongst migrant workers was noted too. This was an additional challenge, as H&S advisor's believed 'we are going back to square one' (7.2.5), as new workers took time to adapt to communication methods and different working practices. The foreign subcontractor also took time to adapt to the paperwork demands, and a delay in organising UK site managers training, as well as segregation between subcontractors, meant that the foreign subcontractor's management had challenges with planning works (see 7.2.9 'Putting everything aside that has ever been said in this room... that does not ever happen again'). There were many other unexpected challenges that occurred, such as issue of monitoring competence in an unknown system and changing work systems in order to comply with stricter legal requirements (see 7.2.11
'How do we check competence when we don’t know what they are doing?'). These problems were more efficiently dealt with following the appointment of an additional H&S advisor, due to additional safety knowledge and supervision (see 7.2.12 ‘I turn my back and they are swinging from the lights’). It also created trust, as the foreign subcontractor’s management, were more willing to act on advice from their own H&S employee, rather than the principal contractor’s employees.
Chapter Eight:
Conclusions

‘Chance-takers are accident-makers’

Tim Mohn
Industry Principal

‘A man can fail many times, but he isn't a failure until he begins to blame somebody else.’

John Burroughs
Naturalist
8.0 Conclusions

Through the adoption of ethnographic methods – a rare approach in construction management research – this research study investigated unsafe acts on a large multinational construction project for almost three years. Accidents are complex chains of events, and unsafe acts have been found to be highly influential in the occurrence of accidents in previous research. Therefore, the fundamental premise of this study is that reducing or eliminating unsafe acts is crucial for safety improvement in the construction industry. Due to their nature, unsafe acts can be difficult to identify and understand, especially those made at management level.

8.1 Contribution to Knowledge

Considering that previous research has found that unsafe acts are a common contributor to accidents, reducing unsafe acts that occur in the construction industry would provide a significant step towards reducing accidents. Through the use of an ethnographic lens, unsafe acts that could have been less visible, became more noticeable, and it is hoped that the insights provided in this work can aid future construction projects towards best safety practices.

The aim of this research was to improve understanding and gather insights around unsafe acts committed on a large construction project at management level, operative level and in relation to a multinational workforce. In pursuing this aim, the original contribution to knowledge of this research is its rich, in-depth, ethnographic insights into the complexity of unsafe acts committed on construction projects. The key findings through these ethnographic insights are that: there was a blame culture, creating an environment that was very difficult to learn from; that there was significant production pressure and some cost-saving strategies that appeared to increase safety risks; some H&S rules were
viewed as excessive and inflexible by construction workers, and therefore at times used their own judgement about when to follow the rules; there were communication barriers with migrant workers, and the one in six translator policy used in an attempt to overcome this was far from ideal; and that the different ways of working that foreign subcontractors had meant they were difficult to manage, monitor and adjust. The findings could be explained by two underlying themes that appeared to prompt or contribute to the unsafe acts that occurred: These two themes are: the perceived compensation culture and tight financial budgets.

8.2 Research Questions

The research aim could be more specifically explored through the questions that this research has answered. The answers to these questions, which were outlined in the Introduction Chapter, and their theoretical and practical implications, are discussed below. The first three questions were discussed and answered in Chapter 5, Unsafe Acts by Management; the following two in Chapter 6, Operative and Supervisor Unsafe Acts; and the final two in Chapter 7; Multinational Workforces.

1. Do managers create an environment where accidents and incidents are freely reported and learnt from?

Managers on the project often made decisions and undertook actions that created a Person approach perception of unsafe acts. This was not a conscious decision and the management were unaware they were adopting a Person approach. This approach focuses on individual error and is inextricably linked to a blame culture (Reason, 2008). Ethnographic insights in this study highlighted many of the negative influences of a blame culture (See Chapter 5.1). Managers were seen to blame individuals for mistakes that led to incidents and accidents (see 5.1.1 ‘My gaffer is going mental’), and those involved in
accidents and incidents feared repercussions from superiors. This meant that accidents were under-reported, reported late, or were misreported with a cover up (see 5.1.8 ‘No way they would have recorded it as a near miss’; 5.1.9 ‘Well that is just the standard cover up’ and 5.1.10 ‘So much gets swept under the carpet it has become a trip hazard’). One of pressures which prompted this approach was the perception that there is a compensation culture in the industry. This has created a view that when an accident occurs blame should be attributed and a financial settlement paid. In Lord Young of Graffam’s report (2010) on the compensation culture, instigated by the UK Prime Minister, he stated the aim was to ‘free businesses from unnecessary bureaucratic burdens and the fear of having to pay out unjustified damages claims and legal fees.’ Five years later on, it appears that problems caused by the perception that there is a compensation culture are still very real. It is recommended that more attention is given to the eradication of the compensation culture within the industry.

The System approach is another way to perceive unsafe acts that is often seen as more desirable (see for example Dekker, 2006). It is more beneficial as it goes beyond the local event to find contributory factors in the workplace, organisation and system as a whole (Reason, 2008). In such an approach, it is easier to create a ‘no-blame’ culture, such as a ‘just’ or ‘open’ culture which is one of problem solving rather than blame. Hence it is recommended that construction companies make managerial decisions to adopt a System approach perspective on unsafe acts. This will create an environment where accidents are more likely to be reported and learnt from.

2. Do managers make decisions for scheduling or cost reasons which increase the safety risk on the project?

It was acknowledged at all levels throughout the organisation that the project was under production pressure, a factor that has been linked with accidents by many researchers (see for example Hinze & Parker, 1978; Hinze, 1997; Rundmo et al., 1998; Brown et al., 2000; Mohamed, 2002; Goldenhar et al., 2003; Seo,
The findings in 'They want the job done yesterday' (5.2.4) highlighted how works managers thought that the schedule and budget was too tight, and that risks were being taken to save time. Operatives also acknowledged that this pressure did filter down to them (see 5.2.3 ‘The phrase understood on-site is ‘just get it done’’), and that this led to risk-taking in order to save time. It was suggested that the tight budgets had prompted managers into making decisions to save costs on: equipment (see 5.2.6 ‘I'd never been set on fire in the last 25 years 'til you gave me a fire-resistant overall’), temporary structures (see 5.2.8 ‘You get what you pay for’), tools (see 5.2.7 ‘it kicks back at you like a fucker’), machinery (see 5.2.9 ‘i was ready to meet my maker’) and manpower (see 5.2.5 ‘like a fiddle string out there, just getting tighter and tighter’).

Tight budgets also initiated the appointment of cheap migrant workers from many different nationalities, which created additional challenges with communication and working practices (See Chapter Seven). Migrant workers have been found to being statistically a higher risk in previous safety research (see CCA, 2009; HSE 2011; HSE, 2012). Some participants believed that though the lowest price almost always wins the bid for the construction work, this does not necessarily mean it is the ‘best value’ (see 5.2.11 ‘we've got money for a Fiat Punto and they want a Range Rover’). The constraints on the budget appeared to have been driven by the initial bid, which was a ‘shock low price’ (NCE Editorial, 2011) at almost £300m less than the other competitor, and under the initial estimated range of cost for the project. Though it should be noted that some of the cost differences between FCBC and ForthSpan bids was attributed to different foundation designs and that FCBC used floating plant (see Hayward, 2012).

This research study strengthens the long held premise that cost and safety are related, and revealed that tight budgets likely lead to having to manage additional safety risks such as significant production pressure, cheap equipment and migrant workers. It is hoped the insights from this study can aid
construction tender bids on the safety benefits that may be being missed at the bidding stage. Hence, it is important construction companies and clients are informed of the additional safety risks associated with a tight schedule and budget, which can lead to strains on safety management.

3. **What are the challenges associated with trying to change behaviours through incentive schemes?**

Unsafe behaviours or acts are one of the main causes of accidents (see for example Heinrich et al., 1980; Salminen & Tallberg, 1996; Lingard & Rowlinson, 2005). As part of the behavioural safety program, the project had reward and incentive schemes aimed at encouraging more safe behaviour. It was found that forms of positive reinforcement such as ‘good practice’ SOR cards and green cards used for positive safety behaviours were not used as frequently as forms of negative reinforcement (see 5.3.4 ‘What about the green cards?’ ‘HR as well...if we get any’). Positive reinforcement is a powerful way to change behaviours (Vecchio-Sadus & Griffiths, 2004), though it was not formally recognised frequently on this project. The reasoning behind the lack of formal positive reinforcement was partially attributed to the ‘macho’ nature of the construction industry.

Some prize winners believed that they had not done anything special to win the awards (see 5.3.2 ‘I was just doing my job’). This meant that the value of the safety awards and prizes were demeaned, and that the safety awards were less likely to have the intended positive influence on employee behaviours. This problem is likely to have been created from the lack of nominations for awards (see 5.3.1 ‘Safety awards only matter if you are in Tower and Decks’), as some months there was a struggle for candidates. Following the research findings in this study, it is recommended that safety awards are only awarded to those that have gone above and beyond what it what is expected. They should primarily be distributed when merited and not because it is the end of a month.
There was some confusion surrounding the team awards. This arose from a high turnover of construction workers, as sometimes there were teams with many individuals who had not been in the team for the required award timescale (see 5.3.3 ‘but you can’t give one sweetie to one kid and not one to another’). To some extent, this meant that the team was divided, and it was not clear what the protocol was for such instances. It is hoped this insight can help construction companies when designing team safety awards to avoid feelings of confusion or ill-feeling.

Construction companies should also be aware of the dangers of contracts which incentivise production. For example, this study found that subcontractors that were on a ‘price’ for the job (rather than being paid per hour) appeared more likely to try to save time by taking risks (see 5.3.5 ‘they seemed desperate to keep going’). There was also evidence of informal incentive schemes, such as ‘Vegas Time’. These were undercover incentive schemes that rewarded workers for getting the job done quicker than expected (see 5.3.6 ‘it would be naïve to think it is uncommon’; 5.3.7 ‘they got paid a full shift for work that took two hours’ and 5.3.8 ‘what happens in Vegas, stays in Vegas’). Such schemes work on the same principle as ‘price’ contracts, where workers may be encouraged to take risks to save time, since they will be rewarded. It is recommended that construction managers are made aware of the dangers of such schemes, and that all incentive and reward schemes are thoroughly thought through in order to get the desired behaviour change.

4. Was there a confrontational nature on the project, and is this linked with unsafe acts?

It has been recognised that construction industry has a confrontational nature for quite some time (Newey, 1992; Smith, 1992), and this still appears to be the case (Loosemore & Lim, 2015). In this study, it was revealed there was confrontation against compliance with some of the safety rules, and in particular, the use of PPE. This confrontation meant that raising safety issues, or
having safety interventions were less likely to happen since employees shied away from any possible confrontation (see 6.1.1 ‘the tail is wagging the dog’). This meant that there were fewer safety communications, leading to a less safe environment. Some operatives that adopted a confrontational nature did not believe in some of the safety rules being enforced. This meant that some site rules would be continuously broken, and due to the operative’s confrontational nature, the rule-breaking would sometimes not be raised by their direct superiors. It would be beneficial for the industry if this confrontational nature was reduced or eliminated, as this would increase the likelihood of safety issues being raised and safety interventions being successful.

5. Do operatives routinely break PPE site rules and, if so, why?

As mentioned above, some of the construction workers thought some of the site rules were excessive and many of the construction workers wanted a more ‘common sense’ approach to safety. A ‘common sense’ approach is something that has been used by many small construction firms for some time (Vassie et al., 2000). The disagreement with the site rules led to a lack of compliance among site safety rules with many workers (see 6.1.2 ‘Encourage common sense’ and 6.1.3 ‘you couldn’t finish the job without breaking the rules’) admitting to using their own judgement when following the rules. This meant that there were some distractions ‘from the real safety issues’ as more emphasis was placed on getting operatives to comply with the ‘basic’ safety rules such as PPE compliance. The bureaucracy through rules and regulations was unpopular, lacked worker engagement, caused frictions and damaged working relationships. Many construction workers were not used to the rules and regulations, viewing them as excessive. They believed it was impractical to adhere to all the PPE rules constantly as, for example, glasses would sometimes get misty. It should be recognised that there are potential dangers with allowing operatives to have the power to be more flexible with the rules and undertake their own ‘on-the-spot risk assessment’ within a common sense approach. Some members of the site management acknowledged this concern, suggesting the
site rules were needed to protect site personnel (see 6.2.2 ‘You would be better off trying to learn about animals in the zoo’). H&S advisors were of the view that sometimes operatives broke rules because they simply did not want to wear PPE; rather than it being a safety benefit. While the dangers of allowing operatives to undertake ‘on-the-spot risk assessments’ are realised, it is recommended that there could be more engagement with the workforce on safety issues when planning future work tasks. Such engagement could make the workforce feel more valued as their views are listened to and could help explain the reasoning behind the rules. This could improve understanding of the rules that workers clearly disagreed with (see for example 6.1.5 ‘glasses cause more accidents than they stop’) and could also enable more flexibility of the site rules for specific upcoming tasks when assessing the risks.

The strict, inflexible rules and regulations were partially prompted from the perception that there is a compensation culture. This again suggests that reducing or eradicating the perception that a compensation culture exists will benefit the industry. As noted above, many operatives did not agree with the strict rules and regulations and admitted they sometimes used their own assessment as to when to follow the rules. From an organisational viewpoint, this could represent a positive aspect of the Person Approach, which attempts to uncouple individual unsafe acts from the organisation as far as possible. In this case, if any routine breaches of the strict rules led to an incident, the organisation would have distanced themselves from compensation claims. This may be appealing to the organisation considering the perception that there is a compensation culture. However according to Reason (2008), this positive aspect of the Person Approach is strongly outweighed by it negative aspects, including the likely adoption of a blame culture.

6. Do unsafe acts occur due to the work practices of different national groups of workers?
Different groups of nationalities had different ways of working despite all having to comply with UK health and safety legislations. This led to: conflicts on what was safe; 'holes' in the procedures; unintentional unsafe acts due to lack of knowledge and misunderstandings which could led to tensions between parties. Findings on a study on a foreign subcontractor (see section 7.2), found that the subcontractor valued production as more important than safety and they acknowledged their way of working was ‘...quicker but less safe’ (7.2.3).

Construction claims by the subcontractor were extensive and caused divisions between them and other contractors (see 7.2.7 ‘you wouldn’t believe it they claim everything’). This led to H&S issues when an individual performed tasks he shouldn’t have been doing, due to an injury he had previously acquired. He explained he was doing this because he feared that asking for help from the foreign subcontractor employees in the area would lead to a claim against his employer. Segregations between contractors also meant there were site safety planning issues with contractors working on the same construction site (see 7.2.8 & 7.2.9).

Adjusting to the UK and principal contractor’s standards of working was a challenge for many foreign subcontractors. This was a slow process that was being continuously hampered by a high turnover of migrant workers (see 7.2.5 ‘we are going back to square one’). A lack of trust formed between principal contractor and subcontractor meant that the subcontractor seemed unsure whether safety issues raised were for best practice or legal requirements, which meant delays occurred (see 7.2.10 ‘When will the new ladders arrive?’). The foreign subcontractor appointed a full-time H&S advisor and this improved trust issues and increased supervision (see 7.2.12). The trust issue improved as the foreign subcontractor appeared to be more comfortable accepting advice on safety costs from their own employee rather than from the principal contractor’s H&S advisors. Occasionally some of the foreign subcontractor’s standard working systems were not understood by the principal contractor, which led to issues with monitoring competence. At times, these systems were
even illegal in the UK, and had to be altered to comply with the law (see 7.2.11 ‘How do we check competence when we don’t know what they are doing?’).

These were types of unsafe behaviours that were occurring because of the differences in national backgrounds. Theoretically speaking, the challenges associated with having a multinational workforce in the UK construction industry are not well explored in the literature. These ethnographic insights add to theoretical knowledge on some potentially unexpected challenges. As the industry becomes more globalised, with employees from a variety of backgrounds working together, understanding this area will gather even more importance. It is hoped that these insights can help aid future cross-cultural construction projects.

7. Do unsafe acts occur due to communication issues between employees of different nationalities?

Appointing a nationally diverse workforce can create significant health and safety challenges with communication. Language barriers seemed to cause confusion and separations, make work less enjoyable, limit interventions and make it more difficult to improve behaviours through training. These issues resulted in additional resources and time-consuming activities including extra supervision, training available in other languages (or having interpreters) and having posters, signs, toolbox talks, ten minute briefs available in other languages.

There was a significant reliance on the construction workers who were interpreters as any communication to their teams (of maximum six) would have to be translated through them. Despite being a very important communication link it was very difficult to assess what safety messages were being passed on, or how it was being delivered. As discussed in Section 7.1, the one worker/interpreter in every six workers policy broke down due to: work locations (site and office), resistance from migrant workers to act as
interpreters, interpreters being very busy as they had many additional roles (such as a safety rep, first trainer etc.), as well as holidays and illness. Therefore, there were times translators weren’t available and communications were made through a ‘funky chicken dance’ or many noise, hand and body movements (see 7.1.6 ‘You feel like you are doing the funky chicken’). This was far from ideal as it led to confusions and difficulties in intervening in a positive manner (for example, ‘stop’ hand symbols can seem abrupt). The use of mobile phone applications and computer translation services (such as Google translate) were unreliable for on-site conversations and limited to basic safety document translations that needed the further work from interpreters (see 7.1.7 ‘it just came out complete nonsense’ and 7.1.8 ‘I think what I’m given is a Google translate’).

Theoretically speaking, these findings build upon previous ethnographic studies on safety communication with migrant workers in the construction industry. The mixture of migrant workers in GlazaBuild team (see Tutt et al., 2013a) was deemed ‘safe’ by being top of the Site Safety League Table. Considering that stable groups have been linked to lower accidents (Gherardi & Nicolini, 2002; Mars, 2005), it is not implausible to think that since the majority of the GlazaBuild team had worked together on curtain glazing jobs in the UK for at least two years and held permanent contracts with the company, this stability was important for their success. This was recognised by Tutt et al. (2013a) who stated that this stability allowed for ‘the ongoing development of local knowledge and the fine tuning of interpersonal communication between team members’. The high turnover of migrant workers and short period of work on the QC, in comparison to the GlazaBuild workers, is unlikely to have helped the situation.

In this study, migrant workers were initially an inexpensive option. However, they also presented a potentially greater risk, and significant time and resources were required to attempt to successfully manage the communication issues and different working practices. Bust et al. (2008) stated that it is essential the
effectiveness of methods such as translation of safety information, visual methods and the use of interpreters are assessed. In this study it was found that the use of migrant workers, who also acted as translators, was an inflexible and far from ideal approach that sometimes led to non-verbal methods in order to communicate. In some cases, it was also almost impossible to know what safety messages had been communicated to the workforce through the interpreters and in what way or manner this had be done. This left H&S advisors unsure whether some H&S messages had been communicated with stressed importance, quickly highlighted to ‘tick a box’ or not discussed at all. The use of translation techniques through phone applications and Google translate was unreliable for conversations on-site, but more useful for aiding the translation of safety documents. It is recommended that an alternative safety management approach to communication issues is attempted; though it is important for construction professionals to note that there is currently no clear solution to this complex problem.

8.3 Insights Gained: Underlying Themes

The aim of the research was to provide insights, and the research questions above helped to achieve these aims through these insights. As previously indicated, there were two key themes that appeared to prompt many of the unsafe management and operative acts that were undertaken. These two themes were the *perceived compensation culture* and the *tight financial budgets*. Below is a summary of the negative effects on safety of these two themes:

8.3.1 The Perceived Compensation Culture

- Led to fear of claims against the organisation, prompting excessive paperwork and (according to many construction workers) extreme and inflexible site rules.
- The vast paperwork was a drain on resources and created a ‘virtual safety world’ with paperwork rather than a ‘real safe world’.
• To some extent the fear of claims also discouraged accountability, as organisations appeared to fear potential claims against them for a wrongful disciplinary processes. Discipline against individuals would often depend on factors such as your position and who you worked for, which meant it was hard to create a level playing field, leaving feelings of injustice.

• The perception that the site rules were excessive led to a demand for a more ‘common sense’ approach, especially from those at operative-level. Operatives adopting a ‘common sense’ approach decided to sometimes use their own judgement about when to follow the rules, which led to rule-breaking, especially with the use of PPE.

• Frustration and confrontation with site rules meant that superiors sometimes shied away from enforcing rules to avoid confrontation.

• In a compensation culture, there is a perception that for every accident that occurs, blame should be attributed, which takes a step towards a Person approach and a blame culture. The perceived compensation culture in the construction industry makes it harder for construction companies to adopt a more desirable ‘just’ or ‘open’ culture, rather than one of blame.

• The blame culture led to a fear of making mistakes. This fear also meant that incidents and accidents were under-reported, reported late or misreported as workers tried to cover up mistakes.

• There was a fear with raising H&S issues to superiors.

• Tools designed for safety improvement, such as SORs, could be perceived as being used to blame others rather than raising issues.

8.3.1.1 Perceived Compensation Culture. So What?

The perception that there was a compensation culture appeared to prompt the unconscious adoption of a Person Approach perspective to unsafe acts. This perspective as far as possible uncouples the organisation from individual unsafe
acts. However, it is inextricably linked to a blame culture, where incidents and accidents were misreported, reported late or under-reported, creating an environment that was very difficult to learn from. The perceived compensation culture induced H&S rules and paperwork requirements that were viewed as excessive and inflexible. The vast paperwork requirements meant that significant time was spent on documentation rather than managing safety, and created a ‘virtual safety’ world rather than a ‘real safety’ world. The H&S rules were viewed by construction operatives as excessive, meaning that at times they chose to own judgement about when to follow the rules, essentially doing an ‘on-the-spot’ risk assessment. This was viewed as an unsafe act by upper management.

So what? The theoretical implications of this work suggests that it would be beneficial to the construction industry if further steps were taken to reduce or eradicate the perception that a compensation culture exists. This reduction or eradication should reduce the likelihood of the undesirable Person Approach perspective being adopted, reduce extreme paperwork demands and have rules that can be viewed as reasonably practicable rather than excessive and inflexible.

8.3.2 Tight Financial Budget

- Production pressure was recognised at all levels of the organisation and led to risk-taking in order to stay on schedule.
- Works managers believed the schedule was too tight, and acknowledged risk-taking occurred.
- Poor wages amongst some construction workers was a contributory factor to the high turnover on the project. This is an increased risk considering stable groups have been associated with low accident rates.
- In some areas there was a lack of manpower, which was raised in H&S meetings as a safety issue.
- Some safety equipment such as the safety boots were cheap, poor quality and not best practice.
• Some of the construction tools were low-priced, such as the red tag high vibration tools, which created additional safety management strains and risks.

• Some of the temporary structures were cheap designs and not best practice.

• Some construction machinery appeared to be poor quality with additional safety risks.

• A low-cost construction workforce was assembled including cheap migrant workers, which brought several additional challenges.

• Communication channels with migrant workers was a challenge, and it was hard to know what was being communicated and how it was being communicated.

• The high turnover made it even more difficult to channel successful safety communication and for workforces to adapt to expectations from a UK principal contractor.

• The one in six policy for translating was far from ideal and broke down on several occasions.

• There was significant reliance on migrant workers who were interpreters. They were key in passing on safety communications, and were given additional responsibilities because of their bi-lingual capabilities. Some migrant workers were happy with these extra duties but others were less co-operative, wishing to just stick to their construction job description.

• There was no standardisation on levels of interpretation amongst translators. This meant that translators on the project ranged from a basic form of English to being fluent.

• Different work practices amongst migrant workers of foreign nationalities led to confusion, frustration, unintentional unsafe acts and required time and resources to be spent on trying to solve unexpected problems.
• Some foreign subcontractors had faster but less safe ways of working and suggested it was a cultural difference.
• Excessive construction claims were made by subcontractors, creating segregations between contractors working on the same construction site.
• Some of the foreign subcontractor’s standard working systems were occasionally not understood by the principal contractor, which led to issues with monitoring competence. At times, these systems were even illegal in the UK, and had to be altered to comply with the law.
• Some employees believed that across the whole project financial restrictions meant that safety performance could not reach best practice levels and therefore there were additional safety risks.

8.3.2.1 Tight Financial Budgets: So what?

Tight financial budgets meant that there was significant production pressure throughout the duration of the project and many cost-saving strategies used. Previous research work has highlighted that due to competitive tendering contractors are encouraged to bid very low and that they can be discouraged from factoring in the cost of performing the work safely in their bids. This research work suggests that this still appears to be the case and the ethnographic insights have highlighted areas where cost-saving strategies are being undertaken: labour shortages, temporary designs, machinery, equipment and migrant workers. Some of these cost-saving strategies meant that there were additional safety risks and challenges. The management of migrant workers was particularly challenging due to different ways of working and communication barriers. The communication strategy of using one translator/worker to every six non-English speaking migrant workers was found to be far from ideal, as it was broken several times. While employing migrant workers remains an economically appealing approach, construction managers should be aware of the additional challenges that a multinational workforce can bring, and that solutions and methods used for overcoming these challenges were ineffective and problematic. Hopefully the
insights in this work can help aid future construction projects, but currently there is no clear solution to this complex problem. Significant production pressure was acknowledged at all levels within the organisation from directors to construction operatives. In an attempt to keep the project schedule on its critical path construction site managers would use undercover and informal reward schemes, which this study has named ‘Vegas Time’. While these schemes can improve relationships between site managers and operatives, they significantly incentivise production, potentially at the cost of safety.

So what? The tight financial budgets meant that there were additional safety risks. The theoretical implications of this work are that if occupational health and safety is appropriately factored into the procurement of projects, many of these risks will be reduced.

8.4 Limitations

It is important to consider the limitations associated with an ethnographic approach. Limitations that are often cited are: that ethnographic researchers choose what to record, have potential bias and that the researcher can only be at one place at one time. While these are limitations connected with an ethnographic approach, this study has attempted to reduce the effects of these limitations. The type of action that was recorded was explained as using Goffman’s (2005) idea of ‘following the action’. In this approach, ethnography is emotionally charged, uncertain and even risky; features that make it interesting and capable of delivering profound insights (Marshall & Bresnen, 2013). By explaining the type of action being recorded, the reader is aware that this choice could underplay the routine, patterned, more habitual and frankly more boring elements of day-to-day life within the organisation (ibid). In other words, the action that was chosen to be recorded was that of unsafe acts that occurred, rather than of the more mundane day-to-day aspects of life within an organisation. The subsequent analysis of this action or naturally occurring data
still undergoes a process of interpretation by the researcher. Hence according to Shipton (2013) it can be argued that all ethnographic data is ‘imagined or recollected’. This raises the question of researcher bias. In an attempt to reduce the effects of this limitation, this research used participant researchers (see 3.5.1.1). This meant that after the interpretation process was completed, the findings would be revealed to participants in the setting. Communication of these outputs occurred through informal discussions, formal presentations and sharing future paper publications. LeCompte & Goetz (1982) explain that this check of ethnographic interpretations is a method of approaching internal reliability. Another limitation is that the researcher can only be in one place at one time. In this study, the researcher travelled to the research setting between one and three times a week for almost three years. This meant that there were times when the researcher was not present in the setting. However, even if the researcher was continuously there, the setting was so large that it would still be possible to miss the action. Such as continuous approach of constantly being in the research setting would also raise the issue of ‘going native’. This limitation meant that the types of data being gathered were different. For example, it would depend on whether the researcher was physically there when an event of interest was unfolding, or was hearing about it later from an informant who was there. These different types of data were identified, categorised (see section 3.4.3) and were used to help triangulate findings. Another limitation of the work not related specifically to an ethnographic approach was that there were communication barriers between the researcher and some migrant workers. While this is a limitation, it is also a finding (see section 7.1) as many individuals struggled to communicate with non-English speaking migrant workers.

8.5 Recommendation for Future Work

This study has explored unsafe acts at various levels of a large construction organisation, identifying problems that should be further explored, and touched
on others that deserve further attention. The following recommendations for future work are discussed below:

- The industry's perceived compensation culture has previously been highlighted as having adverse effects on safety performance. This study has built upon this knowledge, providing insights on many of the problems this culture can create, and the unsafe acts it can prompt. Considering previous research has suggested the compensation culture is based on perception rather than reality (e.g. Lord Young of Graffham, 2010), future work should consider how the perception of the construction industry's compensation culture can be reduced or eradicated.
- There was a desire for more of a 'common sense' approach especially by those at operative level. Further research is required in this area to tend towards a definition of this concept in construction, and to identify the strengths and weaknesses of this safety approach.
- This study also revealed how tight schedules and budgets appeared to contribute to increased safety risks and initiated unsafe acts. It is hoped that these insights can help aid clients and construction companies during the tender bid and thereafter. Future work should investigate how the industry can begin to avoid these tight budgets and schedules in order to improve safety performance.
- Tight budgets make the option of appointing a multinational workforce more appealing. While migrant workers remain an economically sound strategy, further research is required in order to understand and find a safety management system that can help reduce or eliminate the additional risks posed through communication barriers and different working practices.
- This study found: there was an underuse of formally recognised positive reinforcement which is a powerful tool used in changing behaviours, and that both team and individual awards could not have the desired effect
(see Section 5.3). While it is hoped that these insights can help future construction companies when creating incentive systems, further research in reward and incentive schemes in construction would benefit the industry. This should help aid construction companies to reduce unsafe acts and behaviours.

• This study also found that undercover incentive-based initiatives were being used to reward workers for accepting overtime and for their productivity. In a similar way to the low ‘price’ contracts identified this could encourage taking risks to save time. While it is recommended that construction companies avoid such strategies, further work is required on the actualities of undercover systems in terms of their frequency, complexity and depth.

• As outlined in the ethics section of the methodology, alcohol and drugs consumption could have been further explored but due to the potential harm this could cause informants, this was not carried out. There were some references made to alcohol and drugs throughout the research study (see for example 6.1.1) and survey results revealed 31% of 475 participants thought that alcohol and drugs were ‘always’ a factor in accidents (see Oswald et al., 2013). This deserves further exploration, possibly through an alternative methodological approach.

8.3 A Final Methodological Reflection

Undertaking ethnographic research was a continuous learning process, and many insights were gathered from the experience of being an ethnographic researcher. Based on this experience, the sections below discuss the use of a rare approach in the construction safety field, and advice for future ethnographic researchers in the field. Below, in first person, the researcher reinforces three insights deemed important for ethnographic research success: establishing rapport, finding a role and being resilient.
8.3.1 Establish Rapport, Find a Role & Be Resilient

One of the greatest challenges with ethnographic research is settling in. In this study the majority of informants were very welcoming, but some did struggle to understand the purpose for me being there. They would ask ‘what is it you want to achieve?’, ‘what are you trying to get out of this?’, and ‘is there any way we could help?’ As ethnographers often just ‘rock up’ and see what happens, having an objective and clear answer to these questions was difficult, as I didn’t exactly know what I was looking for. While it was difficult to explain my purpose in full, the interest shown from participants in helping with my research project through such questions was a sign that rapport was being established. The importance of being able to establish rapport with informants and gatekeepers could not be stressed highly enough. The use of the six stage protocol outlined in Oswald et al. (2014) was not only useful for reducing observer effects, but acted as a guide to establish rapport. Close informants and gatekeepers can explain to you how things are actually practiced in the industry. They can help you to navigate the unfamiliar environment and to understand the social norms within the setting, which help you to ‘fit in’. For example, they can help explain to you the construction jargon that is used.

Figure 23 – Who is the real rubber duck?²

Rubber Duck Source: http://www.silentspring.org/tooclosetohome/portfolio/ugly-ducklings/
The ‘boom’ or the ‘jib’ on a crane, the ‘snotter’ to describe the molten ends that come off during welding, the ‘big red’ to describe a telehandler or the ‘rubber duck’ to describe a wheeled excavator (see figure 23). In this way, informants can serve essential roles as teachers or guides (Murchison, 2010, p. 89).

Becoming aware of and adopting the construction jargon is part of being an ethnographic researcher. For example, Baarts (2009) explained that she ‘gradually learned the construction jargon, including telling my workmates to ‘shove it up their asses’ when enough was enough’. Ethnographers are what Agar (1996) calls ‘professional strangers’ to the environment. This, as well as an initial lack of knowledge of construction jargon or perhaps understanding of the social setting, can mean that ethnographers are potentially easy targets for being ‘the butt of jokes’. This can be especially true in the construction industry – an industry that is full of ‘lads’. The white board below (see figure 24) shows an example of construction workers publicising mistakes by others. Being resilient to such comments is part of the industry. Similar to Sage (2013) and Shipton (2013), my ‘student status’ brought many presumptions among informants. Often jokes were made about the arrival of my next student loan, drinking beer and tough early mornings. My moderate participant observation approach also lent itself to light-hearted comments about being a ‘part-timer’. For example: ‘presume the student union must be closed today if you are in?’.

Figure 24- Needing Resilience: Workers joking about mistakes from the steel fixers and joiners
On one occasion a site manager was talking about his student son, and said: ‘The other day my laddy came back from a night out, was sick all over the kitchen and then fell asleep in the dog kennel... are you like that?’ Shipton (2013) found it ‘a bit annoying’ after a while but ‘played along with the lazy student jokes to keep things light-hearted’. The vast majority of the time the jokes, are just jokes, and should be kept light-hearted. Hence, it is important to be resilient, to be able to laugh at yourself, and not to get offended easily, especially when comments can become more personal. For example, the comments made suggesting laziness while I was on site: ‘all you do is just and observe’ or more explicitly and directly ‘what the fuck are you doing here?’ This question came early in my research, and made me realise the importance of finding a clear role that is understood by others in the setting. Following these comments I would make sure I would spend time at the research setting undertaking ‘computer work’ on my laptop, as well as just ‘participant observation work’ which involved observing and talking to participants. This helped to ‘fit in’ to the environment, by finding a role that was not out of place within the setting and reduced the ‘lazy’ perception that was being associated with participant observation work. To try and ‘fit in’ as much as possible, I tried to keep a consistent weekly structure, where I would be at the research setting on Tuesdays and Thursdays.

8.3.2 Ethnographic Methods as an approach in the Construction Industry

Ethnographic approaches are rare in construction management research despite being ‘a powerful way of providing the kinds of insight necessary for theoretically informing our understanding of construction practice’ (Pink et al., 2013). Upon reflection from this study, it is the opinion of the researcher that it can provide alternative avenues that can lead to knowledge that would have been difficult to acquire through other methodological approaches. For example, it is hard to imagine how the ‘Vegas Time’ concept revealed in this study could have been captured from a survey. Due to its richness, ethnographic
approaches can also provide deeper insights that what can be captured at the surface from other methodological approaches. For instance, had another study using an alternate methodological approach attempted to explore the migrant worker problem through accident statistics, the study would have found little difference in accident rates between foreign subcontractors and UK subcontractors. This could have indicated that the safety performance of foreign subcontractors working in the UK were similar to that of UK subcontractors. Through an ethnographic approach, many challenges and problems with a foreign subcontractor working under a UK principal contractor were captured (see Section 7.2). It is important to note that this is not to say an ethnographic approach is always the best approach to undertake; more that it is a very useful approach in the construction management research field, which can open avenues of knowledge that would be more difficult to do with other approaches.
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Appendix A: Shieldhall Tunnel Visit

Appendix A is linked to section 3.6.4 External Reliability or Generalisability. The following section communicates findings from the visit to the Shieldhall Tunnel Visit, when attempting to ‘seek fit’ research findings from the QC project.

Discussions relevant to findings in Chapter 5: Management Unsafe Acts

The findings relevant to Chapter 5 findings include Blame Culture, Production Pressures and Reward Systems.

*Blame Culture*

In the presentation some of the negative effects of a blame culture were communicated. These included a fear from operatives to raise safety issues, under-reporting, misreporting and late-reporting of incidents. During the following discussion, one labourer explained that they often had close friendships with their fellow workers, and they were ‘more likely to just tell him not to do it again rather than report it’. Another added that if it is not perceived as dangerous, then it wouldn’t get reported. Another comment suggested that there should be more opportunity to communicate incidents with humans rather than through paperwork. He stated: ‘by giving people a forum they were more likely to report incidents... sometimes we want to avoid the paperwork’.

Participants did not believe they had a blame culture at their project, but believed it was a problem within the wider construction industry, especially with the reporting of accidents.

In the questionnaire/survey, participants were asked: ‘From your experience in the construction industry, to what extent are accidents under-reported due to a fear of blame?’

- There were a few comments regarding the severity of the incident and the reporting tendency:
A site manager believed accidents tended to be reported but that ‘near miss reporting is definitely under-reported due to blame culture’. Another site engineer agreed: ‘depends on the accident scale, a lot of accidents will be under-reported.’ A sub agent also referred to accident scale, as well suggesting that minor cuts and scrapes were seen as part of the job. Another participant stated: ‘In my experience, small incidents where a person has directly done something causing the incident that might not be reported.’

- There were a few comments referring to fear and reporting frequency: An operative was of the view that ‘every time someone makes a mistake to do with safety they are removed from site. So the person that made the mistake could lose their livelihood’. Another participant stated that a fear of blame meant that accidents were typically under-reported to a significant extent, though he believed this project was well reported. This was reiterated by other participants, a project accountant and contracts manager who didn’t believe a blame culture was an issue.

- A H+S professional believed that under-reporting due to fear was a large factor that caused the discrepancies between labour force survey data and HSE figures. Another H+S professional thought that ‘blame culture is now prevalent due to no-win no-fee lawyers’.

Other comments included:

- A member from the client believed many issues were dealt at operative level within the team, and therefore weren’t reported at a higher level.

- Another comment echoed that of a point made in the discussion: ‘they do not want to get involved with paperwork, interview etc’ in a post incident enquiry.

- Another operative acknowledged that ‘a high percentage of minor injuries are not reported.’
*Production Pressure*

The presentation highlighted that at times production pressure had been affecting the safety performance on the QC project. In the following discussion, comments included: ‘cutting corners was common to save time’, ‘it is the number one factor in accidents’ and ‘the commercial team and the health and safety team should work closer together for planning’. One participant believed that: ‘paperwork slowed work down’ and that employees ‘aren’t going to wait for the paperwork to be updated before doing a task if a method statement needs changed’. He added that action cards could be used for dynamic changes there but they wouldn’t be changed to the original document, which meant the paperwork never matched what was going on.

In the questionnaire survey, participants were asked: ‘From your experience in the construction industry, how strong an influence is production pressure in causing accidents?’

- Site manager: ‘Production pressure definitely impacts on accident frequency and having time to work through issues is not always available, this is one of the strongest influences on accident frequency’.
- Contracts manager: ‘bonus system was removed within our company some time ago in an attempt to avoid this negative behaviour.’
- Site engineer: ‘if the labour force are ‘work proud’ and care about their work and have a good reputation then they are very liable to cut corners to ensure weekly progression.’
- An operative agreed ‘it does increase the possibility’.
- A sub agent stated: ‘I have seen production pressure create/cause unsafe acts but not resulted in accidents. Still happens.’
- Another participant agreed: ‘It is definitely a major factor as you would take a short cut you wouldn’t normally do.’
- One participant thought it was an influence in ‘40%’ of accidents.
- Client: ‘From a client perspective we do not condone unsafe work to improve programme position. Issue stems from unrealistic programming
by contracting teams and lack of flexibility with programmes to allow issues to be dealt with.’

- Industrial cleaner: ‘I think fear of falling behind can cause more pressure on foremen and filter down to workers. Take time to do the job correctly rather than worry about time.’
- Labourer: ‘Pressure makes you make mistakes.’
- Participant: ‘Significant pressure does result in corner cutting.’
- H+S professional: ‘This is an influence but also ‘personal’ time savers apply, not just management production pressures. Workers make shortcuts to suit themselves, similar to how we all carry too many shopping bags from the car to the house to reduce the number of journeys.’
- Another H+S professional believed it was ‘not too strong an influence.’

**Reward Systems**

The challenges outlined in the presentation included: the struggle for nominations, that some workers didn’t think they had done anything special to win the award and some areas cared more than others about safety awards. After this presentation, the H+S manager at the Shieldhall project explained that they had 'success cards' that they used for those that have gone above and beyond. Participants seemed to believe that they didn’t struggle for nominations, and another comment was that they believed changing the awards had helped keep interest in the reward system.

Participants were asked: *From your experience in the construction industry, what are the challenges with reward systems?*

- Site manager thought that making rewards relevant to behaviours was the greatest challenge, as ‘rewards driven by management may not be seen as relevant to site staff’.
- Project accountant believed it was nominations as ‘people considered they were just doing there jobs’.
- A site engineer agreed: ‘the view of I’m working, I don’t need a reward’.
• H+S Manager was also of a similar opinion: ‘rewards are not actually seen as rewards by persons receiving them’.

• PA/Office manager: ‘fairness and appropriateness’.

• Client employee: ‘unwanted recognition’.

• Industrial cleaner said: ‘personally think it should be to good practice not just for doing your job’, possibly suggesting that sometimes awards aren’t given for going above or beyond.

• A contracts manager made comment to rewards related with observations, suggesting some people may try to increase their chances of being rewarded, rather than completing actual observations.

• An operative acknowledged that rewards increased the use of cards: ‘It makes people put in cards when they otherwise not put them in’.

• Another labourer agreed: ‘some people try harder to win awards’.

• A H+S manager also believed this: ‘people make up issues to try and fill in observation cards’.

• Other participant views included: ‘Didn’t have big challenges about that’ and ‘Backing from the project and belief in them, as they work.’

Findings Related to Chapter 6: Supervisor and Operative Unsafe Acts

The topics discussed relevant to Chapter 6, included the perception that the H&S regulations were excessive, and the importance of foremen in communicated H&S messages.

Health & Safety Regulations

Presentation discussed that some employees thought H&S rules were excessive and more common sense was required. There was a range of comments in the following discussion ranging from: ‘they are necessary’ to ‘sometimes we seem to create rules, and there are too many and they sometimes counteract with others.’
Participants were then asked: *From your experience in the construction industry, how do you feel about health and safety site rules?*

- Site manager: *'Very important. Very good. Must be in place. Need to set expectations and benchmark.'*
- Project Accountant: *'Needed. Ensures consistent approach.'*
- Contracts manager: *'Issues and site induction and made clear and concise.'*
- Site engineer: *'No room for flexibility, H&S team don’t understand practicality of work – 80% of time.'*
- M/Operator: *'You do need it to make things safe.'*
- Sub Agent: *'Site rules can be excessive and sometimes counter-productive. The difficult position to any problem tends to be to introduce another procedure/rule. Very rarely are the effectiveness of the rules examined in my experience.'*
- Participant: *'Necessary and respected most of the time so far on this job.'*
- Project control: *'In place for a reason.'*
- Client: *'These need to be appropriate for the site.'*
- Industry cleaner: *'Most there for a reason, not everyone has common sense.'*
- Labourer: *'Sometimes they can be safe, but it is for our own safety.'*
- Participant: *'Necessary and well organised at this site. However, seen some sites where there are very little. Too elaborate will insight corner cutting.'*
- H+S professional: *'Very important but must be practical and 'thought through”'*
- H+S professional: *'As long as they are short 5/10 then I believe they are useful.'*

*Foremen*

The presentation discussed the communication challenges between departments and the importance of foreman in passing on the safety messages in the chain of communication as email correspondence moved from office based to site.
The question asked: *From your experience in the construction industry, how important do you think foreman are for the communication of safety messages to the operative?*

- Site manager: ‘Very. If they do not buy into and practice what is set out in inductions/procedures the workforce will not follow/copy.’
- Project Accountant: ‘Vital. Set the example. Enforce the safety message.’
- Contracts manager: ‘Extremely important. Lead by example.’
- Site engineer: ‘Very important – formal management training for foreman would be important.’
- Machine operator: ‘Very important.’
- Sub agent: ‘Foreman/site supervisors are the key link in getting the safety message delivered to the operatives. They deal with operatives on a day to day basis and can be the major influence on operative behaviour. By the same token if a foreman does not buy into this it would impact an operative behaviour.’
- Participant: ‘In my experience, shift handover is a key moment where communication is vital.’
- Office Manager: ‘I think foreman is vitally important.’
- Project control: ‘Critical – link between management and site. They are eyes and ears on site.’
- Client: ‘Critical. Also issue relates to lack of experienced foreman in the industry. A lot of the ‘old guard’ have left the industry.’
- Industrial cleaner: ‘Very, they are the communication between H+S officers and workers’.
- Labourer: ‘Very important as he’s the person we communicate with all day.’
- Participant: ‘Very important. Squad will follow lead.’
- H+S professional: ‘Crucial!’
- H+S Professional: ‘Key to communications. Start of shift briefings are very relevant.’
Findings related to Chapter 7: Multinational Workforces

Challenges related to communication and different work practices of a multinational workforce were outlined in the presentation. There was less discussion on this topic as less practitioners had experienced this. One comment was that both were challenges but he believed different work practices was a greater challenge than that of communication.

In the questionnaire/survey, the participants were asked: From your experience in the construction industry, what are the additional challenges with multinational projects?

- Site manager: ‘Consistency of procedures and corporate requirements. Different companies require different things which cause confusion. Does help knowledge share and getting new ideas in doing things.’
- Project accountant: ‘different languages/different cultures’.
- Site engineer: ‘language barriers, method of working, care for safety’.
- Operator: ‘Communication of the safety message.’
- Sub Agent: ‘Apart from language issues, different perceptions of what constitutes safe behaviour can be a major issue.’
- Participant: ‘Worked on a major multinational project. My experience is that site communication is not a major problem. On the park, guys get understood. On office though, I found people from multinationalities would react/fell differently about issues including H&S issues.’
- PA/Office manager: ‘As an ESOL teacher, an appropriate (tailor-made) course would be a first step. Evening classes could also be useful.’
- Project control: ‘How do you know for sure the message has got across? How do we check?’
- Industrial cleaner: ‘Language and working habits, better communication from the start of the project!’
- H+S professional: ‘language and cultural barriers, perception of risk’
Other Relevant Findings of note discussed
This section discusses other issues that were relevant to more than one findings chapter. These topics of discussion included the practical use of safety observation cards, and the perception that H&S paperwork was excessive.

The practical use of observation cards
The presentation outlined some of the challenges that had been associated with the use of observation cards. Five challenges were highlighted including:
observation cards can be used to blame others, they can be quota driven which leads to an excessive papertrail, a wide quality of observation reports, categorisation can be inconsistent and can be used as an excuse for not intervening.

When opened to the audience, the first comment from a participant stated: ‘I think you have hit the nail on the head with those five points’. Another member of the audience said that ‘I couldn’t have summarised it better myself’. From other comments it appeared the practitioners agreed that there was difficulty managing observation cards and these challenges were key challenges.

The open-ended survey question given to participants was: From your experience, what are the challenges with observation cards?

• Health and safety professionals highlighted issues persuading operatives that it is for their and their colleagues benefit, it is hard to get meaningful data, and there were issues with who and when observations should be closed out.
• A labourer thought the biggest problem with them was that they can get people into trouble.
• The welfare and industrial cleaner wrote: ‘some cards seem pointless as its just common sense. Example: crisp packet on floor. Pick it up, place it in bin.’
• A member of the client thought the perceived blame culture, potential for criticisms and unwanted recognition were all issues.

• A project controller thought the observer putting in the card was often not well received.

• A PA/Office Manager believed the length of time collating the information, and the time delays in producing summaries.

• One participant wrote: ‘becomes a problem when driven by quotes’ and that ‘quality of the observations were poor and that becomes a waste of time/money just processing the cards.’

• A sub agent wrote ‘that operatives see it as another thing/chore to do.’

• A Machine Operator thought ‘the challenges are to get the men to fill in the cards.’

• Site engineer agreed stating the biggest challenge was to get ‘enthusiasm of labour to fill out observations.’

• Another participant thought there was limited experience with observation cards.

• Contracts manager: ‘Reminding all that completing cards after action is still important’.

• Project accountant: ‘Excuse for not intervening’.

• Site manager: ‘Challenge is to avoid where they are seen as quota driven or to feed a blame culture. Both tend to reduce the effectiveness and the number of cards submitted. Negative behaviours tend to be reported much more than positive behaviours’.

**Excessive Paperwork**
The presentation outlined that some of the method statements were hundreds of pages long, and employees thought that H&S paperwork was excessive. Some believed we were living in a ‘virtual safety’ world where huge effort was put into having correct paperwork, but it wasn’t always being completed in the same manner on-site. The paperwork demands were a drain on resources, and it sometime wouldn’t be changed if unscheduled events occurred.
The first comment in the discussion was that an individual believed this was a problem ‘right across the industry’. Another said the method statement was trying to fulfil too many requirements and that it was incompatible. For example, it tries to explain to workers what was to be done, but also fulfil all the detailed legal demands. They believed it was a problem with this job currently, and there was some evident tension in the discussion between companies in the joint venture regarding this.

Participants were asked: From your experience in the construction industry, to what extent do you think H&S paperwork is excessive?

- Site manager: ‘Very excessive. More often than not in result of an accident a form is introduced’. It seems procedures are reviewed and added to but old forms still remain.’

- Project Accountant: ‘Yes. Site/company/corporate requirements.’

- Contracts manager: ‘Very subjective. We condense our paperwork to reflect the risks associated.’

- Site Engineer: ‘EXTREMELY excessive. No care for the environment due to large use of paperwork.’

- Machine Operator: ‘It is O.T.T (over the top) but it does need to be recorded’.

- Sub Agent: ‘This is a major problem across the industry. The answer to any issue always seems to be another layer of paperwork.’ This also means it is difficult and time consuming to change so sometimes doesn’t get changed as a consequence.’

- Participant: ‘RAMS become thicker and thicker. In my view this mainly due to the fact RAMS are used to cover increasing insurance requirements. It would also take much more effort (energy/time) if RAMS produced had to spend time refining which info/technical sheet they should include or not – much easier to stick everything inside the doc ‘just to be safe’.

- PA/Office Manager: ‘There is a great amount of paperwork’.

- Project Control: ‘70%’
• Client: ‘100%. RAMS are now required to fulfil too many requirements. The core aim – to inform the workforce of method and risks, seems to have been lost in the legal ‘arse’ covering exercise.’

• Labourer: ‘Too much to take in sometimes’.

• Participants: ‘I think is excessive due to legal responsibilities of clients and employers’; ‘excessive to dot I’s and t’s legally’; ‘many in the industry see MSRA as cover for the employee rather than protection of the workforce’.

• H+S professional: ‘Almost 100%. Driven mostly by enforcing agencies (HSE), Insurance industry and clients.’

• H+S professional: ‘Sometimes it may be excessive and not relevant to work being carried out. It should be shorter and more specific.’

Comment at the end of session by a participant: ‘I think you have highlighted a wide and good range of issues the industry is facing.’
Appendix B: Ethics Form

Research ethics checklist

This code applies to all research carried out in the CHSS, whether by staff or students. The checklist should be completed by the Principal Investigator, leader of the research group, or supervisor of the student(s) involved. Those completing the checklist should ensure, wherever possible, that appropriate training and induction in research skills and ethics has been given to researchers involved prior to completion of the checklist, including reading the College’s Code of Research Ethics.

This is particularly important in the case of student research projects.

If the answer to any of the questions below is ‘yes’, please give details of how this issue is being/will be addressed to ensure that ethical standards are maintained.

<table>
<thead>
<tr>
<th>1</th>
<th>THE RESEARCHERS</th>
<th></th>
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<tbody>
<tr>
<td><strong>Your name and position</strong></td>
<td>David Oswald, PhD Student</td>
<td></td>
</tr>
<tr>
<td><strong>Proposed title of research</strong></td>
<td>Intentional unsafe acts on a nationally diverse construction project</td>
<td></td>
</tr>
<tr>
<td><strong>Funding body</strong></td>
<td>EPSRC and Forth Crossing Bridge Constructors</td>
<td></td>
</tr>
<tr>
<td><strong>Time scale for research</strong></td>
<td>3.5 years (Oct 2012 – Mar 2016)</td>
<td></td>
</tr>
<tr>
<td><strong>List those who will be involved in conducting the research, including names and positions (e.g. ‘PhD student’)</strong></td>
<td>David Oswald, PhD Student</td>
<td></td>
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<tr>
<th>2</th>
<th>RISKS TO, AND SAFETY OF, RESEARCHERS</th>
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<tbody>
<tr>
<td><strong>Those named above need appropriate training to enable them to conduct the proposed research safely and in accordance with the ethical principles set out by the College</strong></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>Researchers are likely to be sent or go to any areas where their safety may be compromised</strong></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>Could researchers have any conflicts of interest?</strong></td>
<td>No</td>
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<tr>
<th>3</th>
<th>RISKS TO, AND SAFETY OF, PARTICIPANTS</th>
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<tbody>
<tr>
<td><strong>Could the research induce any psychological stress or discomfort?</strong></td>
<td>No</td>
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<tr>
<td>Question</td>
<td>Answer</td>
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<tr>
<td>Does the research involve any physically invasive or potentially physically harmful procedures?</td>
<td>No</td>
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<tr>
<td>Could this research adversely affect participants in any other way?</td>
<td>No</td>
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<td><strong>4 DATA PROTECTION</strong></td>
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<tr>
<td>Will any part of the research involve audio, film or video recording of individuals?</td>
<td>Yes - A focus group with volunteering participants aware they are being recorded for research</td>
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<tr>
<td>Will the research require collection of personal information from any persons without their direct consent?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>How will the confidentiality of data, including the identity of participants (whether specifically recruited for the research or not) be ensured?</td>
<td>Pseudo names will be used for participants when referred to in research reporting</td>
<td></td>
</tr>
<tr>
<td>Who will be entitled to have access to the raw data?</td>
<td>David Oswald</td>
<td></td>
</tr>
<tr>
<td>How and where will the data be stored, in what format, and for how long?</td>
<td>Stored in nVivo for the duration of the PhD</td>
<td></td>
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<tr>
<td>What steps have been taken to ensure that only entitled persons will have access to the data?</td>
<td>Password protected laptop</td>
<td></td>
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<tr>
<td>How will the data be disposed of?</td>
<td>Deleted</td>
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<tr>
<td>How will the results of the research be used?</td>
<td>For research publications and PhD thesis</td>
<td></td>
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<tr>
<td>What feedback of findings will be given to participants?</td>
<td>Presentation of results to FCBC (the contractor of the construction project that is the focus of the study)</td>
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<tr>
<td>Is any information likely to be passed on to external companies or organisations in the course of the research?</td>
<td>No</td>
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<tr>
<td>Will the project involve the transfer of personal data to countries outside the</td>
<td>No</td>
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### European Economic Area?

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<th>5 RESEARCH DESIGN</th>
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<tr>
<td>The research involves living human subjects specifically recruited for this research project.</td>
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<td>If 'no', go to section 6</td>
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<tr>
<td>How many participants will be involved in the study?</td>
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<tr>
<td>What criteria will be used in deciding on inclusion/exclusion of participants?</td>
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<tr>
<td>How will the sample be recruited?</td>
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<tr>
<td>Will the study involve groups or individuals who are in custody or care, such as students at school, self help groups, residents of nursing home?</td>
</tr>
<tr>
<td>Will there be a control group?</td>
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<tr>
<td>What information will be provided to participants prior to their consent? (e.g. information leaflet, briefing session)</td>
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<tr>
<td>Participants have a right to withdraw from the study at any time. Please tick to confirm that participants will be advised of their rights.</td>
</tr>
<tr>
<td>Will it be necessary for participants to take part in the study without their knowledge and consent? (e.g. covert observation of people in non-public places)</td>
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<tr>
<td>Where consent is obtained, what steps will be taken to ensure that a written record is maintained?</td>
</tr>
<tr>
<td>In the case of participants whose first language is not English, what arrangements are being made to ensure informed consent?</td>
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<tr>
<td>Question</td>
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<td>-------------------------------------------------------------------------</td>
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<tr>
<td>Will participants receive any financial or other benefit from their participation?</td>
</tr>
<tr>
<td>Are any of the participants likely to be particularly vulnerable, such as elderly or disabled people, adults with incapacity, your own students, members of ethnic minorities, or in a professional or client relationship with the researcher?</td>
</tr>
<tr>
<td>Will any of the participants be under 16 years of age?</td>
</tr>
<tr>
<td>Do the researchers named above need to be cleared through the Disclosure/Enhanced Disclosure procedures?</td>
</tr>
<tr>
<td>Will any of the participants be interviewed in situations which will compromise their ability to give informed consent, such as in prison, residential care, or the care of the local authority?</td>
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**6 EXTERNAL PROFESSIONAL BODIES**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>Is the research proposal subject to scrutiny by any external body concerned with ethical approval?</td>
<td>Yes</td>
</tr>
<tr>
<td>If so, which body?</td>
<td>FCBC (the contractor)</td>
</tr>
<tr>
<td>Date approval sought</td>
<td>10.5.12</td>
</tr>
<tr>
<td>Outcome, if known or</td>
<td>Approved</td>
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</table>

**7 ISSUES ARISING FROM THE PROPOSAL**

In my view, ethical issues have been satisfactorily addressed, OR

In my view, the ethical issues listed below arise and the following steps are being taken to address them.
8 Ethical consideration by School

The following section should be completed by the Head of School once the proposal has been considered by the School's research group.

I confirm that the proposal detailed above has received ethical approval from the School [* subject to approval by the external body named in section 6].

Signature [Signature] Date 11.6.15

* Delete as appropriate
Appendix C: Publications

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Oswald, D, Sherratt, F and Smith, S (2015) An Ethnographic Study of an Accident Investigation, Procedia Manufacturing, 3, 1788–1795
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DOING THE 'FUNKY CHICKEN' TO COMMUNICATE ON MULTINATIONAL PROJECTS

David Oswald\textsuperscript{1}, Fred Sherratt\textsuperscript{4} & Simon Smith\textsuperscript{1}

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\textsuperscript{2}Anglia Ruskin University, Bishop Hall Lane, Chelmsford, CM1 1SQ

An influx of migrant workers to the UK in recent times has meant the construction industry has had to adapt to nationally diverse workforces. In previous studies migrant workers have been highlighted as higher risk, and in 2007 the 25\% rise in UK construction fatalities was attributed to communication issues and poor working practices. This study used an ethnographic approach to explore challenges created by a nationally diverse workforce on a large civil engineering project (+£500m), with particular focus on communication issues. Communication barriers meant that safety inductions took longer and bilingual workers were distracted from their work to translate. There were times when no translators/interpreters were present, and to overcome communication barriers a 'funky chicken dance' was used; or in other words, communication through noise and many body and hand movements. The funky chicken dance was sometimes successful in communicating to workers but was far from ideal. National diversity also meant that different ways of working was perceived as acceptable, which led to 'holes' in the procedures and tensions between employees. This study found: that confusion and debate surrounding safe working practices led to errors and confrontation; that safety risks were increased due to the challenges associated with communicating health and safety messages; there was significant reliance on interpreters and no simple way to check H&S messages were being communicated through them; the policy of one worker and interpreter to every six was inflexible and far from ideal; that there was greater difficulty in assessing levels of competency and there was a high turnover of foreign workers.

Keywords: Communication, Construction, Ethnography, Migrant, Safety

INTRODUCTION

The expansion of the European Union has led to an influx of foreign workers into the UK from the A8 countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia). In the UK, it is estimated that approximately 88,000 (8\%) of the manual labour in the construction industry are non-UK workers (CCA, 2009), which has put pressure on the management of health and safety at a time when the UK construction industry was progressing relatively successfully (Bust et al., 2008). Though comprising of 8\% of the total workforce, migrant workers account for nearly 17\% of total fatalities (CCA, 2009). Owen (2007) attributed a 25\% increase in construction fatalities to communication issues and poor work practices following an influx in migrant workers; a claim which according to Tutt et al. (2013), needs to be unpacked in terms of research knowledge. This problem is not only found within the UK construction industry, with research suggesting the United States is facing a similar problem (Hare et al., 2013). Multi-national

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misunderstandings that occur can lead to health and safety problems, and therefore a new approach to health and safety management is required (Bust et al., 2008; Tutt et al., 2011). This paper aims to explore the challenges caused by a nationally diverse workforce on a large civil engineering project (+£500m).

**MIGRANT WORKERS**

The influx of migrant workers has created additional challenges to employers in the UK (Tutt et al., 2011). The injury rate of migrant workers in Australia has been found to being around twice that of local workers (Geraghty, 1979) - a finding consistent with Dong and Platner's (2004) work in the US, and statistical evidence from the UK (CCA, 2009). McKay et al. (2006) found that two-thirds of migrant workers received no health and safety training and the other third tended to have a short site induction that was often not understood or communicated effectively. The issue of understanding has been highlighted by Hare et al. (2013) following a study by Halverson (2003) in the US that found training did not result in reduced accident rates among non-English speaking workers. At least in the short term, language barriers are the greatest obstacle to the smooth integration of migrant workers (D’netto, 1997). Despite concerns regarding communication within the construction industry, Loosemore and Lee (2002) argue there has been an insufficient examination of inter-cultural communication problems within an increasingly diverse construction workforce and found significant communication problems with migrant workers. Communications difficulties have obvious implications including worker engagement and health and safety management (Hare et al., 2013). The importance of safety communications has been highlighted by many in safety literature, with researchers including safety communication in their assessments of safety climate (e.g. Mearns et al., 2003; Lin et al., 2008). Hare et al. (2009) believe that an essential starting point is to developing methods of effective communication and Bust et al. (2008) and Tutt et al. (2011) stress that a new approach to health and safety management is required for nationally diverse projects. Trajovski & Loosemore (2006) recommend that safety training is provided in a variety of languages following strong support for this by non-English speaking migrants in their Australian study. However, some concern has been highlighted that this may hinder foreign worker's integration and could discourage learning English (Commission on Integration and Cohension, 2007). The best long-term investment is considered to provide English language courses (Hare et al., 2013), though this approach may not seem appealing as according to McKay et al. (2006) most migrant workers in construction are employed in the short term.

**RESEARCH APPROACH**

To explore the complex context on a nationally diverse construction site, this study adopted a rationalist ontology and interpretivist epistemology. Within this theoretical framework, reason is the primary source of knowledge (Schuh & Barab, 2007) and there is a belief in the ability of human beings to explain and understand their social world (Uddin & Hamiduzzaman, 2009). Based on this paradigm, an appropriate methodological choice was deemed to be ethnography. Ethnography is an established qualitative method that often uses participant observation as a main research tool and is now emerging as part of a repertoire of approaches for understanding the construction industry (Pink et al., 2013).
For almost a three year period, the researcher was a member of the health and safety department on a large construction project. This provided a common interest with his closest informants, which can lead to assistance and engagement by informants in the study or project (Murchiston, 2010, p. 92). The H&S advisors each had different site areas in the project and the researcher used the advisors as ‘gatekeepers’ on the project. A gatekeeper can ease the passage of the researcher’s entry, make the surroundings and contexts more visible and understandable, and can introduce a range of possible informants (Pole & Morrison, 2003, p. 26). An overt approach was undertaken which necessitated the establishment of rapport with the participants, and helped overcome any reactivity such as the Hawthorne effect (see Oswald et al., 2014). A ‘moderate’ participant observer approach was adopted. This is where the participant observer has both insider roles in the research setting and other outsider roles. According to DeWalt & DeWalt (1998) this can provide a good balance of essential involvement and necessary detachment to remain objective. The researcher was often perceived by construction workers as a trainee safety advisor who posed little threat likely to be due to his youthful looks, age, small height and that he was often with safety advisors. As a student still attached to a university, the researcher assumed the role of a novice or an apprentice, a role which can be very productive (Murchison, 2010, p. 42).

Data was gathered from attending safety department meetings, conversations with project employees of different roles, going on organised ‘walk-arounds’ and viewing photos and safety observation reports. Hence the majority of the data was through recalls of discussions or informal interviews with informants. Due to language barriers, discussions with migrant workers were less common and have not been included in this study. The data was input, sorted and organised in computer software programme, nVivo. The inputted data was analysed using a thematic analysis approach, which gives the researcher a ‘bird’s-eye view’ of emerging patterns that could be drawn out (Aronson, 1994).

An iterative-inductive approach was undertaken, which is not unusual in ethnography (O'Reilly, 2009). This led to the research becoming progressively focused over time; a characteristic funnel structure that ethnographic research should have (Hammersley & Atkinson, 2007, p. 160). One of the focuses that emerged was the findings related to migrant workers and communication, which have been highlighted within this paper. The majority of migrant workers were grouped based on nationality, in an attempt to avoid inter-migrant worker communication challenges. For ethical reasons, and to protect the subjects within this study, names within the following passages are false.

**ETHNOGRAPHIC FINDINGS**

In the summer of 2014, the project was expecting an influx of different foreign workers on the site. The vast majority of operatives already working on the project were from the UK, supplemented by about a dozen operatives from Spain and Portugal, and a handful from Germany and Poland. The project had already had challenges with the Spanish subcontractor, operating with a mixed Spanish and Portuguese workforce (see Oswald et al., 2014b) and there had been conflict between the German and Polish operatives. Namely, that they would not speak to each other and displayed a 'hatred' for one another through aggressive intent and confrontation.
In a H&S department meeting, this issue was highlighted, with one of the items being discussed surrounding the nationalities arriving and 'if they all get along with each other'. The issue of communication was also discussed in detail with proposed 'multi-language signage', 'wallet cards to be developed with common statements' and 'black bands on hardhats for English speaking translator'. The translators or interpreters (these terms were used interchangeably on-site and in this paper) were required to translate text or spoken words and were usually foreign workers who spoke English as well as their own native language. Tutt et al. (2013b) found a similar conclusion, that the same person was required to translate (written) and interpret (oral), highlighting a lack of appreciation of the different skillsets. As well as translating, the interpreters had their normal roles and responsibilities as employees such as operatives, foreman or site engineers. In the following months, Croatian, Czech, Romanian and US workers arrived on site.

The rest of this section presents various short and stand-alone ethnographic vignettes that are split up by informant's quotations (in italics), which generate greater understanding on a phenomena under study.

'I spend 40% of my time on 3% of the job'
Communication had been highlighted in advance as being a potential problem, but it was a difficult one to resolve. There were challenges with not only direct communications between employees but there was also time spent and resources used with translations. For example, the H&S induction would take much longer, especially if there were three different languages present, and employees that were bi-lingual were also found to being taken away from their own work to be used as interpreters. One of the H&S advisors was being required to translate the briefs to the workers in the morning. He believed he was spending '40% of my time on 3% of the job'. During one of these inductions, one of the Spanish workers asked 'do you mean we cannot jump from man basket to man basket?'. This type of behaviour could be regarded as a gross misconduct on this project on the UK, yet his questioning suggests this was a behaviour that occurred in Spain.

'It would come out complete nonsense'
Issues with direct communication of safety issues, such as asking the workers to use ear defendant plugs were challenging. Such communications can sometimes be overcome with hand signals, though informants believed that they can be seen as being abrupt e.g. stop sign or 'cut throat' symbol. This can make it harder to make safety interventions in a positive manner. One operative said he had used a translator application on his phone, but 'sometimes it would come out complete nonsense'. This issue become more of a hazard when successful communication was under time pressure. For example, on one occasion there was a suspended load being lowered; the load started swaying and when this occurs operatives grab the tag line to stop it swaying out of control. At the point where the load began to sway, the worker nearby was of Croatian origin and spoke no English. He was being told in English to grab the tag line, but he didn't understand. This incident was marked as a 'near miss'.

'You feel like you are doing the Funky Chicken'
One of the H&S advisors' said 'you feel like you are doing the Funky Chicken' to try to communicate with the foreign workers. The funky chicken is a popular rhythm and blues dance where dancers flap their arms and kick back their feet in an imitation
of a chicken. He was insinuating that in order to explain what he was trying to say he would need to use many body and hand symbols. He explained that on one occasion he noticed a welder was working without a fire extinguisher close by. He asked him: 'where is your extinguisher', but the operative did not understand. Therefore he started trying to represent the size of the extinguisher with his hands, pretending to pick it up and make the sound of an extinguisher hosing down a fire. However, this 'funky chicken' dance could not be understood by the operative. The advisor tried asking again, but this time using 'fire extinguisher' rather than 'extinguisher':

H&S Advisor: Where is your fire extinguisher?
Operative (loudly): FIRE?!
H&S Advisor: No No No!

The operative had understood the word 'fire' but not extinguisher, leading to confusion. The H&S advisor then tried his 'funky chicken' dance again and on this occasion the message was understood - the worker then went to get a fire extinguisher before returning to work.

'If you speak to him in English, he will just say qué'

Bust et al. (2008) note that one of the remedial strategies adopted by construction companies is to have at least one English speaking interpreter present in each group, a policy that was implemented on this project (one English speaker in every six). However, there were suggestions that this policy was not being adhered to at all times. One safety observation report explained that there were two English speaking interpreters but the team was divided into three gangs. When non-English speaking workers were isolated this increased the safety risk on the project. For example, an incident occurred when two foreign workers entered an area, signed onto the briefing sheet without understanding it and went into the construction hoist. On the briefing it stated that the hoist was out of order. Neither of the workers were trained to use the hoist and ended up getting accidently locked inside.

A H&S advisor thought that the one in six policy attracted 'lip service'. The policy became strained due to teams being split between the site and the office. In some cases, the management, who were mainly office-based were the recognised translators. In this situation, a H&S advisor thought the policy was 'pointless'. He also added that a steel fixer had refused to wear the black band which identified him as a translator. The worker had explained that this was because his job description is as a steel fixer, not a translator. Though he understands English, the H&S advisor said that 'if you speak to him in English, he will just say qué?' and that 'he would be willing to do be a translator, if he was paid extra money to do so'. Tutt et al. (2013b) raised the question of whether the informal translation of health and safety documentation is asking too much of migrant workers, especially when they may not be paid for it and it has little long-term benefit on their upskilling, moving through the construction sector or other aspirations. This refusal to take on the interpreter role suggests that there were migrant workers of this opinion.

'They are being trained for everything'

The roles of the interpreters were extremely important since all health and safety communications had to go through them. In a H&S meeting this issue was highlighted by one of the advisors: 'we are relying on these guys to communicate important messages and we have little or no idea what they are saying or how much they are saying'. Since interpreters were often the only bi-lingual member of the
team, they would regularly be put through lots of different types of training e.g. first aid. For some positions, such as the safety rep role, operatives are meant to volunteer but interpreters would often be asked. A works manager believed that they have ‘too much responsibility’ and they are ‘being trained for everything’. One of the H&S advisors thought that though this may be the case, he was also aware that his opinion may be shaped by the fact he did not want to ‘lose his interpreter for training courses’. Communication from the top-down was a difficult task, even without the additional challenges a multinational workforce brings, and according to a H&S advisor there were ‘many rumours and Chinese whispers on the park’. Communication sent by email would still need to be briefed to the operatives since they have no access to a computer, and for the foreign workers they would need to be translated and briefed. Some information was not documented on safety bulletins for fear that the media would use it against the project, which would put more emphasis on communication channels in person and on the interpreters.

'Wee bit maire on the eirrse of it'
Ten Romanians had arrived to work on site and on one occasion I was observing a Romanian operative working alongside a Scottish operative. They were carrying out an operation where a steel structure was being lowered onto the back of a trailer. Once the structure had landed on the trailer, it was light enough that they could push it into place, if it was slightly off-centred. The Scottish operative was taking the lead and said in a very broad accent: ‘Wee (small) bit maire (more) on the eirrse (arse) of it’ or in other words, move the back of the structure a little bit more in the same direction. The British safety advisor was also watching this operation laughed because he knew there was ‘no way’ the Romanian worker would understand. Despite the lack of understanding through verbal communication, many hand signals were used to complete this job. An ethnographic study by Tutt et al. (2011) found that migrant workers used their ‘own language’ to communicate through a mixture of hand signals and languages.

Of the ten Romanians that came to work in the summer of 2014, two were removed from site very soon after their arrival because, according to the foreman, they weren't up to the required standard. Both the workers returned to site on a few occasions after their dismissal. This was believed as a desperate attempt to get their job back, though this raised concerns with the security department, who were worried about potential thefts. By November there were only two Romanians left, one of whom had an accident with his shoulder, but struggled to communicate what was wrong with him. Workers being sent home or leaving to be closer to home were not uncommon. Gherardi and Nicolini (2002) suggested that stable groups are linked with lower accident rates; hence such a high turnover can contribute to employee unsafety. In a study by Tutt et al. (2013) a multinational team including migrant workers maintained a stable group which 'allows the ongoing development of local knowledge and the fine tuning of interpersonal communication between team members'.

'They didn't know how to turn it on, where to clip on, how to lower it'
Despite having equivalent qualifications there did seem to be differences in the level of competence. According to Biggs & Biggs (2013) as, well as attitudinal and motivational factor, competence appears to have a direct impact on safety. After an investigation into qualification levels, one H&S advisor believed that some workers
had a higher qualification than what would be expected in the UK. Another H&S advisor thought the qualification levels of a group of foreign workers in his area were lower, and that it was evident. He gave an example that the workers had completed the MEWP training yet 'they didn't know how to turn it on, where to clip on or how to lower it' (because the emergency break was on). He also said that a worker was caught jumping from MEWP to MEWP, a gross misconduct, yet the foreman didn't use any disciplinary action because the subcontractor was leaving soon anyway.

Speaking with the workers, the H&S advisor was told they didn't want to come back because it is cold and they can wear shorts and trainers back home. There were also eight workers with no English speakers amongst them, breaking the interpreter policy.

'I've not got anything against the foreign lads but something needs to be done'

One morning, one of the H&S advisors received a call from one of the UK workers. It appeared he was aware that his call could have seemed vindictive, as he stated: 'I've not got anything against the foreign lads but something needs to be done'. He went onto explain that the Czech workers were driving into an area cars weren't allowed. The workers were coming in to pick up tools and leave but the UK worker thought that 'someone is going to get knocked over'. He also said that they are using plant, such as cherry pickers, that 'I know they don't have cards for' i.e. they are not trained to use. He claimed he had tried to speak to them, but couldn't get the message across, so the Czech workers were just getting in the cherry pickers anyway. The H&S advisor went into the area to investigate, and it was revealed that indeed some of the Czech workers were using machines that they weren't trained to use. Even though the work wasn't 'erratic', without deemed competence it could be indefensible in court, so the work was stopped. The training required only took four hours, and according to the HR department, they had requested training but never confirmed their attendance.

'The steel fixers have never used steel before'

There were some suggestions that the foreign workers were very inexperienced and had not worked in construction before. A factor, which according to Stranks (1994), can shape attitudes towards safety. A member of the H&S department stated that some of the 'steel fixers had never used steel before'. Although he believed they can learn, he saw this inexperience as an extra risk. Soon after the Czech workers arrival there was an incident when they were trying to make grout cement. The seemingly inexperienced workers tried to use five bags of grout and no water and 'flashed out' the grout pump. A site manager believed 'a lack of experience is the biggest problem on this job', that 'you have guys out of their depth' on such a large project and it was 'all across the board'.

'The biggest problem the project faces'

In October 2014, I joined an arranged walk-around with a H&S advisor, a H&S representative from the client and the works manager in the area. I was in the back of the group walking with the client's representative, Bill. As we walked past an oncoming migrant worker, Bill said: 'Alright mate, how you doing?'. The migrant worker past without acknowledgement and Bill turned and said to me 'I could have been saying anything'. Another migrant worker approached and he again tried to engage: 'Alright big man, how's it going?'. Again the worker past without any form of acknowledgement.
McKay et al. (2006) found that some migrant workers had such poor English they could barely understand what was going on, but in site inductions they were smart enough to head nod at appropriate times, and to work out the induction was completed when others started signing the induction sheet. In Pink et al.'s (2010) work, they described how 'similar tactics' were used by migrant workers, who also had understanding difficulties and displayed a fear of asking questions. In this study, since we passed migrant workers in a group, it may not have been as obvious that Bill was speaking to the migrant workers. This, a lack of understanding, and a fear of engagement as in Pink et al.'s (2010) study, could possibly have led to the lack of acknowledgement.

Bill believed the national diversity was 'the biggest problem the project faces'. Although there was a mixture of different nationalities, with the project being in the UK, it was being built with accordance to UK health and safety standards. Bill thought that as different nationalities had different acceptable working practices, that the standards expected were not being met. He said that this meant that there were 'holes' in the safety procedures, and if an accident occurred, it could be difficult to defend the prosecution. This issue was also discussed in the H&S department, with regard to rope access compliance and the various training levels. One of the advisors thought that: 'there are too many nationalities out there that aren't 100% sure what they are required to do'.

'The photos speak for themselves'
The different ways of working were a real concern, and there had been multiple unsafe behaviours that had been witnessed, with some being caught on camera. On the walk-around, Bill said 'the photos speak for themselves', and that 'we have guys hanging out MEWPS, working at height on beams not clipped on or tied to blue rope; and some of these guys are the supervisors... and you are like, hang on, you are the guys giving the briefs in the morning?!'. One of the Croatian workers had been immediately dismissed for one of these acts in what was deemed a 'red card' offence for gross misconduct. Communicating what was acceptable working practice, changing working practices and keeping consistency with this safety message was a real challenge.

'In some places CDM is just three letters on a scrabble board'
H&S advisors can get the opportunity to travel to different projects around the world. They were in agreement that there were different safety cultures throughout the globe, with one advisor stating that in 'some places CDM is just letters on a scrabble board'. Note that CDM stands for the Construction (Design and Management) regulations, which places legal duties in the UK. While the H&S advisors anticipated that there may have been different working practices with Eastern European workers, they thought there way of working with the US would 'have been quite similar' due to the 'connections' between the two countries e.g. English speaking. However, at the beginning there were differences that caused some friction. On one occasion, a H&S advisor had to stop the hot works being carried out by the American workers because, though they had basic PPE on, they did not have any protective overalls on for hot works. One of the operatives claimed that 'they had worked like this for 40 years' but the H&S advisor was of the opinion that it 'didn't necessarily mean they had been doing it right'. This stoppage caused a strong reaction from the American works manager who 'went mental' and was very confrontational. There was 'a couple
of months of tension’ whenever the advisor went into the works managers office but they have since found common interests, that has improved their relationship.

‘They are hungry, will work all the hours, will do as they are told and are cheap’
Though there were many challenges associated with a nationally diverse workforce, the migrant workers being employed were cheap. A member of the H&S department thought that employing many nationalities on this project had caused an extra risk. He believed when employing foreign workers people just see the ‘bottom line’. In other words, they just see how much it will cost them. His opinion was that ‘migrant workers have been employed because they are cheap’ but once they are here we have to spend resources: ‘to manage workers we struggle to communicate with, on workers that are inexperienced and on workers are not used to the UK standards and ways of working’. Speaking with an experienced civil engineer on the project, he said that you can understand it economically as they are ‘hungry, will work all the hours, will do as they are told and are cheap’.

CONCLUSIONS
A multinational workforce made it challenging to communicate health and safety messages on this project. Interpretations of messages, such as safety bulletins, lessons learned and posters used valuable time and resources, which meant it was difficult to translate all communications into all languages required. There was a significant reliance on the construction workers who were interpreters as any communication to their teams (of maximum six) would have to be translated through them. Despite being a very important communication link it was very difficult to assess what safety messages were being passed on, or how it was being delivered. The one worker/interpreter in every six workers policy was inflexible due to: work locations (site and office), resistance from migrant workers to act as interpreters, interpreters being very busy as they had many additional roles (such as a safety rep, first trainer etc), as well as holidays and illness. Therefore, there were times translators weren't available and communications were made through a 'funky chicken dance' or many noise, hand and body movements. This was far from ideal as it led to confusions and difficulties in intervening in a positive manner (stop symbols can seem abrupt).

Different groups of nationalities had different ways of working despite all having to comply with UK health and safety standards. This led to: conflicts on what was safe, 'holes' in the procedures, unintentional unsafe acts due to lack of knowledge and misunderstandings, which in some cases, led to tensions between parties. There was confusion in deeming competence of the workers and those that were not perceived satisfactory were sent home, which combined with workers being away from home and wanting to return, led to a high turnover. There were also suggestions that the workers lacked experience. Communicating acceptable work practices, changing work practices and keeping consistency throughout the project was a significant challenge.

Appointing a nationally diverse workforce can create significant health and safety challenges and problems. In this study migrant workers were initially a cheap option, but also a greater risk, and significant time and resources was required in an attempt successfully manage the communication issues and the different working practices.
The use of migrant workers, who also acted as translators, was an inflexible and far from ideal approach that led to a 'funky chicken dance' in order to communicate.

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‘YOU COULDN’T FINISH THE JOB WITHOUT BREAKING THE RULES’: COMMON SENSE SAFETY ON A LARGE CONSTRUCTION PROJECT

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Common sense safety refers to the practical knowledge and judgement developed by workers after on-site experience and has been employed by workers of small and micro construction firms for quite some time. This study, which is part of a wider PhD project, aims to explore whether the common sense safety phenomenon is present on a large infrastructure project (+£500m) in the UK. A mixed method approach was implemented through conversations with workers and analysis of qualitative and quantitative safety climate survey data. Considering that the majority of construction workers were employed from smaller subcontractors, it was found that several brought this ‘common sense’ attitude. This caused frictions against the stricter and formalised rules and regulations enforced at a larger organisation. Workers believed that they ‘couldn’t finish the job without breaking the rules’ and only wanted to use specific PPE for the tasks that required them. There was particular resistance with safety glasses, who some believed caused ‘more accidents’ than prevented.

In a safety climate survey, 62% of employees agreed they ‘sometimes use their own judgement about following procedures’; and 78% strongly agreed or agreed that ‘using common sense will keep me safe at work’. The supervisors had concerns about a ‘common sense’ approach and middle-management acknowledged that it ‘wouldn’t represent a defence in court’. However, they did not always challenge the workers for not adhering to PPE requirements. For many workers the bureaucracy courtesy of rules and regulations was a big change and one that was unpopular. This can cause frictions in terms of working relationships and meant that greater safety efforts focused on compliance rather than the ‘real’ safety issues.

Keywords: common sense, PPE, safety, trust

INTRODUCTION

In a report to the prime minister, Lord Young of Graffham (2010) highlighted that a growing compensation culture in the UK construction industry has had adverse effects on health and safety performance. This 'compensation culture' has created an environment where organisations attempt to eliminate all risks by all means, even though this objective is unattainable (Lord Young of Graffham, 2010; Gyi et al, 1999). The compensation culture attributes blame, and rather than accepting that accidents can and do happen, somebody must always be at fault and financial
recompense is seen to make good any injury (Lord Young of Graffham 2010). In a study by Aboagye-Nimo et al (2013), a ‘common sense approach’ was brought to light, where workers informally and freely assessed situations and subsequently came up with possible solutions on how to avoid or handle potential hazards on site, while abiding by the law. This informal health and safety management technique was found to be an effective and key advantage that small and micro firms had over large firms. The aim of this study was to explore to what extent such a common sense approach existed on a large construction project, where acknowledgement of this 'compensation culture' may have more significant influence in the goals of the safety management systems in place, than on smaller more informal sites.

COMMON SENSE SAFETY IN CONSTRUCTION

Although safety performance in the construction industry continues to improve, recommendations for further interventions are proposed regularly. For example, Choudhury et al (2008) recommended that as a best practice approach, construction organisations need to target eight areas: safety policy and standards, safety organization, safety training, inspecting hazardous conditions, personal protective program, plant and equipment, safety promotion, and management behaviour. Such excessive 'safety bureaucracy' can prove problematic, indeed, Cheng et al (2012) found that several safety management practices are perceived as complicated and adversely affect the project performance in the construction industry. However, avoidance of workers’ compensation costs have led to firms implementing excessive safety measures (Manu et al, 2013). In response to such concerns about excessive bureaucracy in safety, Lord Young of Graffham (2010) produced a report entitled 'Common Sense Common Safety', hoping to challenge this notion of safety red tape which reduces workplace production. The aim of the report was given as follows: "to free businesses from unnecessary bureaucratic burdens and the fear of having to pay out unjustified damages claims and legal fees. Above all it means applying common sense not just to compensation but to everyday decisions once again" (Lord Young of Graffham, 2010: 9). The report highlighted that the existing 'compensation culture' in workplaces must be eradicated in order for common sense to prevail. In agreement with Lord Young, Löfstedt, (2011) added that matters concerning ‘health and safety’ have become increasingly ridiculed and therefore gradually losing its importance in society. In the report, it was indicated that excessive bureaucracy and red tape requirements have been blamed for preventing individuals from engaging in socially beneficial activities, overriding common sense and eroding personal responsibility. The HSE also states that is imperative that workers and working groups disassociate ‘safety’ from ‘bureaucracy’ (HSE, 2003: 73). Thus more emphasis needs to be placed on genuine safety and concern for workers’ wellbeing if fear of the compensation culture is eliminated (Löfstedt, 2011). Managers of construction firms (especially large ones) have been found to be affected by the fear of the compensation culture the most as they have a larger workforce to cater for and as such, end up creating further strict rules and regulations to prevent such claims from occurring (Wamuziri, 2013).

Common sense is defined as the ability to behave in a sensible way and make practical decisions (Ludhra, 2015). Aboagye-Nimo et al. (2013) explain that common sense in the case of construction site safety refers to more than basic level of practical knowledge but requires experience and long term knowledge gained
through training, experience, experiential learning in new situations. They found a common sense safety culture to be prevalent among workers of small and micro firms. However, many construction sites and projects are known to be dynamic and involve large, small and micro firms at different stages of the project (Izam Ibrahim et al., 2013). Due to the fluidity of the activities on construction site, an overlap of cultures between strict and standardised safety measures and common sense safety may exist on large projects. This creates an opportunity for research of common sense safety operating alongside strict safety procedures within large project environments.

RESEARCH METHODS

The lead researcher employed ethnographic methods on a large construction project (+£500m). From October 2012, for a two and a half year period, an overt and 'moderate' participant observer approach was adopted, which can provide a good balance on insider and outsider roles (DeWalt and DeWalt, 1998). In this case the moderate participant observer approach involved being within the research setting one to three times a week during the core business hours. The lead researcher was affiliated with the health and safety department, which led to the health and safety advisors being 'gatekeepers' for their different work areas on the project. A gatekeeper can ease the passage of your entry, make the surroundings and contexts more visible and understandable and introduce a range of possible informants (Pole & Morrison, 2003, p. 26). The researcher was often perceived by construction workers as a trainee safety advisor who posed little threat likely to be due to his youthful looks, age, small height and that he was often with safety advisors. As a PhD student still attached to a university, the researcher assumed the role of a novice or an apprentice. Lofland (1971) describes this as being an 'acceptable incompetent' and Murchison (2010, p.42) states that ethnography can be very productive if the researcher assumes the role of an apprentice (Murchison, 2010, p. 42). Following previous research about the 'common sense' phenomenon, the lead researcher explored the data that had been gathered through conversations with construction site operatives and management (supervisors, foreman, works managers and site engineers) and from a safety climate survey that had been conducted on the project. The survey was administered by an external consultant, comprised of 128 questions, took around 15-20 minutes to complete and had 475 respondents. Of the respondents, 92% were male, 55% labour force, 45% supervised others and 38% have less than six months on the project. The surveys had a mixture of 5-point Likert scales (strongly agree, agree, neither, disagree, strongly disagree), unbalanced 4-point scales (always, sometimes, rarely, never), 3-point scales Likert scales (high, medium, low) and forced choice ‘yes’ or ‘no’ questions. Such a mixed-method approach is rare in construction safety research (Zou et al., 2014) but it is argued by Abowitz and Toole (2010) that it can lead to improved validity and reliability of research outcomes. For this study, which is part of a wider PhD, a mixture of quantitative and qualitative findings was used for triangulation, one of the three approaches to mixed-method research (Bryman, 2008). This research concentrates on findings relevant to 'common sense safety' rather than 'common sense health and safety'. Hence, safety issues, rather than health issues are discussed.
SAFETY CLIMATE SURVEY FINDINGS

This inductive study, which is part of a wider PhD project, highlights the key findings on a large construction project. The following section below presents and discusses on results of a safety climate survey. The next two sections are in first person and involve ethnographic conversations with workers from two levels (operatives and middle management).

In March 2013, a safety climate survey was conducted by an external consultant. The following survey results strongly suggests the presence of a common sense phenomenon: 75% strongly agreed or agreed that 'my own experience will keep me safe at work'; the majority of worker's 'sometimes' (62%) 'use their own judgement about following procedures (always, 10%; rarely, 18%; never, 10%); and 78% strongly agreed or agreed that 'using common sense will keep me safe at work'. When asked if workers would challenge a workmate for no gloves, 56% said 'always'; for no eye protection, 62% said 'always'; for use of a mobile phone in an unsafe place, 58% said always. Along with speeding (54% always) and not clearing up (58% always), these five acts, out of a total of 19 acts, were the least likely to be challenged on site. This perhaps suggested these rules were questioned by workers or not perceived as important as others. The final open-ended question in the survey was 'how do you think we could improve the safety on this project?'. The following answers were related to common sense safety:

'Practical common sense Health and Safety goes out the window to protect persons by generating an exhaustive paper trail. Critical factors like competence go out the window and instead irrelevant rules are enforced'

'Not presuming the next one is a hillbilly but prepare the risk assessment with more emphasis on the existence of common sense.'

'Common sense approach required by safety team'

'Encourage Common sense'

'Everybody uses their common sense including safety advisers'

'Give people more common sense.'

'Use common sense and discretion.'

'Common Sense'

'More common sense approach. Client does not necessarily have the experience to determine what safety measures we as experienced contractors should employ.'

'A more proactive approach is required. Make the workers apply common sense and judgement rather than drilling into them that everything is safe as they take their eye off the ball.'

'Common sense of plant and equipment usage. Awareness of safety. ' 

'Make the workers apply common sense and judgement rather than drilling into them that everything is safe as they take their eye off the ball.'
'Look at the bigger picture. Gloves and glasses are not always the answer. Try looking at weather conditions, management, experience, foreign labour language barriers and most of all, common sense'

The statistical findings suggest that workers believed in a more common sense approach and sometimes use their own judgement when following procedures. The final open-ended question explored how workers believe safety can be improved, and the evidence suggests that there was desire for a more common sense approach. To further explore the rationale behind these suggestions, a fine-grained ethnographic approach using participant observation was undertaken. For ethical reasons, all names within the following ethnographic passages are pseudo-names.

ETHNOGRAPHIC FINDINGS: THE OPERATIVES VIEW

The following findings are from discussions with site operatives on the project. The section bold sub-heading quotations represent the beginning of a new ethnographic vignette.

'You could not finish the job without breaking the rules'

One afternoon on site, I noticed there was a discussion taking place between one of the construction workers, Paul and a safety advisor. Being curious, I approached to realise that the safety advisor was asking Paul to fasten the crotch-strap for his lifejacket. Paul proceeded to do it but wasn't too happy about doing so, suggesting that the safety advisor 'didn't know all the positions he needs to get into to' and that the crotch-strap can often get caught on things, which is 'a hazard'. Once the crotch-strap was fastened and the safety advisor explained the reason for the crotch-strap being there (to stop the lifejacket not going over your head when it inflates on water impact). After the safety advisor had moved on, I got the opportunity to speak with Paul, who I had met a couple of times before. I asked him how he was getting on and he smiled and said he was 'not bad, just avoiding trouble'. I laughed and said that it 'looked like he was causing safety some trouble', to which he laughed and then responded:

'Yea mate, but you have to admit, Health and Safety is a bit of a joke at times - it goes too far. You wouldn't be able to finish the job without sometimes breaking the rules. You just need to use your own common sense as a risk assessment sometimes... For example, sometimes your gloves are a hazard. They can get stuck on things. So if you're in an area where they might get caught on thing - take them off. Also, your glasses, if they steam up so you can't see clearly - take them off. The other day I was in a confined space with limited mobility and my helmet was restricting vision and getting in my way, so I took it off.'

I asked: 'but what if you trip in the confined space and smack your head?'
Paul replied: 'well that is your own stupid fault'.
I said: 'But everyone makes mistakes now and then, no?'
Paul: 'Yea there is human error, but I've been in construction 40 years and not had a problem.'
I then asked: 'if he did see someone without an item of PPE on would he challenge them.'
Paul: 'Na, its nout (nothing) to do with me'.
The conversation with Paul was enlightening, and not an unusual opinion amongst construction workers on this project. Paul believed that wearing PPE all the time was too generic a rule for all situations, and that sometimes the rules needed to be broken. There were multiple occasions where workers were found not to be wearing their PPE, and this was causing issues with the safety advisors as they constantly had to remind workers to wear their PPE. This problem was noted in a site departmental meeting where the head of department had stated that the lack of PPE compliance was distracting them from the 'real safety issues'.

'Glasses cause more accidents than they stop'

Being a researcher attached to the safety department, I sometimes helped out with safety-related tasks when required. On one occasion I travelled around the site with a safety advisor to put the new monthly safety topic posters up in the workers welfare units. As we walked into a welfare unit, one of the workers noticed the safety advisor and immediately took out his safety glasses. He turned to his fellow worker and said 'I've only had these three days and they are already ------ [explicit language]'. The safety advisor overheard this conversation and asked to take a look. He suggested they might need a clean but the worker disagreed, saying he had just cleaned them and they were scratched. At this point, another worker in the welfare unit interrupted saying they were 'the worst things' and they 'cause more accidents than they stop'. He gave the example, of if they get dirty during a concrete pour, then 'it is not like you have time to go and clean them, and you aren't allowed to take them off'.

'We are delusional. We think we are safe but we are not'

I am not the most comfortable with heights, and have found that the best way to handle this is to not look down! However, on a construction site, sometimes you can't avoid seeing the bottom. As I travelled up the construction hoist with a safety advisor, I was a little nervous. Watching my step from exiting the hoist to scaffold board, I got a quick flash of the drop. However, once on the scaffold I felt more comfortable, as the perimeter was boarded up. There was another higher platform in the centre of the scaffold, which the safety advisor wanted to check. My nerves returned as I climbed the ladder and the boarded perimeter no longer protected my view of the drop. Reaching the top one of the workers opened conversation with: 'you are no good with heights are you?'. I smiled and said 'was it that easy to tell?'. He joked 'it sure was, and we are going to enjoy watching you go back down the ladder as well'. I asked if they were afraid at all of heights, to which they both said they weren't. One of them expanded to say that 'he had been doing it 15 years and always felt comfortable' and that 'you couldn't do my job if you had any fear'. While having this discussion, the safety advisor noticed a worker sitting on top of a rebar cage (at height without any protection), smoking and on his mobile phone (both in undesignated areas). He raised these issues with the worker saying 'that is what you could call a hat-trick' (three safety breaches at the same time). The worker that I had been talking with, then interrupted, saying that with all these safety rules and PPE we think we are safe 'but we are delusional'. He expanded saying 'what is his helmet going to do for him there? If he falls off the rebar, it will just fall off his head? We think we are safe but we are not'.

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ETHNOGRAPHIC FINDINGS: MIDDLE MANAGEMENT VIEW

'It is just a bit of common sense'

Having heard from some of the operatives on their views on PPE, I was interested to hear from a supervisor for his perspective. I asked a supervisor if his guys wore PPE all the time. He said that most of the time the guys were good and wore full PPE despite not all of them being used to it - some of the subcontractors would turn up without all the required PPE and had never worn some of it before (usually safety glasses). He did admit that there were occasions when the workers would take off items of PPE when they were on site, but not working. He was happy with that arrangement as it was 'just a bit of common sense'. He expanded to say that if the guys were enforced to wear it all the time it could damage his relationship with them and they would be more likely to take PPE off in other situations that could be higher risk. Though the supervisor did add that when the safety advisor comes out he would make sure that all they guys have their PPE on, 'out of respect to the safety man'.

'You would be better off trying to understand the behaviours of some of the animals in the zoo than some of my guys'

After reading and signing onto the ten minute brief of a work area, I went to meet the site foreman with one of the safety advisors. I hadn't met the foreman before, so introduced myself as a PhD student researching safety. He asked what part of safety I was looking into and I told him that I was investigating the safety behaviours of the workers. He laughed and said 'you would be better off trying to understand the behaviours of some of the animals in the zoo than some of my guys'. I asked him what he meant, and he expanded to say that 'some of them just aren't all there' and they 'often do daft things'. He said he had this one worker that kept walking into scaffold poles and other objects, and every time he heard 'a yell' he knew who it was. The same worker once turned up early to start his shift, and proceeded to walk around the site with no PPE on at all. When the foreman confronted him, he believed he hadn't done anything wrong because 'he wasn't working'. Common sense is based on individual's experiences and perceptions, and therefore can differ between people. This has led to the saying 'common sense is not common' and hence sometimes rules may be required to protect people from themselves.

'There is no such ------- thing as common sense safety in construction'

A minor accident had occurred on site, and during the post-accident investigations a safety advisor was discussing the contributing factors with the site manager. The incident occurred, while extending the cables of the construction hoist. The injured person had put his head over the hoist handrail, while the hoist was moving, to see if any of the cables were snagging. Unfortunately, his head got jammed between the handrail and a cable guide, causing a minor facial injury. One of the scaffolders had said that, even though he had not been trained to complete the task, it should have just been 'common sense' to not put his head over the edge. The site manager reacted firmly stating: 'there is no such ------- thing as common sense in construction. You try and use that as an excuse and you would be laughed out of court.'
ETHNOGRAPHIC FINDINGS IN CONTEXT

The following section summarises the above findings, and places them in context with research literature. Two themes appeared to emerge from the findings: common sense versus formal policies and procedures, with specific regard to the blanket rules around PPE; and trust culture versus compensation and blame culture. The safety climate survey highlighted that construction workers wanted a more common sense approach. The ethnographic findings suggested that workers thought all PPE shouldn't be worn at all times, and should instead be task specific. Using a common sense approach would step away from the strict and inflexible site rules, and give the workers more responsibility. This would possibly create more safety aware workers, but some middle managers seemed sceptical whether they could be trusted. A trust culture could be seen as the opposite of a blame culture. The bureaucracy through rules and regulations was unpopular and caused frictions and a lack of trust in relationships. Middle-management acknowledged this but displayed reluctance in adopting a common sense approach, for fear of it being 'laughed out of court'.

PPE: Common Sense vs Formal Policies and Procedures

Many of the construction workers wanted a more common sense approach, which led to a lack of compliance among site safety rules with workers using their own judgement. This lack of compliance led to distractions 'from the real safety issues' as emphasis was placed on complying with the rules. Health and safety advisors constantly had to remind workers about PPE compliance. This perhaps suggests a common sense approach would be more appropriate, as this would shift responsibility back to the workers and create a more safety aware workforce. A more common sense approach would result in giving operatives more H&S responsibilities, but some managers displayed a lack of belief in this approach and weren't sure the workforce could be trusted, as they 'often do daft things'. If operatives were given more freedom for assessing risk and performing some H&S duties, it could be worthwhile performing additional training, since Lombardi et al. (2009) found that lack of safety training was an important factor in affecting the lack of PPE use. He also suggested that a lack of comfort/fit and fogging or scratching of eyewear were important barriers to PPE usage, which was also the case in this study. In a common sense approach, such barriers could mean that construction workers could chose not to wear PPE because they don't want to, rather than because they weren't required to. Cameron and Duff (2007) also highlight this issue of PPE comfort as a reason why giving people this responsibility can be inadequate in some instances. In giving such responsibility, they also question beliefs about the risks involved for the task in hand. This could be an important point considering Oswald et al. (2014) suggest that due to the types of risks in the construction industry, risks are more likely to be tolerated and under-rated.

Trust Culture vs Compensation and Blame Culture

A compensation culture has created an environment where organisations attempt to eliminate all risks by all means, even though this objective is unattainable (Lord Young of Graffham, 2010; Gyi et al, 1999). This study found this created tensions and frictions in relationships as many workers desired a more common sense approach. Damaged relationships contributed to a lack of trust, thereby contributing to a blame culture. Rather than accepting accidents can and do happen, someone is at
fault and financial compensation is perceived to make good of an injury (Lord Young of Graffham, 2010). On this project, researchers found that a blame culture did exist (see Sherratt et al., 2015, in press). This blame culture resulted in a lack of trust between operatives and management to discuss health and safety issues, under-reporting and late reporting. In such a blame culture, there is less opportunity to learn about future accidents. A common sense approach was found to be effective in small and micro firms in a study by Aboagye-Nimo et al (2013), suggesting that this approach could also have value on large projects. However, one key difference is that smaller firms are avoiding this compensation culture for a couple of reasons: the close personal relations in small firms would mean that claims could be seen as a betrayal and there is little money to be gained (Aboagye-Nimo et al., 2013).

In this study on a large project, the managers had a view that a common sense approach could be legally susceptible, and displayed fear of the compensation culture. Gyi et al. (1999) found that managers of large construction firms have been affected the most by the compensation culture, and have ended up creating strict rules and regulations in order to prevent such claims from occurring. Simple and inflexible rules may also be perceived as an appropriate approach due to difficulties with communication throughout large organisations. Top-down communication has to travel throughout the whole organisation to the operatives who have no computers access. This issue becomes even more challenging in multinational organisations (see Oswald et al., 2015), which is becoming more and more common as the world becomes more globalised. Considering these communication issues, simple strict rules without flexibility could be seen to avoid confusion in a large organisation. However, this can result in a lack of worker engagement with workers being simply told 'it is a site rule'. Worker engagement is often perceived as a measure of trust (HSE, 2012). Researchers found that the Olympic Park project managed to counteract blame through worker engagement and trust (HSE, 2012), highlighting that it can be achieved in large organisations. Strict rules and regulations with little flexibility tend to the most basic stage of a five-stage worker engagement process documented by the HSE (2011): 'Individuals are simply told what to do regarding safety and/or health.' This means that decisions are not fully explained to workers, workers are not involved in the decision making process and are not trained to perform some small day to day H&S duties etc. A lack of engagement can result in a lack of compliance, resistance to the rules and a divide between management and the workforce.

CONCLUSIONS

Previous research has found the common sense approach to be effective in small construction firms. However, there is a lack of the compensation culture in such small firms in comparison to larger organisations, which means that larger firms adopting this approach could be more susceptible to claims. This has led to excessive health and safety measures, and evidence in this study suggests that there was resistance to such measures, especially from those at operative-level. This can lead to negative consequences such as resentment, poorer relationships and a divide between operatives and management. Using a common sense approach gives workers more responsibility and flexibility, but some managers didn't think that workers could be trusted and that it would leave the firm open to legal action. While a compensation culture exists, a common sense approach may be more difficult to implement and
large firms may have to adopt strict regulations. This can lead to negative consequences and a blame culture, which creates an environment where it is hard to learn about future accidents. Trust can be seen as the opposite to blame and is often perceived as a measure of worker engagement, which highlights the importance of involving the workforce in H&S decisions. While worker engagement can be more challenging in a large organisation due to size and communication channels, large organisations should realise its importance in attempting to avoid overcome poor operative and management relationships and a blame culture.

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Accident Investigation on a Large Construction Project: An Ethnographic Case Study

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Abstract

Unsafe acts are believed to account for approximately 80 to 90 percent of accidents. This paper will investigate this issue through exploring the reasoning behind the unsafe acts that resulted in a minor accident on a large construction project (+$1B) in the UK. The study described here, part of a wider PhD project, was undertaken using an ethnographic approach. Participant observation enabled the researcher to be involved in the whole accident investigation process including witness statement interviews, informal discussions, post-accident reports and meetings. The understandings displayed by those involved in the minor accident included a desire for a lack of blame, with the incident being described as ‘an act of god’. The study reveals intentional unsafe acts that were due to time pressures, an acceptance of the unsafe act as a social norm and a lack of planning and training. Without any investigation, this accident could have been attributed purely to a cable guide, which could have been considered an unsafe condition. However, through thorough investigation there were also four unsafe acts related to the accident discovered: three of which were intentional.

The construction industry needs to shift its safety management effort towards the understanding and elimination of unsafe acts despite them being more difficult to identify and prevent than unsafe conditions. Changing intentional unsafe behaviours is one of the next steps for improving health and safety of the industry, and the insights from this paper add to the knowledge of why these unsafe acts occur.

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Keywords: unsafe acts; ethnography; construction industry; behavior

1.0 Introduction
In 1959, Heinrich stated that accidents are caused by an unsafe condition and/or an unsafe act. Since then, safety management systems have concentrated on eliminating both these areas, though there has been more focus on unsafe conditions on site. This is because physical evidence can be gathered to account for the accident [1] and hence relatively little effort devoted to reducing or eliminating unsafe acts [2]. Donald and Young [3] suggest that little remains to improve on in terms of physical conditions, and considering that approximately 80-90% of accidents are caused by unsafe acts, further construction safety improvement is hardly expected to improve without more concentration on the reduction or elimination of unsafe acts. The construction industry needs to shift its safety management effort towards the elimination of unsafe acts [2] despite them being more difficult to identify and prevent than unsafe conditions [1]. The aim of this paper is to explore safety attitudes and behaviors relating to a minor accident on a large construction project.

2.0 Workers Mental Process and Unsafe Acts

Reason [4] defined two types of unsafe acts: errors and violations. Reason asserts that the term violation denotes an intentional act, and in most accident databases, violations are far more common than errors [5]. As unsafe acts are often intentional [6] understanding why these intentional unsafe acts occur is an important step towards elimination. Cognitive theory aims to explain human behavior by understanding thought processes. In this theory, the assumption is made that thoughts are the primary determinant of behavior. There have been a few notable research efforts on workers’ mental processes towards safe behaviors. Eagly & Chaiken [7] suggested that attitudes towards safety influence intention, which in turn affects behaviors. While this model has been useful to explain workers’ mental processes, it omitted the perception of accidental risks, which is an important aspect of safety behavior analysis [2]. Mearns, Flin, & Gordon [8] build on this model, by emphasizing risk perception in their more comprehensive model. A recent model by Shin et al. [2] added a feedback loop, which is ‘key to understanding a workers’ mental process to safe behavior’.

2.1 Risk Perception

Risk perception is defined as a workers subjective judgment on a risk [9]. The relationship between risk perception, risk taking behavior and injury experience are complex [10]. In the construction industry, work undeniably requires a higher tolerance to risk and risk taking behavior than the average occupation [11] and this is partly why some people work in the industry, as they like to take risks [12]. In construction, time and money are two important driving forces. This can mean that for operatives paid on 'price' there is a benefit to finishing quickly, but that often leads to taking risks and cutting corners [13].

2.2 Attitude

According to Shin et al. [2] to eliminate worker’s unsafe acts, their safety attitudes need to be closely examined. An attitude is 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor' [7]. Workers attitudes towards risk tend to be optimistic, though this can change if a worker experiences a traumatic accident [2]. Attitudes towards behaviors refers to the degree to which a person has favorably or unfavorably evaluated the behavior [14] and are closely related to a combination of expected benefits and cost [2]. According to Shin et al. [2] there are five factors influence attitude towards behavior: habit, attitudes towards target, reward or punishment, norms and/or approval of significant others and self-identified outcomes.

2.3 Behavioral Intention

Behavioral Intention (BI) is the ‘subjective probability that he or she will engage in a certain behavior’ [15]. BI is how willing, or how motivated, a person is to try to perform the behavior and is the single most proximate predictor of behavior [16]. According to Ajzen & Fishbein [17] most human behaviors are predictable based on intention. Behavioral intention depends on attitude towards behavior, the subjective norm and perceived behavioral control.
3.0 Research Approach

This study investigated a minor accident that occurred on a large civil engineering project (+$1B) using ethnography. Ethnography is an established qualitative research methodology that is becoming more regularly applied in the construction industry [18]. Ethnography often uses participant observation as a main research tool. This is particularly suited to studying sensitive issues (such as safety in construction) since it does not intervene with the activities being investigated [19] and can provide rich descriptions about poorly understood areas [20]. The participant observer in this scenario was involved throughout the accident investigation process. This consisted of being present during the witness statement taking, informal conversations with those involved, accident scene investigation and post-accident meetings and reports. It is important to outline the setting to enhance the chances of replicability [21]. The social setting was a mixture of formal (eg. recording of witness statements) and informal (discussions with participants) and this is highlighted in the ethnographic passages.

To enhance reliability, it is important for the researcher to 'take a look in the mirror' and identify how he and the social arena could influence the data, (see Oswald et al. [22]) in what is widely acknowledged as the reflexive turn. While an overt PhD safety researcher, from previous immersion into the setting the researcher believed he was perceived as a trainee safety advisor with little power or threat to participants, partly due to youthful looks, small height and the fact the researcher was often with the site safety advisor. In ethnographic work, validity may be its major strength due to reasons such as the ethnographer's common practice of living among participants, the opportunities for continual data analysis and comparison to refine constructs and that it is conducted in a natural setting [21]. The findings in this paper such as a lack of planning or training contributing to the accident are not new in the field of construction safety, and previous studies have tried to determine the generalizability of such findings through quantitative methods with large sample sizes. The importance of this work does not lie with the generalizability, but with the deep insight and understanding an ethnographic study can bring. This study is grounded in a rationalist ontology and interpretivist epistemology, where reason is the primary source of knowledge [23]. The explanations by workers for their behaviors are reasoned and linked back to cognitive theory literature where appropriate. The data was recorded, coded and analyzed using software program nVivo, with the key findings being discussed in this paper. For ethical reasons, pseudo names have been used in the following passages.

4.0 Ethnographic Findings

In late June (2014) an incident that had been described as ‘minor’ occurred at 6:30pm, at around the time the dayshift workers were leaving and the nightshift workers arriving. The information that had been passed to the health and safety team was that the injured person had suffered a facial injury and because it was a head injury, he had been taken to hospital as a precaution. The following morning the safety advisor of the area went to investigate what had happened, and I was fortunate to be able to accompany him.

4.1 ‘Why don’t you ask the people that were actually involved?’

Our first point of call was in the area where the incident took place. Upon arrival on site, the two supervisors were asked if they knew anything about the incident and whether it had been recorded in the accident book. One of the supervisors stated that it wouldn’t have been recorded because it was locked in his cupboard (so no-one would have had access last night). The other supervisor then reacted in an aggressive and confrontational manner asking: ‘why don’t you ask the people that were actually involved’. The safety advisor was of the opinion that his demeanor was unnecessary. He felt he had just asked a simple question, and since the people involved were not yet on site, he thought he would make enquiries with the two supervisors. The construction industry has been known to being confrontational and this can not only be a problem for the industry but also research [24].

4.2 The Injured Person’s Witness Statement

Soon after, the injured person (Bob) arrived on site, and the safety advisor progressed to take a witness statement. The incident had occurred during the extension of the cables of a construction hoist, so that
the hoist would be able to travel higher up. During the process the hoist was moved upwards in short jolts or bursts of 300mm. These short increments were used so that there was less chance of the reinstall and cable getting snagged or damaged. In Bob’s witness statement he said that ‘this meant looking over the handrails and downwards to view the cables’. He described the accident as: ‘I was looking over the handrail with the hoist travelling upwards when a cable guide above me came into contact with my hard hat pushing my head down against the handrail. I let out a yell to Terry who was at the controls and the hoist carriage stopped immediately. I was (head) jammed between the handrail and cable guide and I couldn’t move until the carriage was lowered. Once released Terry called Gary (foreman) to inform him of the incident, after which the man basket was sent up and I was brought down to into the medical room, where my injuries were cleaned and dressed (cut to right cheek) and then I was escorted to hospital. At the hospital I was examined and the dressings were changed. I was brought back to site around 21.00 where I picked up my vehicle and drove home.’

Bob also admitted that he hadn’t attended the hoist training on extending the system but that he had been ‘a steel erector for over 30 years’ and ‘consider myself competent to carry out this nature of work’. While experience and confidence can be positive, overconfidence can be dangerous. The overconfidence effect is a well-established bias [25] that could have occurred here and can lead to a ‘won't happen to me’ attitude [5]; an attitude which is present in the industry [26].

The hoist system was described by the subcontractor’s hoist engineer as ‘one of the most complex’ he had been involved with. This was primarily because the structure was not vertical but at a slight angle. Despite not being trained for hoist training on extending system, the injured person felt ‘competent to carry out this nature of work’. Lichtenstein et al., [26] found that people tend to overestimate the safety conditions around them and their ability to control or prevent accidents, and considering the hoist system was complex and the injured person was not trained, an overestimation could have occurred here.

4.3 ‘It was an act of god, could have happened to anyone’

At the end of the witness statement, he made it clear that he thought no blame should be proportioned to anyone and this ‘was just an accident’, ‘it could have happened to anyone’ and it was ‘an act of god’ and nothing could have prevented it. ‘Acts of god’ or accidents occurring beyond their control [27] have too often been used as a defense for negligence such as drinking and driving [28],[29]. Bob was quite an old and experienced worker. The advisor thought he was perhaps accepting the accident because he was used to the safety expectations being lower since he was an older worker (over 50 years old). He tried to make it clear that in the worst case scenario, he could have been decapitated, if they had decided to go in bigger jumps than 300mm. The general foreman, Gary, thought that Bob was ‘sound and a good worker’. One of the key factors contributing attributed to the accident was that Bob had not been trained to safely work on the hoist system. Following the statement, the advisor and I spoke with Gary, who had sent him to work. He confirmed that he had not been on the 5-day training that he should have been on. He had sent eight workers to the training, but six had since left, one was ill and another was unavailable as he was working elsewhere. As the trained workers had not been replaced, it suggests that the department had either suffered from a lack of planning, or perhaps a lack of resources. Horner and Duff [30] stated that productivity of even routine work can benefit from rigorous planning and Hare et al., [31] believe that there is no reason why health and safety performance should not also benefit from the same rigor. It was confirmed by both the hoist subcontractor engineer (Terry) and another worker who had just recently been on the hoist training, that he would have benefited from being on the training course. Specifically because he would have been aware that he shouldn't have put any part of his body outside the hoist. Though perhaps this lack of training isn't surprising considering Sawacha et al. [32] found that ninety-two percent of operatives reported that they had been asked to operate machinery without adequate training. The risk assessment also had stated this, but Bob had not been briefed or signed on to this risk assessment.

4.4 Hoist Engineer’s Witness Statement

Soon after, Terry arrived on site. He was the Hoist engineer and witness of the accident. The safety advisor was of the opinion that his witness statement seemed ‘very honest, but also very damaging’. There was a major concrete pour that was to occur on the nightshift and hence there was significant time pressure on the lengthening the cable system. The strength of the language in the daily logbook (for correspondence between day workers and nights) perhaps gave an indication to these pressures:

Terry was asked if there was any way he could have done a quick temporary job, and then come back at a more relaxed time and do a proper job. Terry hence tried to use all the slack in the cable system to make the cable reach the required height, but he found it to be one meter short and hence a ‘proper job’ was required. He admitted that he knew that Bob was not trained and that Gary also knew. Being untrained for the job, the workers involved knew they were committing an unsafe act, but this perhaps is not surprising considering most unsafe acts are intentional [6]. Gary said he was the ‘best worker he had’, and if it was OK if Bob came up with him. He stated that he had worked with Bob before on similar tasks, that he was an excellent worker and was much ‘better than some of the other guys that had been trained’; hence he was happy to work with him again. The fact that Bob had worked with the Hoist Engineer before represents that ‘near misses’ have previously occurred i.e. a worker doing a job he was not trained for. Since this unsafe act had happened multiple times, this suggests that this behavior was accepted by those in the environment and could have perhaps developed into a habit. In the theory of planned behavior [16], one of the key variables of behavioral intention is normative beliefs and subjective norms. This is an individual’s perception of the social normative pressures and the perception about the specific behavior, and is influenced by significant others. Hence, the social acceptance by others in the environment could have had an influence on the recurring decision to commit this unsafe behavior. Terry admitted he was aware of his surroundings but was not keeping an eye on Bob. This lack of awareness could have been due to overconfidence and complacency since they had worked together before on similar jobs without an accident. Terry's witness statement:

‘I always give the warning ‘going up’ prior to moving the carriage. We were both watching the cable to ensure it wasn’t being damaged. We had travelled approximately 20m in total when Bob shouted ‘stop’. This coincided with me hitting the ‘stop’ button and not purely because Bob shouted. The stop button is pressed as a matter of course every time we stop travelling. As I looked towards Bob I could see he was stuck between the handrail and cable guide by his head. I immediately pulled the stop button out and travelled down approx. 500mm to release Bob. I checked him out and other than a cut to his right cheek he seemed OK and he indicated he was OK. In fact he wanted to carry on with the task. I insisted he got medical attention. I then phoned Gary and shortly afterwards the man basket was sent up and Bob was taken down. I remained on the Hoist to make it safe. Bob was escorted down by the N/S banksman. I know Bob hadn’t received the Hoist 5 day training course. I have worked with Bob on a number of occasions and feel he is a competent man.’

In a discussion which followed the witness statement taking, there was a delay in getting him down because the incident occurred between day and night shift, which meant a crane operator was not present. This could have been of greater concern if the injury was more severe and the injured person needed attention urgently. Though it was not pivotal in this incident it, a weakness in the safety management system was highlighted. Fortunately this weakness was not exploited on this occasion as Bob's injuries were not more severe (e.g. major loss of blood). Despite being injured Bob had a desire to carry on working, which demonstrates a dimension of the construction industries well-documented macho culture [33].

4.5 ‘Butchered is perhaps a harsh word, that may make vegetarians amongst us uncomfortable’

Following the gathering of evidence, a meeting was organized with the head of section, who was from mainland Europe. The head of section generated a report that pointed the blame towards the hoist engineer (Terry). He was of the opinion that 'as the trained and competent worker delivering a specialist operation he should have delivered it safely'. He should have given some form of training to Bob. The safety advisor disagreed, suggesting that legally as the principal contractor they should be managing such situations properly, though he acknowledged Terry should not have accepted an untrained worker. This clash of opinion could have come from expected different working practices in different countries. In an informal discussion prior to the meeting, the foreman, Gary admitted he was prepared 'to take a bit of wrath' or in other words, some form of disciplinary action, but as he sent him up with a trained and competent subcontractor (Terry), he wouldn't take all responsibility. He was keen 'to make a lessons learned and move on'. Though there was disagreement on the accountability, they did all agree that the accident could have been worse. The advisor made the point that had the hoist gone up in bigger installments, the injured person could have had his head 'butchered off'. Though the head of section
made a light-hearted comment surrounding the word choice, he agreed it was a serious incident that could have been worse. A few weeks after the incident, the subcontractor hoist engineer, Terry told the safety advisor that he had been asked to do it again - do a job with a worker that wasn't trained. The superior who asked him had not been involved in the previous accident, and explained they were under significant work pressures. Terry refused to go up with someone that wasn’t trained despite this pressure. For Terry the accident had been quite upsetting; he had mentioned he felt 'bad' for Bob, and that he 'should have seen it coming'. Following traumatic events, people can perceive an increased level of risk [34], and considering Terry refused to commit a similar unsafe act when asked by a manager, this suggests that his risk perception levels had increased. Though previous accidents can change workers attitudes to being more pessimistic towards risk, this can gradually return to an optimistic state by forgetting the accident as time passes [2].

5.0 Ethnographic Findings in Context

The above ethnography of the investigation has allowed for interpretation of the reactions to the accident. The reasoning for the actions undertaken has been grounded within the relevant literature and summarized below.

Unsafe acts are often intentional [6] as workers decide to err from safe practices. In this scenario, the decision to use a worker who was untrained for the task represents an intentional unsafe act. This intentional act had been repeated several times previously, suggesting that it had become a social norm in the environment - an important factor in the behavioral intention [16]. Unsafe acts can also be unintentional, and Bob looking over the hoist was an example of this - as he had not been trained, he was not aware this was an error. These errors can be reduced through safety education, good supervision, system design etc [5]. This is perhaps why he saw the event as 'an act of god' or beyond anyone's control. There could have also been an element of the overconfidence effect [25] and complacency, as people tend to overestimate the safety conditions around them and their ability to control or prevent accidents [26]. His desire to work on despite being injured perhaps suggests a dimension of the well-documented macho culture (e.g. [33]) in the industry. Risk perceptions can change, especially following a traumatic accident [34] and this was the case for Terry, who refused to commit the unsafe act again despite being asked by a manager above him in the hierarchal structure. Although aware of the incident, this superior was not involved and hence his risk perception was unlikely to change purely on awareness, due to the 'won't happen to me' attitude [35]. The general foreman who sent Bob to work was 'prepared to take a bit of wrath', suggesting he was aware his act was unsafe. His decision to send an unskilled worker could have been influenced by the fact it had been done before (social norm), time pressures, lack of other trained operatives and that the unskilled worker was accompanied by a suitably trained employee from a specialist subcontractor. A competitive tendering process [36] creates pressure on time, which is an external environment factor that can influence behavior. In this case, there was a large concrete pour looming which added pressure.

6.0 Conclusions

Unsafe conditions have received more attention than unsafe acts because there is usually physical evidence that the accident can be attributed to. Without any investigation, this accident could have purely been attributed to the cable guide (unsafe condition) which caused the injured persons head to be jammed. However with further investigation multiple unsafe acts led to this accident. Unsafe acts included: the foreman sending a worker to do a task he wasn't trained for, the trained hoist engineer accepting this untrained worker, the untrained worker putting his head outside the hoist and even though it had no bearing on the accident, the work was carried out when no crane operator was present (to help with egress from the hoist should an incident occur). Three out of the four unsafe acts were intentional errors with the untrained workers act appearing to be an error. As the untrained worker seemed unaware of his unsafe act, he believed the accident was 'an act of god'. The foreman was aware of his wrongdoing and was prepared to take 'a bit of wrath'. The trained hoist engineer showed an increase in risk perception levels following the accident by refusing to commit the unsafe act again despite being asked by a manager. The unsafe act of sending and accepting untrained workers for a job had occurred before, suggesting that this was an accepted behavior within the social environment. The lack of planning and/or
resources had created an environment where the behavior to train the individual became more undesirable due to the time pressures involved. Changing such intentional unsafe behaviors is one of the next steps for improving health and safety of the industry, and the insights from this paper add to the knowledge of why these unsafe acts occur.

References

A SPANISH SUBCONTRACTOR IN A UK CULTURE

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Globalisation of the construction industry has meant that people from different national cultures often work together. This creates many additional challenges for the industry, one of which is forming and maintaining a positive safety culture. This study focuses on a Spanish subcontractor working in the UK on a large construction project (+£500m). Throughout a 9-month period, an ethnographic study was undertaken to explore the safety-related challenges that were created for the principal contractor; the lead researcher was able to spend time on the project as a participant observer to gather data around this phenomenon. Despite some regarding it as suspicious, ethnography has now emerged as another approach for understanding the construction industry. This paper demonstrates that through this qualitative approach, new avenues can be explored to broaden and improve our understanding of the industry. The Spanish subcontractor had a faster but less safe culture than their UK counterparts and found it difficult to change their ways and comply with stricter regulations. During the study period, the Spanish subcontractor was stopped numerous times for safety reasons, and even temporarily removed from site. These failings led to the appointment of a health and safety advisor which did lead to some improvements. The challenges did not only occur when the Spanish subcontractor was not following regulations or revealing a poor safety culture, but also when they appeared to display competence. Under UK legislation, the principle contractor is required to check and monitor the competence of the subcontractor and their systems. However in one scenario the principal contractor did not know anything about the Spanish system the subcontractor were using, so how would it be possible to monitor competence? Findings suggest that whilst the Spanish subcontractor may have been a low-cost option initially, safety risks were increased leading to significant amounts of time, money and resources being required to attempt to control these risks.

Keywords: Construction, Ethnography, Migrant, Spain, UK.

INTRODUCTION

In most countries, large construction projects employ significant numbers of ethnic minorities (Dainty et al., 2007) as labour and specialist subcontractors are drawn from the global construction market. Hispanic workers in the US have received some attention in literature yet there is very little or no research on Hispanic or Spanish-speaking workers in the UK. The case study project explored here is currently under construction by workers of a large number of nationalities, including the Spanish subcontractor who forms the focus of this research. This paper aims to explore the

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safety-related challenges of this Spanish subcontractor with a mixed Spanish and Portuguese workforce, operating within a UK culture, whilst also enabling reflection on the use of ethnography as a successful research method in this field.

THE SAFETY OF MIGRANT WORKERS

A poor safety culture is often highlighted as a factor in the causation of accidents. Creating one positive safety culture among an organisation is a difficult task, especially when the organisation is large, which makes it harder to steer, even with full commitment (Hudson, 2007). This task becomes even more challenging when the organisation has migrant workers from various backgrounds. In the UK, there is no doubt that an influx of migrant workers is creating additional challenges to employers (Tutt et al., 2011).

In a study by the HSE (2013a), migrant workers were at a greater risk in construction than British born workers because of language differences, inexperience or lack of understanding of UK Health and Safety standards and cultural differences. In 2006/07 an influx of migrant workers into the UK was identified as the reason for a 25% increase in fatalities, due to communication issues and poor work practices (Owen, 2007). In the following year almost a fifth (17%) of recorded construction deaths involved migrant workers, despite migrant workers only estimated to comprise of 2.4% of construction workers (Tutt et al., 2011). Research found that two-thirds of migrant workers received no health and safety training, while the other third tended to have a short site induction, but this is often not understood or communicated effectively (McKay et al., 2006). Communication barriers with migrant workers have not only been highlighted as a problem in Australia’s culturally diverse construction industry (e.g. Loosemore and Lee, 2002), but Sells (2007) describes it as a ‘leading concern’ amongst migrant Hispanic trades workers.

The influx in Hispanic workers in the US has enabled their construction industry to meet its workforce demands, but unfortunately this has occurred with costs in health and safety of Hispanic construction workers, as Hispanic workers appear to experience a large number of accidents compared to their employment levels (Goodrum and Dai, 2005). Dong and Platner (2004) found that nearly one-third of Hispanic construction workers spoke only Spanish, and their risk of fatal occupational injury was almost twice that of other construction workers. According to Brunette (2004), Hispanic workers, in general, come to the US with a poor understanding of Health and Safety, little or no experience in building trades and had little or no government enforcement of safety regulations. With English not being their mother language, any understanding of the educational or training exercises will be significantly lower than for the native speakers. Clearly, the influx in Hispanic construction workers to the US has created additional challenges and is receiving attention. Yet, research on Hispanic migrant workers from Spain working in the UK is very limited. This could be because there are less Hispanic workers in the UK than in the US, however, as the industry becomes more global, many workers from various backgrounds will be required to work together, including Spanish and UK employees.
Workplace Accident Rates in Spain and the UK

The HSE (2013b) released European comparison figures for the estimated incidence rates (per 100,000 workers) of fatal accidents at work in 2010. This included all workplace fatal injuries except road traffic accidents and accidents on board transport. The UK had the third lowest rate (0.71 per 100,000 workers) out of the 23 European countries behind Slovakia and the Netherlands. Spain was the tenth lowest with an incident rate of 1.76 per 100,000 workers. This inconsistency between Spain and the UK may suggest there is a difference within the safety culture of the two nations.

RESEARCH APPROACH

Ethnography is an established qualitative research methodology that often uses participant observation as a main research tool. Since observational research does not intervene with the activities being investigated (Alder and Alder, 2000) ethnography is particularly suitable for studying sensitive issues (safety in construction is often a very sensitive issue) since this type of research can provide rich, detailed descriptions about the unknown or little known (Li, 2008).

This study investigates a Spanish subcontractor in a UK culture that was based at a large construction project (+£500m) for a 9 month period. ‘Moderate’ participant observation was implemented, which DeWalt & DeWalt (1998) suggest can provide a good balance of essential involvement and necessary detachment to remain objective. Therefore, although time was spent actively engaging through observations, conversations with employees and attending meetings; time was also spent detached to recording findings and avoid the risk of getting so close to the subjects that objectivity can be lost. The data collected was recorded, coded and analysed through software program, nVivo, with the highlights of the findings being summarised within this paper.

By employing this research method, the primary aim of this study was to identify the difference in the safety culture between the Spanish and UK workers and the safety-related challenges caused by a Spanish subcontractor working in a UK culture. The following ethnography describes in detail the ‘real life’ safety-related challenges that employing a Spanish subcontractor in a UK culture caused. The passages have been presented as detailed as possible to allow the reader to concur with the interpretations made or to make their own interpretations. The fact that different interpretations are possible is an accepted aspect of this type of research and does not reduce the validity of the study. For ethical reasons, and to protect the subjects within this study, names within the following passages are false.

¿DÓNDE ESTÁ EL SOL?

A Spanish Subcontractor in a UK Culture

In the summer of 2013, a new Spanish subcontractor began working on a large construction project in the UK. This offered an opportunity to explore the safety behaviours of Spanish and Portuguese operatives and management in a UK culture. However, their introduction onto the site did not last long, as they were quickly removed after causing design, operational and safety concerns revolving around incomplete method statements and risk assessments during a trial construction. On
the lead researcher, investigated through ethnography. The following passage describes highlights of the findings in first person.

**The First Visit**

James, one of the safety advisors, was going out to do a regular workplace inspection on the Spanish subcontractor’s site, and I had the opportunity to accompany him. On his previous inspection he found that the design of a 21 metre work platform had been incorrectly erected. There were pins and bracing that were missing, misplaced or not clipped on, while four operatives were working at the top. He had to stop the works. The temporary designs of the works were being altered between the approved documents and what was being built on-site. James was hoping to see improvements.

Once we arrived on site, we met with Pedro, one of the management staff of the Spanish subcontractor. While James addressed another issue that had arisen, I had a chance to introduce myself and chat with Pedro. Pedro explained that he was enjoying the project and was grateful to be there, but admitted he knew his team would need to improve their safety practices if they wished to stay for the long-term. Following my further questions, he continued to say that they had been receiving severe criticism for their safety practises and ‘they were right’ to be criticised but it was very difficult to adjust their safety culture. They were used to their way of working, a way he described as ‘quicker and less safe’. He further explained that they were doing their best to reach the safety expectations but it was not proving easy.

During the inspection and other site visits, I began to observe the Spanish and Portuguese workplace behaviours. It became clear their behaviours were different to that of the UK workers I had seen on the project. The Spanish and Portuguese workers appeared to be more tolerant to taking risks: they would often walk behind moving plant without being acknowledged by the driver, use mobiles while driving and the housekeeping was not the same standard as on other sites on the project. Though UK-based workers were also observed taking unsafe risks around the project, it was not to the same frequency as the Spanish and Portuguese workers. James, the safety advisor, was also of this opinion.

**Climbing the Tall Piers**

On another visit, I had the opportunity to go up the piers being constructed with representatives from the Spanish subcontractor and the principle contractor including Ben, a safety rep in the section. Ben was moved to work with the Spanish subcontractor in hope that it would help to improve their ways of working. Ben had worked with Portuguese workers before so said he knew what to expect. He thought the Spanish and Portuguese workers on the project were ‘great guys’ but he did admit it wasn’t as enjoyable as working with the UK workers, due to the restrictions with language barriers. There were still many of the Spanish and Portuguese operatives that did not speak English, but Ben seemed to think their English was improving. He said to me that the Spanish subcontractor’s operatives thought it was great that the principal contractor was so concerned about their safety and had never had anything like it before. He expanded to say that it wasn’t the workers that were resistant to the safety demands, but instead the Spanish subcontractor’s management who were ‘more concerned about the bank accounts’. Though the Spanish and Portuguese operatives were happy for improved safety methods he didn’t think their
behaviour had changed to become more safety conscious – they were still used to their way of working. Ben cared about their safety and had reported a serious breach by four of the Spanish subcontractor’s employees: a manager and 3 operatives had ignored a physical barrier and a red ‘do not use’ tag on the access stairs to a pier. This occurred directly after the ten minute brief, in which the contents had been created by the principle contractors H&S Manager in an attempt to improve their perceptions. This resulted in a safety re-induction of all of the Spanish subcontractor staff and an official written warning for failing to adhere to the principal contractor’s health and safety standards.

The Spanish subcontractor had placed nets around the working platform on the piers to catch any falling objects. Standing at the top of the pier, Ben and I noticed that these nets had accumulated a lot of debris that had fallen, far more than you would expect for accidental falls. During a weekly meeting with the principal contractor and the Spanish subcontractor, which I was fortunate enough to attend, this issue was brought up. The principal contractor had concluded that the nets must have been used as ‘a bin’ rather than a protective safety measure (the net is only meant to be there to catch something if it accidently falls). A design to close the gap to reduce the falls was insisted upon the reluctant Spanish subcontractor in the meeting.

‘What does this tell us? That concrete pours are more important than safety?’

The Weekly Meetings

As an ethnographer, I found the weekly meetings fascinating. The mood in the meeting room was tense with strong flashes of frustration and anger. For well over an hour the Spanish subcontractor would be ‘hammered’ for their failure to comply in various areas. During my first meeting, I sympathised with the Spanish employees, though it was clear others had lost their patience with them.

The meeting room also revealed the attitudes of the Spanish subcontractor's management. One of the most revealing examples revolved around a simple safety design that had been requested for months. A basic safety design was required since there was a 450mm gap between the toe-board and the handrail, which meant if objects were dropped, they could bounce on the metal walkway and over the toe-board. Hence, the toe-board was not sufficient and the principal contractor suggested using netting. On one occasion a chamfer was actually seen resting on top of a toe-board, meaning it could easily fall over the side - totally defeating the toe-board’s purpose. This basic safety design had been requested for months without completion, yet when a temporary design change was needed for a concrete pour to commence, the design was ready within two hours. The Spanish subcontractor’s project manager was asked directly in the weekly meeting: ‘What does this tell us? That concrete pours are more important than safety? Why can you not get us this safety design?’. The project manager replied that he could not confirm a date as it was in the hands of an external designer and out-with his control. The principal contractor found this answer hard to believe, especially when it was possible to obtain a temporary design for a concrete pour within two hours. This perhaps suggests that the Spanish subcontractor did not want to spend time and money implementing netting around the working platforms and did not perceive it as an urgent or important issue.

Many of the other safety issues were slow to being closed out including ladders on the access to the piers, which did not comply with the UK regulations. This issue was
raised in October and new ladders finally arrived in March the following year. The principal contractor was also demanding the Spanish subcontractor’s project manager to plan the works, a legal requirement (CDM, 2007) that was overdue. It appeared the project manager was perhaps struggling to complete this task because he was not trained to the UK standards (his UK site managers training was not for three months). He explained that he didn’t know what other subcontractors were doing around them, so for example he didn’t know which areas were available for loading/unloading.

On-site it appeared that there was this lack of integration between the neighbouring UK-based subcontractor and Spanish subcontractor. When speaking to Goggsy, a site manager of a UK-based subcontractor working in the site area next to the Spanish subcontractor, he explained that he was always looking for improve their ways of work and was curious to see the Spanish subcontractors systems. His suggestions to them were apparently just ignored and they seemed not interested. Despite being site neighbours it was clear that there were separate teams and safety cultures. According to Loosemore et al. (2010), such segregation caused by language and cultural barriers, can pose challenges with not only safety but also waste, quality and productivity.

**A large construction project or a pub in England?**

I also got a chance to speak with the Cristian, a member of management staff for the Spanish subcontractor. I had met Cristian in the weekly meetings but this was the first time he had the opportunity to speak with him on-site. Cristian had previously worked in construction projects in Spain, but had to move due to the difficult economic situation in Spain. He therefore came to the UK to work in a pub and learn English. After two years the opportunity arose to return to the construction industry, working on this project in the UK. When I asked if there was a big difference in safety between UK and Spanish construction, he explained that: the culture is undoubtedly very different, that higher safety standards were expected in the UK and that the codes were more detailed. He gave the example that in Spain ‘a ladder is just a ladder’ but in the UK there are required sizes and specifications. The closest he had come to UK standards in Spain was when he had worked in high-speed rail. The smaller projects in Spain were less safety conscious. Just like Pedro, he said the work on the jobs he had done in Spain was ‘much quicker than here but less safe’ and that they could do ‘a lift a day’ – a very fast rate. He did go on to say that though the culture is less safe in Spain, it is not a ‘disaster’ and he had not seen any major injuries. Comparing the statistics, a HSE report (2013) found that Spain has approximately 1 extra workplace death per 100,000 workers than the UK.  

Cristian had found it very stressful working on the project and even said that at times he enjoyed working in the bar in England more than working on this large construction project. He explained that sometimes he thought it was very frustrating working with the principal contractor, especially as the Spanish subcontractor was reliant on their equipment. Sometimes Cristian would have five men ready to work but the principal contractor would impose an action that they must do before the works could be carried. But this action, a safety requirement or other, sometimes did

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7 UK is 0.71 and Spain is 1.76 deaths per 100,000 workers. Note this is deaths across all industries.
not require all five men, which meant a greater cost. Cristian seemed to think that the principal contractor did not seem to understand.

**How do we check competence when we don’t know what they are doing?**

There had been several occasions where the Spanish subcontractors had not reached the safety standards expected and work had to be stopped. However, there were even challenges when the Spanish subcontractor appeared competent. During operations the Spanish subcontractor planned to use a Spanish scaffold system; a system they appeared competent in and had all the required documentation from Spain to communicate that they were qualified and competent. Yet this system was unknown to the principal contractor, so how would it be possible to monitor and check competence in this particular system? (UK legislation – Construction (Design and Management) Regulations 2007 – requires this). It was concluded by the principal contractor that to be able to continue, the Spanish subcontractor would have to use a system that was used and recognised in the UK in order to check competence. Though through further investigation into the system being used, it was actually found to be out of date (it had been superseded since tender) and hence the system had to be changed anyway. Had the system not been superseded and had to be changed because of lack of knowledge in the work system, it would have been very frustrating for the Spanish subcontractor.

**We need paperwork as well as your concrete**

On another occasion on site, I got another brief opportunity to speak with Pedro. Having heard that poor method statements and risk assessments had an influence in their initial removal during the trial construction period, I was curious if Pedro could enlighten me on such safety methods used in Spain. Pedro explained that back in Spain they have risk assessments or something similar but they are often not completed properly or even at all. He had found that the paperwork requirements on this project were much greater than to what he was used to.

‘If you pay me another salary…’

Behavioural-based safety (BBS) training was introduced across the site. One of the most powerful tools used in BBS sessions are safety videos. Yet with this tool being in English, the impact on little or non-English speaking migrant workers is significantly reduced. Translating the subtitles from English to Spanish would be a very timely procedure, and one English and Spanish speaking employee joked that he would only do it if ‘you pay me another salary’. This reduction in understanding is similar to Brunette’s (2004) findings for Hispanic workers in the US - where non-English speaking workers gained less from training than English speaking.

**Safety Advisor or ‘Policeman’?**

There were fears from the works manager within the section that there would be a major incident, and he had therefore requested as much coverage as possible from the principal contractor’s safety team. The problems and issues had been noted by the principal contractor’s project director, who told the Spanish subcontractor in a meeting that they had to improve. Following fears that the Spanish subcontractor could be removed from their post due to these safety concerns, they employed their own full-time safety advisor. The new safety advisor felt like a ‘policeman’, having to watch the Spanish workers very carefully. However, the safety performance
certainly made improvements following his arrival. Even from the weekly meetings this was evident - safety discussions had taken over an hour, but as items got closed out from week to week, the safety aspects could be discussed within 20 minutes.

A key factor in this improvement was the liaison between the Spanish subcontractor’s new safety advisor and their management. The Spanish subcontractor appeared to feel more comfortable taking advice from their own employee, especially when it involved cost. The improvements have been positive, but there are still incidents occurring and a lot of work to do moving forward. Had this improvement not have occurred, it would have put the principal contractor in a very difficult position. If they were to remove the Spanish subcontractor, the dismissal process would have to be flawless, which would require time to gather all the evidence and issue formal written warnings. The principal contractor could also not afford to wait too long to make such a decision, as if an incident occurred and an investigation concluded that the principle contractor were mismanaging the subcontractor - by giving regular verbal warnings with no action, the principle contractor could be liable.

ETHNOGRAPHIC FINDINGS IN CONTEXT

The above ethnographic findings should be situated in relation to current understanding of Hispanic workers in an English-speaking country. In this study the Spanish subcontractor were unfamiliar with the safety demands placed upon them. This difference in safety expectations caused great stress, a factor that has been suggested to have a contributory role in accidents (Murphy et al., 1986). The differences in national culture also caused issues with systems of work and paperwork expectations for method statements and risk assessments. In reflection, it is therefore of no great surprise that Brunette (2004) stated that a clear understanding of the cultural backgrounds of the Hispanic workforce is critical. As well as causing issues and stress with the systematic practices, this study also found that the difference in national culture also brought other negative factors such as: lesser safety training and supervision, inadequate safety knowledge, communication and literacy issues. These negative factors were also identified in a study by CDC (2008) as contributory factors for 200 Hispanic workers deaths in the US. The concerned principal contractor acted on these negative factors by ensuring all safety communication was available in both Spanish and English, having BBS training sessions and insisting on the appointment of a full-time safety advisor. Though these negative factors were concerning, the two greatest concerns were caused by: the Spanish subcontractor's apparent acceptance of unsafe conditions and their desire to work fast.

The Spanish subcontractor's site was subject to a variety of unsafe conditions usually involving poor housekeeping; though more severe conditions were witnessed such as the incorrectly erected 21 metre high working platform. Despite the safety issues caused by such conditions the workers appeared to tolerate these risks. In a study by Roelofs et al (2011), Hispanic workers in the US felt that their only option in opposing unsafe conditions was to leave the job, rather than 'speak out' against these conditions, and that the 'need for a job' was often a factor in tolerating the unsafe conditions. At the time of this study, Eurostat (2014) had Spain's unemployment rate at a staggering 25.6%, compared to the UK's 7.1%. Such economic disadvantage has been used to partially explain why there is disparity in injury rates by investigators.
(eg. Pransky et al., 2002). Though this lack of opposition to unsafe conditions may have been due to the 'need for a job' and economic disadvantage, the reluctance to 'speak out' against hierarchy has been found to being within Hispanic national culture. One of Hofstede's (1997) four original dimensions, Power index (PD) is related to how the hierarchal structure of the organisation is interpreted and in countries with high PD, the management’s authority is accepted as a natural consequence of inequality. Spanish speaking countries score highly on PD and despite Spain being in the lower end of this group with 57, this score is still considered high. In such high PD cultures, organisation is hierarchical with decision making decentralised (Mearns and Yule, 2009), which means decisions related to safety are made by superiors and are expected to be obeyed by subordinates (Gyekye and Salminen, 2006). This cultural trait could also partially explain why there was a high turnover of operatives in this study - workers were more likely to leave than discuss their safety concerns or other problems. This high turnover was frustrating for the safety management that were trying to change and improve safety attitudes and behaviours; a frustration that corresponds with literature, which has suggested that stable groups are linked with low accident rates (Gherardi and Nicolini, 2002).

The Spanish subcontractor would work at a much faster rate and were aware that this approach was less safe. The workers appreciated emphasise on safety, but thought the managers were less involved in safety for financial reasons. In Roelofs et al's study a similar conclusion was found; that Hispanic workers in the US were found to being under greater pressure to work fast, often to assure supervisors' bonuses. The workers in Roelof et al's study also took responsibility for not taking safety precautions themselves and 'going along' with it - again a high PD culture trait.

CONCLUSIONS

In this study, the Spanish subcontractor was initially a low-cost option, but due to cultural differences there were increased risks and safety-related challenges. The Spanish subcontractor’s risk assessments and method statements were originally of a lower standard, and it appeared that their workers were more prone to taking risks, such a walking behind moving vehicles. Language barriers seemed to cause confusion and separations in the safety culture, make work less enjoyable, limit interventions and make it more difficult to improve behaviours through training. These issues resulted in extra expense and the need for additional resources including extra supervision, training available in other languages (or having interpreters) and having posters, signs, toolbox talks, ten minute briefs available in other languages. There were also challenges when the Spanish subcontractor appeared to be displaying competence, as a system they were using was unknown to the principal contractor and hence they could not monitor competence. It is recommended that for future cross cultural collaborations, such challenges are planned and priced for.

There has been very little research into differences in safety culture on construction sites across various nations. This could be due to the narrow research methods used in the industry. Pink et al. (2013) describe the strength of the ethnographic approach as being able to make informal (or unofficial) practises, interactions and ways of knowing visible. Despite all the safety-related challenges discussed that were made visible through this ethnographic approach, the accident and incident statistics of the Spanish subcontractor were not noteworthy in comparison to others on the project.
Hence had a more traditional quantitative approach been applied these issues could have gone unnoticed. This paper adds weight to the argument that through ethnography, new avenues are possible which can widen the range of findings and understanding in the industry.

Statistical evidence suggests that Spain is a more dangerous place to work than the UK. In this study, the Spanish subcontractor acknowledged that their safety culture within the construction industry is ‘less safe’ but more productive. This may have resulted in a national cultural clash that could feasibly have led to many of the safety-related challenges outlined. As the industry becomes more globalised, with employees from a variety of backgrounds having to work together, understanding this area will only gather importance.

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RISK PERCEPTION AND SAFETY BEHAVIOUR: AN ETHNOGRAPHIC STUDY

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In the construction industry, poor risk perception has been suggested to be highly influential factor in unsafe behaviours. To explore the influence of risk perception on unsafe acts in construction, an ethnographic approach was undertaken on a major project (+£500m) in the UK. The aim of the study was to identify the importance of risk perception and the factors that influence it. Literature has found two key factors which influence risk perception ratings. These factors are if the risk is unknown (unknown risks are new and unfamiliar) and if the risk is dreaded (a dread risk is an uncontrollable risk which can be catastrophic e.g. a plane crash). Dread and unknown risks are feared and are the factors which cause variance in the risk perception ratings across all national cultures. Literature has also established that voluntary risks (risks that are one’s own choice e.g. driving a car) are more likely to be taken than involuntary risks. Voluntary risks are strongly linked to controllability, where the risk is under personal control. Applying this knowledge to the construction industry, this paper has concluded that since risks taken in the industry are usually under the individual’s control, non-dread and known, construction risks are more likely to be tolerated and can be under-rated. As this is the case across all national cultures, this conclusion can be made for the global construction industry. In this study, thirty different unsafe acts were collected over a one-year period and findings suggested that a poor risk perception was almost always a perceived influence. The perception of risk can be altered by a variety of factors but common factors found to influence risk perception were benefit and work pressures. These two factors were usually linked as shortcuts were taken to benefit from saving time.

Keywords: Benefit, Construction, Ethnography, Risk Perception, Time Pressure.

INTRODUCTION

Risk perception in the construction industry has been suggested to have a high influence on unsafe behaviours (Oswald et al., 2013). The aim of this study was to investigate the importance of risk perception in construction and the factors that influence risk perception. Through an ethnographic approach and application of the psychometric paradigm, unsafe acts that occurred on a large construction project (+£500m) in the UK were investigated.

CONTEXTUAL LITERATURE: RISK PERCEPTION

Risk perception is a subjective assessment of the probability of an event happening and the severity of the consequences of such an event. Risk perception phenomenon

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became a growing concept in the 1960s when it was identified as a main factor in public opposition to new technologies and nuclear power. Early work into risk perception by Starr (1969) found that individuals would accept risks that are 1000 times greater if they are voluntary (e.g. driving a car) rather than involuntary (e.g. a nuclear disaster). Starr’s quantitative margin was later challenged by researchers, but it is generally agreed that voluntary risks are more likely to be accepted than involuntary risks. Despite Starr’s early findings there was little research on voluntary risk taking in the decade that followed (Lyng, 1990). The research that was conducted gave different interpretations of Starr’s findings, which ultimately led to the psychometric paradigm, discussed in a later section. There has been an abundance of study on risk perception with three theoretical families being developed: anthropological/sociological approaches or ‘culture theory’, ‘psychological approaches’ and ‘interdisciplinary approaches’. Psychological and cultural theories currently dominate the field of risk perception (Sjoberg et al., 2004).

**Anthropological/Sociological Approach (Culture Theory)**

This approach suggests that perceptions are socially constructed by ways of life and cultural values. The Cultural Theory of risk (Douglas & Wildavsky, 1982) identifies four ‘ways of life’, with each corresponding to a certain social structure and outlook on risk. The four ways of life include: hierarchal, individualist, egalitarian and fatalist. The theory has not been widely accepted by researchers with Douglas (1992) even stating that the theory is controversial.

**Interdisciplinary Approach: Social Amplification of Risk Framework**

The Social Amplification of Risk Framework (SARF) is a combination of research in the theories of sociology, psychology, anthropology and communications. The framework aims to explain how risk perceptions are amplified. The media are an important link in communication chains and have strong effects on the public’s risk perception (Wahlberg & Sjoberg, 2000). They are also often seen as irresponsible, with interest in negative information and a special inclination towards low probability but high risk consequences i.e. dread risks. The news media across the nations vary their interest and tend to pay most of their attention to their own national problems (Mazur, 2006). There is also evidence to suggest that risk perceptions in nations change across time. In a study by Mazur (2006), perceptions were measured in 1993 and then again in 2000 in various nations. For nearly all hazards the Filipinos, Spanish, Israelis, Russians and Japanese had increased their ratings of danger considerably while the Germans, Bulgarians and Irish reduced their ratings. The study revealed that trends changed when news coverage changed e.g. when there was an increase in coverage of environmental danger in a nation, the perceptions of environmental danger increased; and when the coverage decreased, the perceptions decreased. This was the case for nine out of ten countries – only Ireland avoiding the trend.

**Psychological Approach - The Psychometric Paradigm**

This approach concentrates on how people process information. In early works it was concluded that people sort and simplify information; but this shortcut can lead to biases in evaluation and comprehension (Kahneman & Tversky, 1974). This framework was built on more recently and became the so-called psychometric paradigm, which in the field of risk analysis, has been the most influential model.
created (Siegrist et al., 2005) and compared to culture theory it has been fairly successful in predicting and explaining perceived risk (Sjoberg et al., 2004).

The psychometric paradigm attempts to address why different people perceive hazards in different ways. Using this paradigm, the study of diverse groups revealed that psychometric scaling can identify and quantify differences and similarities in attitudes and risk perceptions amongst different groups (Slovic et al., 1985). To understand risk perception, the paradigm aims to reveal the factors which affect risk perception. An important paper (Fischhoff et al., 1978) compiled nine dimensions from literature, two of which: dread risks and unknown risks have been found to create the variance in risk rating perceptions.

**Dread Risks**
Dread risks are low possibility but high consequence events such as the devastating terrorist attack on September the 11th 2001. It appears that people try to avoid dread risks - situations that are dreaded and are where many people can be killed at one time, as opposed to situations where the same number of people may be killed but over a longer period of time (Slovic, 1987). However, avoiding dread risks may cause deaths as a study by Gigerenzer (2004) estimates that 350 lives were lost on the roads in the 3 months following the attacks, as people avoided the dread risk of flying. In construction, Bohm (2010) found that perceived risk is linked to the perceived dread rather than the likelihood. Fatalities in the construction industry generally occur sporadically over a long period of time and hence dread risks are uncommon.

**Unknown Risks**
The novelty of the risk is the other major factor found to create the variance in perceptions. Risks that are unknown have a higher risk factor associated with them due to their uncertainty, while risks that are familiar have a lower risk factor associated with them. Uncertainty is a psychological concept closely related to risk and is an important mediator of human response in unknown scenarios (Sjoberg, 2004).

**Dread and Unknown risks in many National Cultures**
There have been studies investigating risk perceptions across different cultures and nationalities. The United States were the first country to publish findings on risk perception (reported by Fischhoff et al., 1978) and in 1983 the first comparative risk perception study was compiled when research was carried out in Hungary (Englander et al., 1986). This research aimed to use the same methodology to that of Fischhoff et al. (1978) in order to compare the findings in Hungary with that of the US. The results were very similar and had strong correlations with the two dominant factors (dread and unknown) in the US studies. The most striking difference between the two nationalities was that the mean of the judgements of risk was almost double in American citizens than in their Hungarian counterparts. Soon after, another study in Norway was undertaken (Teigen et al., 1988). Norway’s judgements of risk were lower than the US but higher than Hungary’s. Their risk profile matched the Americans more closely than the Hungarians, in that, like the US citizens, they had greater concern for drugs and narcotics. There have also been studies in Asia as well as the United States and Europe. In 1989, Keown found that the mean risk ratings of Hong Kong students were not significantly higher than the US but differed greatly in
the type of hazards. Yet despite this variance the two factors ‘dread’ and ‘unknown’ were again concluded dominant. This cross national study was also replicated in Poland (Goszczynska et al., 1991) with the same result: dread and unknown factor dimensions concluded dominant. The Polish risk judgement ratings were slightly higher than the Norwegians but lower than Hong Kong Chinese and the Americans and hence considerably higher than the Hungarians. In 1993 Karpowicz-Lazreg and Mullet replicated the study in France but also investigated education and gender impacts of risk perception. The mean risk judgement ratings were very similar to that of the Americans. Similar conclusions were also found in a later French study (Poumadere et al., 1995). Studies have found that Americans, Hong Kongese, Bulgarian, Japanese, Brazilian (Nyland, 1993), French and Polish subjects have high mean risks and Swedes (Nyland, 1993), Russians, Romanians and Hungarians have low ratings (Boholm, 1998). This evidence indicates that though the risk ratings vary throughout the globe as a mean and for different risk activities, the two dominant factors ‘dread’ and ‘unknown’ constantly have a significant influence.

Other Applicable Dimensions of the Psychometric Paradigm

There are two other dimensions of the psychometric paradigm that are most applicable to the types of risks in this study: personal impact or benefit and controllability.

It has been found that the greater the benefit for an individual, the greater the tolerance of risk is amongst individuals (Slovic et al., 1982; Gregory & Mendelsohn 1993). This is apparent across many disciplines including construction. A simple example being: the mining industry is perceived a very high risk environment for workers yet reports (e.g. Moss, 2011) have suggested that workers appear unfazed by the risks, with the dangers being offset by the financial benefits. Controllability is linked to voluntary risk-taking (Sjoberg, 2001). Risks such as being a passenger on a plane could be deemed ‘voluntary’ but because the individual is not in control of the risk, the risk level associated is higher. In construction, most risks are taken by individuals that are in ‘control’.

METHOD

Research methods in the construction industry have been rather narrow, with Phelps and Horman (2010) arguing they are inadequate for exploring the complex interactions which lie at the roots of the industries widespread problems. Dainty (2008) has suggested that through qualitative and interpretative research, richer insights into the industry may be found. Ethnography – where the researcher observes and writes about a culture from the point of view of the subject – is an established qualitative research method that has become part of the research approaches used in the construction industry (see Pink et al., 2013). This method can provide extensive and in-depth findings, but there are also limitations to this approach. Though it was not a restriction in this study, ethnography is time consuming. It is also strongly reliant upon establishing rapport with subjects, which can be challenging especially in industries such as construction - an industry that Loosemore (1998) describes as ‘confrontational’. The main drawback is related to reliability, as the natural setting cannot usually be reproduced (Nurani, 2008). Criticisms such as unreliability and lack of validity of findings are often associated with ethnography and while some ethnographers ignore such criticisms, others
address them but this often requires different techniques from those that were originally used (LeCompte and Gotz, 1982). The investigation used an ethnographic approach on a large civil engineering project in the UK (+£500m) utilising a ‘moderate participation observer’ stance. DeWalt and DeWalt (1998) suggest this can provide a good balance of involvement – for example, through observations and conversations with those involved – and necessary detachment to remain objective.

Thirty different unsafe acts were identified throughout a one year period and ranged in severity from potential first aid attention to a potential fatality. The acts selected were chosen as they were useful examples of the affect of risk perception on personal safety within the wider ethnographic study. To determine the importance and influence of risk perception, the unsafe acts were initially coded into factors which had influenced the behaviour. These factors were previous highlighted in literature and consisted of: poor management style, alcohol & drugs, poor risk perception, substandard design, inexperience, time pressure, national culture, lack of training, risk taking tolerance, tiredness, confidence and thrill seeking. Acts that were likely to be or could have been influenced by any of the factors were coded with that factor. This data was then coded and further explored using the computer software programme, Nvivo. It was deemed that all of the thirty acts were likely to be or could have been influenced by a poor risk perception.

The psychometric paradigm was then applied to the thirty examples taken from this study to attempt to investigate poor risk perception. The conclusions of this analysis were consistent: all were dread risks, known risks and almost all were undertaken by individuals under personal control of the risk. The vast majority also had personal benefit that usually involved saving time. To further demonstrate this finding the remainder of this paper provides first a discussion of ten of the unsafe acts recorded for this research followed by a quantitative application of the psychometric paradigm to these examples.

**ANALYTICAL NARRATIVE**

Below are ten examples of the influences on risk perceptions found in this case study are discussed in detail.

**Risk Compensation**

Risk compensation is a controversial theory (O’Neil, 1998) that suggests there is a certain level of risk at which people can accept that they are exposed to. Therefore, if a safety measure is introduced that reduces the risk; people can adjust their behavioural response i.e. take on more risk. This can lead to an unjustified lower level of perceived risk and hence more risky behaviour (Sheehy and Chapman, 1987). For example, if seat belts are worn (the safety level increased), then the individuals can drive faster to reach their destination (behaviour change due to increased safety from seat belt). Therefore, according to this theory, the introduction of a safety measure is, in the long run, eliminated by human behavioural response (Peltzman, 1975). There were a couple of examples which to some extent supported the risk compensation theory. Following the issue of flame-resistant (but not fireproof) overalls to hot works operatives, there were two incidents where operatives were set on fire (example 1). From a discussion with one of the operatives, he stated that he had never been set on fire in 25 years until he was given the fire protection. An investigation into the incident by safety advisors found that the operatives had
taken a more comfortable but riskier stance during the work – a behaviour which increased the likelihood of this accident. This behaviour and the poor quality of the clothing resulted in the fire. Soon after, a similar incident occurred with another worker who was also just given fire resistant clothing. The other example occurred when a harnessed scaffolder was seen ‘monkeying around’ and using inappropriate access around the scaffold (example 2). When questioned, the scaffolder thought his behaviour was safe because he was harnessed on, but this is not good practice and is a clear example of safety measures affecting behaviours through risk compensation. In these circumstances the perception of risk had been altered by the introduction of a measure implemented with the intention of improving safety.

**Risk Taking, Confidence, Trust and Thrill-Seeking**

Risks may be taken if it is perceived risk is low, even if the benefit for taking such a risk is low. A common unsafe act that occurred on this construction project was breaking a well-known safety rule: workers are not permitted to use mobile phones in non-designated areas (example 3). The likelihood of an accident occurring due to lack of concentration (e.g. walking and talking on the phone and tripping) does increase when on a mobile phone but nevertheless it is still unlikely. Despite workers knowing that this behaviour is not acceptable and the benefit usually being low (e.g. you do not have to walk to a safe place and return the call) this risk is often taken. The more often the risk is taken, the more confident the risk-taker becomes – a factor which is known to have a negative impact on risk perception (Siegrist et al., 2005). Confidence can lead to complacency: for example one operative was observed hammering while not looking at what he was doing, instead having a conversation with his colleague (example 4). A more severe example occurred when the driver of a transportation boat (full of workmen) became confident and relaxed with the surrounding risks. A near miss occurred on a dark evening when the transportation boat narrowly avoided a tanker vessel (example 5). It is good practise for the transportation boat to be crossing the river at a 90 degree angle, but instead the boat took a quicker route and crossed at around a 45 degree angle (an example of benefit). The radar was on and working but the driver did not notice the tanker. The transportation boat carried on at a fair speed until it was radioed urgently by the tanker, and the transportation boat turned sharply left narrowly avoiding a collision. Though this could have been perceived as a dread risk, (many fatalities were possible) in post-incident witness statements, none of the passengers said they felt in danger which is also a sign of general trust influencing risk perception. The passengers trust the drivers, since they the journey has been completed safely numerous times. High levels of trust have been found to reduce risk perceptions (Siegrist et al., 2005).

Individuals that become so relaxed and confident with surrounding risks can even partake in risk-taking for thrills. Through ethnography this can be difficult to conclude whether risks were taken for thrills; but one example of this did occur when an operative avoided a ladder instead using the tubing on a work elevated platform to climb up around 8ft (example 6). On inquiry he self-confessed that he was very bored with the work he had been doing and did it for excitement. Over-confidence can become dangerous and effect individual’s risk perceptions, especially when they are being exposed to the same risks. Confidence usually comes with experience and can lead to relaxed safety behaviours, but inexperience can also effect risk perceptions. For example, an inexperienced banksman was standing next to the rear
of a tipping wagon, while it unloaded (example 7). The banksman was at risk from falling material and could not be seen by the driver. It was only the banksman’s second day on the job, and his lack of experience influenced his perception of the risks. A mixture of an experienced but cautious individual represents a good balance for risk perceptions.

**Voluntary Risks, Benefit & Work Pressures**

A factor present in many of the unsafe acts is voluntary risk taking. Individuals feel more comfortable with voluntary risk taking (Starr, 1969) since they are in control. A common unsafe act that occurred was the delivery drivers breaking the speed limits on-site (example 8). Since the drivers feel they are in complete control of this behaviour the risk is more likely to be accepted. Another influence on this behaviour is benefit. Drivers can be paid by delivery, which encourages risk-taking behaviour because of the greater benefit. Benefit systems are known to encourage risk-taking behaviour (Sawacha et al., 1999) but there were such systems used on this construction project ‘unofficially’ and unknown to senior management. Such unofficial benefit systems improve relationships between operatives and their supervisors but distort perceptions of risk. Good relationships with the operatives are very important for supervisors, as in a time of need they can rely on their workforce e.g. if extra work was required to be completed at the weekend. Work and time pressures can push middle-management to taking more safety risks. For example, there was an occasion where a beam delivery was due at the beginning of the following week. If the team were not ready for this delivery, they would need to wait a month for the next one. Therefore to stick to the tight schedule, around 20 operatives were working in an area that should have only had four or five workers in it (example 9). Such time pressures are a fairly common factor that can influence risk perception and risk taking. Even short time savers can cause an incident, for example, a crane cut a corner across a non-ground bearing surface (despite knowing to stay on the tarmac) and crushed the service cables running underground (example 10). These examples indicate a link between time pressures and benefit – work pressures cause risk-taking for benefit. The inverse relationship between perceived risk and perceived benefit has been found to be strengthened when time pressures are involved (Finucane et al., 2000).

**REFLECTIONS: APPLYING THE PSYCHOMETRIC PARADIGM**

The psychometric paradigm uses numerous qualitative dimensions of risk. According to Jenkin (2006), the most commonly used include: immediacy, expert knowledge, controllability, novelty, delayed, certainly fatal, increasing, preventability, inequitable, affects future generations, global catastrophe, catastrophic potential, easily reduced and observability. Almost all unsafe acts in this study fell into the same categories for the above dimensions. For example, none of the unsafe acts could cause ‘global catastrophe’, they can all usually be ‘easily reduced’, consequential effects are almost always known immediately and are very unlikely to affect future generations. The other four dimensions (voluntary, known, dread, personal impact) that Jenkin’s highlights are most applicable to the unsafe acts that have been discussed. The psychometric paradigm has highlighted two clear factors when individuals are rating risks: dread and unknown risks. The unknown and dread
dimensions are applicable because they have been found to cause the variance in risk perception ratings.

<table>
<thead>
<tr>
<th></th>
<th>Known</th>
<th>Voluntary</th>
<th>Control</th>
<th>Catastrophic Potential</th>
<th>Dread</th>
<th>Personal Impact</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative on caught on fire</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Major injury or Death</td>
</tr>
<tr>
<td>Scaffolder 'Monkeying around'</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Death</td>
</tr>
<tr>
<td>Mobile walk and talk</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Major injury or Death</td>
</tr>
<tr>
<td>Hammering and not looking</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Minor injury</td>
</tr>
<tr>
<td>Potential boat crash</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Multiple Deaths</td>
</tr>
<tr>
<td>Climbing scaffold tube</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Death</td>
</tr>
<tr>
<td>Bankman behind tipping wagon</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Death</td>
</tr>
<tr>
<td>Delivery drivers speeding</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Death</td>
</tr>
<tr>
<td>Overcrowded beam delivery</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Major injury or Death</td>
</tr>
<tr>
<td>Crane crushing services</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Damage</td>
</tr>
</tbody>
</table>

Table 3 - The ten discussed unsafe acts analysed by the most relevant dimensions in the psychometric paradigm

This study suggests that in the construction industry it is rare that there are any dread risks. As dread risks are perceived as higher risk than non-dread risks, individuals can under-rate these non-dread risks. The other factor is unknown risks. Unknown risks are perceived as a higher risk than known. This study suggests that in the construction industry the vast majority of risks are known, usually because the risks re-occur again and again e.g. working at height. Such known risks can become under-rated, especially if an individual is constantly exposed to the same risks and becomes confident and relaxed around them. Unknown risks and dread risks are feared, and as the summary in Table 1 illustrates, all the risks were known and all were non-dread, meaning that they could be under-rated. The potential boat crash could have caused a multiple deaths, yet perhaps somewhat surprisingly from evidence gathered in the witness statements, this risk was not dreaded.

Individuals have been found to be more willing to accept ‘voluntary risks’. This is heavily linked to ‘controllability’, where less risk is associated with situations that are under personal control (Sjoberg, 2001). There was one example in this study where individuals were not in control - the passengers in the potential boat crash scenario. In the vast majority of situations individuals were in control, which is associated with less risk and hence scenarios could be under-rated. In many of the situations, there was personal benefit distorting the perception of risk. The type of personal benefit was almost always to save time. The delivery driver speeding is perhaps the most obvious example, but there are many others such as: the crane diverting off the tarmac to cut a corner (but crushing the underground services), the overcrowded work area to finish work in time for the beam delivery, the scaffold ‘monkeying around’ to move quickly around the scaffold and the supervisor walking and talking on his mobile phone rather than walking to a safe area and returning the call.

CONCLUSIONS

Literature has found that risks that are voluntary and under personal control are more likely to be taken and that non-dread and unknown risks can be under-rated. From applying this knowledge to the construction industry it can be concluded that since the vast majority of the risks in this case study were voluntary, under personal control and non-dread and known risks in construction, they were more likely to be accepted and under-rated. This conclusion could be significant since a poor
perception of risks has been suggested to being the most common factor in the unsafe acts investigated in this study. Other common influences on the perception of risk were found to be work pressures and benefit, and these are often strongly linked. Work pressures often cause risk-taking for timesaving benefits. Reducing these time pressures is difficult to achieve in practise, but the findings suggest that to improve safety in the industry potential improvements should be investigated.

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THOUGHT CONSISTENCY QUESTIONS IN SAFETY CLIMATE SURVEYS: A CASE STUDY EXAMPLE

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Safety climate surveys are often used on large construction projects in an attempt to understand, improve and track the safety culture. This investigation is based on two safety climate surveys conducted 6 months apart on a very large (+£500m) UK civil engineering project. The aim of this study is to explore the validity of the safety climate survey and the use of ‘thought consistency’ questions. ‘Thought consistency’ questions are questions which are asked more than once, usually in a different way, to act as a check or a trap. The findings from this study suggest that the ‘thought consistency’ questions that were personalised (such as ‘my safety matters more than money to my employer’ rather than ‘safety always comes first, even if it affects profit or productions’) gained a different response than impersonalised questions. Therefore, even though the question appears very similar, if not the same but worded differently, the results varied due to the personalised nature of the question. The content validity of the survey was analysed using Lawshe’s content validity ratio. This check was not only useful for measuring the content validity but identified questions that were perhaps not necessary. The survey highlighted a particular department as an area for concern, since it had shown poorer safety attitudes than the rest of the project. As poorer attitudes are linked to an increase in likeliness of accidents and incidents, the accident-incident register for a 6-month period after the survey was scrutinised. This particular department that was highlighted (35% of the total respondents) was found to have far more accidents and incidents than all of the other departments combined, suggesting that, to a certain degree, the survey was able to forecast future trends.

Keywords: Construction, Forecasting, Personalised Questions, Validity

INTRODUCTION

Safety climate surveys are a relatively new way for construction companies to measure and track their safety climate. The content within safety climate surveys in the industry is extremely varied, which ultimately affects how well the survey can predict future trends. The first aim of this paper was to investigate the importance of the wording on questions that were used as a check, sometimes known as ‘thought consistency’ questions. The second aim was to explore the content validity of the safety climate survey used on a large construction project and to establish whether this survey could predict future trends.

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‘Organisational climate’ first came to light in the 1970s and referred to a global concept underlying the events and processes of an organisation (Guldenmund, 2000). During the 1980s this concept became known as ‘organisational culture’ and nowadays this is the case, with ‘organisational climate’ being a manifestation of ‘organisational culture’. Safety culture is essentially a subculture of organisational culture, where the three levels of organisation culture (artefacts and behaviours, espoused values and assumptions) (Schein, 2004) can equally be applied to safety culture (Whittingham, 2012). Safety climate is seen as similar to safety culture and the terms are often used interchangeably, but researchers have tried to highlight the differences in the terminology.

LITERATURE REVIEW

Safety Culture v Safety Climate

Safety culture is seen as a more embracing term than that of safety climate. Guldenmund (2000) suggests that safety climate refers to the organisations attitudes towards safety, while safety culture is more than that, embracing concerns with underlying beliefs and convictions of those attitudes. He concludes was that safety climate could be used as an alternative measure to safety culture. In Zohar’s (1980) well-established work he used safety climate to describe a construct that captured the employee’s perceptions on the role of safety within the organisation. Various other definitions have been alluded to including Budworth’s (1997) more literal meaning of the ‘safety temperature’ within the organisation. Climate was described by Glendon & Stanton (2000) as more superficial and it is now accepted that safety climate is a surface expression of safety culture (Wamuziri, 2013). The definition of safety culture is not universal either, with explanations ranging from a simple short-hand term for an organisation’s ‘culture of safety’ or those ‘cultural influences impacting safety’ (Hale, 2000) while the Health and Safety Commission (1993) has a more detailed definition of safety culture:

‘The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization’s health and safety management.’

Guldenmund’s (2000) well received paper on safety climate and culture, gives a comprehensive review of all the used definitions of both phenomenon. Safety culture first made an appearance in the 1987 OECD Nuclear Agency Report following the devastating Chernobyl disaster in 1986. Following this report many enthusiastic researchers investigated the effects of safety culture in the work-place, with Pidgeon (1991) describing it as ‘the most important theoretical development in health and safety research in the last decade’. A poor safety culture has been identified as one of the main reasons as to why accidents have occurred on many different construction sites. From 100 random accidents that were investigated by the HSE (2003), it was concluded that safety culture contributed to over half of them. Hence, there has been significant research into this concept in modern times and various attempts to measure the three main components of safety culture: psychological, situational and behavioural. While situational aspects can be seen through the management systems, and behavioural aspects are measured by techniques such as from observations and self-report measures; psychological components are commonly measured by questionnaire surveys.
Safety Climate Surveys

The construction industry traditionally has used accident rates and compensation statistics as methods of measuring its safety performance. Though these are important indicators, the ‘softer’ measuring techniques such as safety climate surveys remained largely ignored until after the millennium, with Mohamed in 2002 suggesting they were in their ‘infancy’. In fact, before the millennium there was virtually no research examining factors such as safety climate in construction (Grubb and Swanson, 1999), despite Zohar’s (1980) important work. Zohar’s work coined the phrase ‘safety climate’ in the initial study of the phenomenon, which found that an employee’s perception of management was the most important predictor of safety climate. Exploration into safety climate measures has increased in recent times and such measures have tended to be used as substitute measure of the safety culture. Safety climate surveys may have struggled to make an impact due to their ‘soft’ nature in what is undoubtedly a ‘hard’ industry. Nevertheless, there have been a few examples of where climate survey approaches have demonstrated considerable value in improving safety performance such as: Donald and Canter (1994) who found a set of scales, used in the chemical industry, that reliably measured safety attitudes and Carroll (1998) who used a nuclear plant case study example to show how surveys were used to identify problems within a departments safety culture. Though these successes support the use of safety climate surveys, there are limitations to this type of research. The survey method only provides a superficial description of culture within an organisation and practises are often too complex to be meaningfully described through wording in a survey (Hopkins, 2006).

Survey Validation

Validating a survey is of great importance. Fink (2002) in ‘The Survey Handbook’ highlights four types of validity: content, face, criterion and construct. This study focuses on content validity, face validity and one of the two subcategories of criterion validity, predictive validity. Content validity makes reference to the extent at which the survey has measured what it was intending to measure. Lawshes (1975) content validity ratio is a widely used measure of this. Face validity does not rely on an established theory but simply refers to how a measure appears on the surface. To establish face validity it is worth noting if all the relevant questions were asked and in the appropriate language. Criterion validity is the most complex type of validity which has two subcategories: predictive validity and concurrent validity. Predictive validity is the degree to which the survey can predict future trends. Concurrent validity occurs if the survey results correlate highly with an already validated survey. Attempts have been made to validate safety climate measures, usually by comparison with retrospective accident data. Though there is logic to this validation process there are shortcomings to such a process due to issues with, for example, under-reporting. Nevertheless, it is not easy to derive an improved validation process. Quantified risk assessment calculations may be an alternate validation method as there is evidence that these align with workers risk perceptions on offshore oil platforms (Fleming et al., 1998). Results of validated studies are encouraging (Flin et al., 2000) but a comprehensive meta-analysis is required (Turner and Pidgeon, 1997) in order to eradicate any failing factors. Cheyne et al. (1999) found that a structural equation modelling method is beginning to indicate which factors inter-relate and if they directly or indirectly influence unsafe behaviours.
Surveys often use quality control questions to check that their data. Such quality control questions can also be described as ‘thought consistency’ questions. Thought consistency questions usually ask the same or similar questions but worded in reverse. For example, one question could be ‘I often get stressed at my work’ and later ask ‘usually I am relaxed in my work’. These questions are sometimes used as a ‘trap’, with those that give inconsistent or contradictory answers having failed (Downes Le-Guin et al., 2012).

Modelling Safety Climate

Questionnaire based methods are useful for gauging the safety climate of an organisation (Wamuziri, 2013) and there have been several attempts to model the safety climate of organisations using this research method, however thus far there is no accepted and unified model. Variance in modelling techniques is often due to the requirements and input from the sponsoring body (Flin et al., 2000), though there has been a few replications of independent questionnaires (e.g. Dedobbeleer and Beland, 1991). The wide range in styles (content, sample size and composition and method of analysis) of survey questionnaires has made it no simple task to compare findings, not only because of the methodological inconsistencies but also the language and cultural differences across countries and industries (Flin et al., 2000). A factor analysis has been typically used to identify the underlying structure, but researchers have found between two and nineteen factors that influence the safety climate. A result which led Coyle et al (1995) to state that it was ‘highly doubtful’ a universal and stable set of safety climate factors would be established.

RESEARCH APPROACH

In a seven-month period on a large construction project in the UK, two safety climate surveys were completed. The number of respondents increased by over 50% between the first and the second survey (n=309 and n=475). These two surveys were exactly the same, comprised of 128 questions and took around 15-20 minutes to complete. The first survey was completed in August 2012 by 309 respondents: 86% were male, 36% were labour force, 50% supervise others and 41% had less than six months on the project. The second survey was undertaken in March 2013, and had 475 respondents: 92% were male, 55% labour force, 45% supervised others and 38% have less than six months on the project. The surveys had a mixture of 5-point Likert scales (strongly agree, agree, neither, disagree, strongly disagree), unbalanced 4-point scales (always, sometimes, rarely, never), 3-point scales Likert scales (high, medium, low) and forced choice ‘yes’ or ‘no’ questions. Researchers have attempted to find the number of scale points that maximise reliability but with contradicting results (Chang, 1994). Details on the respondents age, job title, employer, department and if they were a parent were asked in order to scrutinise the results closely for trends in particular groups. The survey covered a wide range of questions including: the respondents experiences since joining the project from an induction and training to witnessing and reporting unsafe acts; whether production pressure influenced safety; whether safety briefings are relevant; whether the respondent would challenge another worker in an unsafe act; whether their boss would understand if the respondent stopped work for safety concerns.

Three different methodological approaches were used to analyse the validity of the survey and the thought consistency questions. The thought consistency questions
were identified and the survey results (percentages) compared. This simple quantitative comparative analysis was used on questions which were based on time pressures, money and safety procedures. Two aspects of validity were examined: the content validity (including the face validity) and criterion validity, or more specifically predictive validity. Using five subject-matter experts (SMEs), the content validity was examined using Lawshe’s (1975) well-established ‘content validity ratio’. The ratio for each item was then compared with Lawshe’s critical value for five SMEs. The predictive validity was investigated using the accident and incident figures for the next six months after the second survey. Using these figures, comparisons were made between a department (35% of overall respondents) that the survey had highlighted as an area of concern and all the other departments combined. A functionalist perspective on safety climate was taken, where the safety climate is assumed to being interdependent of the safety performance.

**SURVEY ANALYSIS**

The following two sections analyse the survey in different ways: the first attempts to investigate thought consistency questions and the second the validity of the survey.

**Thought Consistency Questions**

The external consultant used thought consistency questions which were similar and not reversed but used a different scale. For example, respondents were asked the following ‘yes or no’ question: ‘Have you worked when you didn’t think it was safe to?’. Later in the survey, using a 5-point Likert scale (strongly agree, agree, neither, disagree, strongly disagree), respondents were asked to what extent they agreed that ‘I have worked when I thought it wasn’t safe to do so’. On the first survey, 8% said ‘yes’ and 12% ‘strongly agreed’ or ‘agreed’. On the second survey, 12% said ‘yes’ and 14% ‘strongly agreed’ or ‘agreed’. To compare the two, the percentage difference between ‘yes’ and the combination of ‘strongly agree’ and ‘agreed’. The first and second surveys had questions which related to time pressure affecting safety. Though the questions were not the exact same or exact opposites, there was still a strong resemblance. Using a 5-point Likert scale, two questions asked: to what extent do you agree that ‘I take shortcuts with safety to get the job done quickly’ and ‘Safety will not be affected by time pressure on this job’. On average, 50% strongly disagreed that they ‘take shortcuts with safety to get the job done’, yet only 23.5%, on average, strongly agreed that ‘safety would not be affected by time pressure on this job’ - a clear inconsistency.

The column chart below (see Figure 1 on the next page) compares two reversed questions used in both surveys: ‘Production pressures get in the way of safety’ and
‘There is not enough time to do my work safely’. The results between the first and second survey are closely related, but the thought consistency is not demonstrated. On average, 71.5% thought that was ‘always’ enough time for them to do their work safely, but only 17.5% thought production pressures ‘never’ got in the way of safety. While these questions are not exact opposites, a closer correlation of results might have been expected. One interesting point to note is that, when the question becomes personal with ‘I’ or ‘My safety’ the results seem to differ e.g. ‘Production pressures get in the way of safety’ and ‘There is not enough time to do my work safely’. It could be the case that there are a significant percentage of individuals that think they have time to do their work safely, but are aware of others that don’t.

This personal aspect was further investigated and many of the other questions gave the same conclusion: a personalised question gave a different result to a non-personalised question, despite appearing to being very similar or the same question. For example, respondents were asked to what extent do you agree that ‘My safety matters more than money to my employer’ and ‘Safety always comes first, even if it affects profit or production’ (see Figure 2 below), this time using a 5-point Likert scale.

![Figure 22 - Time pressure thought consistency questions using a 4-point scale](image-url)
When the question became personal the results changed. Fewer respondents ‘strongly agreed’ (38% average) that their safety mattered more than money to their employer, yet over half (52% average) strongly agreed that safety comes first, even if it affects profit or production. The greatest limitation of this comparative analysis is that though these questions are very similar and likely to be interpreted in a comparable manner, they are not exactly the same or exactly opposite. Therefore, some difference is to be expected in these thought consistency questions. However, this difference is unlikely to be of the quantity shown in these results. For example, when 71.5% agreed that there was ‘always’ enough time to do the work safely, it would be expected that a similar figure would agree that production pressures ‘never’ get in the way of safety, but only 17.5% did - a sharp contrast to 71.5%. This suggests that the results still change when the question is personalised.

There was another set of consistency questions worthy of note. In the second survey, 91% of respondents strongly agreed or agreed that ‘they take responsibility for the safety of workmates’. However, when asked if they would challenge a workmate who was: speeding (52% said no), not wearing gloves (50% said no), not clearing up (49% said no), not wearing eye protection (46% said no), using a mobile phone in an unsafe place (45% said no) and the list continued. On a vague question like would they ‘take responsibility for the safety of workmates’, the vast majority agreed (91%) but when asked more specific questions on taking responsibility and challenging their colleagues, this number dropped, in some cases, to around half.

**Validity**

Content validity is essentially whether the survey assesses the characteristics it was intended to measure. Lawshe (1975) developed a formula that determines the ‘content validity ratio’. The ratio is based on responses from subject-matter experts
(SMEs), whom are required to respond to the following question for each item: is the skill or knowledge measured by this item ‘essential’, ‘useful but not essential’ or ‘not necessary’ to the performance of the construct? Five SMEs within the safety department at the project completed this question for each item. Lawshe’s work states that at least half of the SMEs must deem the item to be ‘essential’ for that item to have at least some content validity. The overall number of items that were identified as ‘essential’ by each SME is tabulated below as a percentage. The ‘useful but not essential’ and ‘not necessary’ items have been grouped together into the ‘not essential’ column to allow for simple comparisons.

<table>
<thead>
<tr>
<th>SME</th>
<th>Essential (%)</th>
<th>Not Essential (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>87</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>61</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 4 - Overall number of items deemed essential

For five SMEs, Lawshe gives a critical value of content validity ratio of 0.99. Hence, for an item to pass this critical value, all five SMEs need to deem the item ‘essential’. 44 of the 128 questions passed this critical value. This analysis was useful for highlighting items that were perhaps not required. A 25-question section in particular had a low content validity ratio, suggesting that it should possibly be completely removed. This section had the question: ‘To what extent do you think you are at risk in your daily work?’. A wide range of various risks then followed including a ‘trip over object’, ‘eye injury’, ‘radiation’ and ‘fatigue’.

Using a face validity approach, it appears that throughout the survey, the appropriate language appears to be used almost all the time. The language used was basic, which is ideally suited for the respondents as there are some that struggle to read and write. It was also translated into foreign languages for those who were non-native English speakers. Having said that, there were areas where the survey could have been improved. Surveys should try and avoid bias, leading, emotional or evocative language. The following question uses a strong negative word: to what extent do you agree that ‘peer pressure sometimes makes me do things I know are wrong’. The word ‘wrong’ should have been avoided, with something like: ‘peer pressure influences me to work unsafely’, being a preferable option. Another question was ‘double-barrelled’: ‘My concerns about safety are listened to and acted on’. This is double-barrelled as it really is asking two questions: ‘are your concerns listened to’ and ‘are they acted on’.

Another example was a question that asked to what extent you agree that ‘I am at risk every day’. Everyone is at some risk every day, so is this question asking whether the risks that the respondents are exposed to are acceptable? The results of this question were not simple to analyse either. More construction employees thought that they were at greater risk than in the previous survey, but is this because the site now has more risks, more labour-force or because workers have improved their risk
perception? Another question asked if ‘we could complete this job without a serious accident’. Though this question could also be interpreted differently as what constitutes a serious accident? Would a broken ankle be determined serious? Such a question is bound to be interpreted differently by respondents and should have been more specific. One of the two subsections of criterion validation is predictive validity - whether the survey can forecast future trends.

The second survey highlighted one large department that had: ‘more unsafe behaviours; lack of adherence to procedures and rules; loss of confidence in safety management and confusion to which rules apply’.

![Figure 23 - Accident Incident statistics for the six months after the second survey](image)

A separate presentation was given to this department as they had been highlighted as an area of concern. The accident and incident figures for the next 6 months after the survey were compared for this highlighted department against all the other departments combined. The results can be seen in Figure 3 above. The highlighted department was large but still only compromised to 35% of overall respondents. From the respondents who were ‘labourers’: the highlighted department had 104, compared to 157 within the combined other departments. The survey had revealed poorer safety attitudes and more unsafe behaviours in this highlighted department, and therefore on this basis, it would be expected that more incidents and accidents would occur in the highlighted department. Clearly in the 6 month period after the survey was completed, the highlighted department had far more accidents and incidents. This suggests that this survey, to a certain degree, managed to predict future trends. Assuming that the functionalist approach used (i.e. that poorer attitudes and more unsafe behaviours will cause more accidents and incidents) is a sound interpretation, this finding adds weight to evidence that safety climate surveys can forecast future outcomes.
CONCLUSIONS

The aim of this paper was to analyse the ‘thought consistency’ questions and the validity of safety climate surveys using a sample of two from a large UK civil engineering project. The survey results indicated that thought consistency questions appeared to not act as a successful check or trap when a personalised question was compared with an impersonalised. Hence, it is recommended that future surveys should only compare personalised thought consistency questions with other personalised thought consistency questions, and likewise, impersonalised with impersonalised thought consistency questions. Thought consistency questions are an important check but these questions need to be carefully worded to be of use. It is also valuable to use a consistent or comparable scale for analysis. In this survey, there were cases were four or five consistency questions were used, but with different scales, which made direct comparisons impossible. Although the majority of questions showed at least some content validity, only 44 of the 128 questions passed the Lawshe’s critical value for content validity. Lawshe’s content validity ratio is not only useful for measuring content validity but it identified items which scored poorly and hence could be deemed not necessary. It is recommended that the creation of safety climate surveys should involve this check to identify questions that are potentially not required, since such questions could be adding unnecessary length and diluting the results. The survey highlighted a particular department (35% of respondents) as an area for concern. In the following six month period this department had far more accidents and incidents than the rest of the departments combined, suggesting that safety climate surveys can, to some degree, predict future trends.

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Handling the Hawthorne Effect: The Challenges Surrounding a Participant Observer

David Oswald, Fred Sherratt and Simon Smith

Abstract

Participant observation can be an excellent way to gather qualitative data and observe real behaviours, provided the participant observer does not cause a behavioural change from the norm. Such a change in behaviour is known as the Hawthorne effect – where people modify their behaviour when they know they are being watched or studied. The Hawthorne effect is one of the greatest challenges research observers face when gathering data and has long been described as the ‘Achilles heel’ of participant research (Coombs & Smith, 2003). This challenge is discussed based on experiences from gathering data on behavioural safety and attitudes on a very large civil engineering construction project currently underway in the UK. The proposed six-stage protocol helped the participant observer witness real behaviours and true attitudes of the workforce while limiting the potential negative consequences of the Hawthorne effect. A case study example using this protocol suggests that it is important that the researcher becomes successfully immersed in the social setting by gaining trust and making the workers feel relaxed and unthreatened. The paper also discusses other challenges associated with an ethnographic approach including validity, bias, interpreting evidence and analysing the data collected.

Introduction

The Hawthorne effect is when there is a change in the subject’s normal behaviour, attributed to the knowledge that their behaviour is being watched or studied. There are actually several similar definitions of the Hawthorne effect (as discussed below), but this definition will be used for the purpose of this paper. The Hawthorne effect and other forms of reactivity can contaminate the pure social environment being studied (Hunt, 1985). Therefore it is of no great surprise that there are many ethnographers that are concerned about this phenomenon (O’Reilly, 2009). This concern has resulted in some ethnographers using covert observations to avoid any reactivity, such as in Rawlinson et al.
Ethnography usually occurs on a long-term basis, and such sustained observation can be used as a check against reactivity such as the Hawthorne effect (Adair, 1984). However, sustained observation alone does not necessarily guarantee success in overcoming reactivity, as ethnographers also rely on building trusting relationships (Carroll & Mesman, 2011) usually through participant observation. This paper proposes a six-stage protocol that aims to aid the participant observer in overcoming the Hawthorne effect through establishing rapport and building these trusting relationships. This protocol was used on a large civil engineering project (+£500m) in the UK, where attitudes towards safety and safety-related behaviours of the workforce were investigated. Using this protocol as a guideline, the participant observer was able to establish rapport with the workforce and witness real behaviours and true attitudes, while limiting any potential negative effects caused by the Hawthorne effect. A case study example of the protocol in use demonstrates that the participant observer’s subject reveals attitudes towards safety which would not ordinarily be observed before establishing rapport. Hence, this contribution illustrates that any negative effects potentially caused by the Hawthorne effect can be limited, even in confrontational environments such as the construction industry, and by using this protocol to establish rapport, real behaviours and true attitudes can be observed.

The researcher has been undertaking an ethnographic methodology for the past 18 months on a large civil engineering project in the UK. The main technique used by ethnographers is participant observation. De Walt et al. (1998) describe four different types of participant observation: passive (researcher has
a bystander role), moderate (researcher has a balance of insider and outsider roles), active (researcher participates in certain or all activities) and complete (researcher is completely integrated). A ‘moderate participation’ stance was undertaken to have a balance of insider and outsider roles, allowing a worthy combination of involvement and necessary detachment to remain objective (De Walt et al., 1998). The participant observer’s ‘insider’ roles occurred two to three times a week during the core business hours (08:00 to 17:00) and primarily involved interacting with the workforce and attending meetings, while observing and recording findings. The researcher employed an overt approach, although there were rare occasions when a covert approach was unintentionally applied. An open approach does inform the subjects that they are being studied and could cause reactive behaviour. As it is ethically important to introduce the researcher’s purpose, my position within the company was described as ‘a researcher investigating health and safety’. Health and safety is a sensitive issue in construction, and this overt approach could alter the subject’s behaviours.

The structure of this paper is in three distinct parts. The following section positions the researcher and discusses the relevant literature including the initial identification of the Hawthorne effect, its definition, challenges, criticisms and attempts to overcome it. The next section introduces the findings and, in particular, the six stage protocol that has developed from the researcher’s experience in an attempt to overcome and avoid the Hawthorne effect in research practice. The final section addresses other challenges the observer faces including interpreting evidence, validity, reliability and bias.
The Hawthorne Effect

The 'Hawthorne effect' is a phrase derived from experiments in the Hawthorne Works of the Western Electric Company in Chicago between 1927 and 1933 (Chiesa & Hobbs, 2008). The aim of the experiments was to investigate whether certain physical features of the factory, such as lighting, impacted the productivity. However, instead the Hawthorne effect phenomenon was accidently identified. Though there is no universal definition of the Hawthorne effect, it is generally accepted to be the phenomenon where participants in an experimental study alter their behaviour or performance because they are aware that they are being observed (Campbell, Maxey & Watson, 1995). The first use of the term appears to have been in the early 1950s (French, 1953) and the phrase has been used in academic texts since (Chiesa & Hobbs, 2008). It still plays a key role in the methodology of experiments, has a widespread influence in research (Jones, 1992) and demonstrates just how difficult it is to understand human behaviour in the workplace (Holden, 2000).

The Hawthorne Studies comprised of six partly overlapping studies at Western Electric Company between 1924 and 1932 (Kompier, 2006) including: the illumination studies (1924-27), the first (1927-33) and second (1928-1929) relay assembly group studies, the micra splitting test room (1928-30), the interview program (1928-30) and the bank wiring observation room study (1931-32). In industrial sociology or psychology, there has perhaps been no other set of experiments or theory that has stimulated as much research and controversy as the Hawthorne studies (Adair, 1984). The two most famous
experiments are the illumination studies and the first relay assembly group studies:

The illumination studies were undertaken between November 1924 and April 1927 after the electrical suppliers of Western Electric claimed that better lighting would improve productivity output (Gale, 2004). As expected when the lighting was high, the productivity increased. However, quite unexpectedly, when the lighting was low, at around a moonlight level, productivity still increased (Adair, 1984). The data was never formally reported and it is unknown how many participants were studied (Kompier, 2006) but a report by Snow (1927: 257–82), a representative from the research sponsor, concluded that:

‘The corresponding production efficiencies by no means followed the magnitude or trend of the lighting intensities. The output bobbed up and down without direct relation to the amount of illumination.’

Original investigators were perplexed by the findings but realised that there were other factors contributing to output.

The second form of experiment, the first relay study, inspired by the illumination study, was a very famous experiment (Kompier, 2006). It was an extremely detailed study based on five women for a five year period. The research aimed to identify how production of relays (a part used in the construction of a telephone) could be increased and what factors influenced the women’s’ work production rate. During this study various factors changed including the introduction of breaks, breaks with food and the shortened working day (Kompier, 2006). One might suspect that the productivity rate would decrease from the introduction of these changes, yet each time a change occurred, production increased. The observers found this very puzzling, but what was even
more confusing was that when the working day structure returned to the norm, with no breaks, hot lunches or incentive pay, then production peaked (Blalock & Blalock, 1968). No matter what the changes were, whether the day was shorter or longer, had more or less rest periods, an increase in productivity was still observed (Ruch & Zimbardo, 1971). It was concluded that since the workers knew that the experimenters expected the workplace adjustments to affect them, their behaviour changed (Elmes, D. et al., 1985) because of the attention (Ruch & Zimbardo, 1971) that they were receiving.

The greatest criticism of the methodology of the Hawthorne experiments was that two of the female subjects were allegedly changed during the experiment. Though there is contradicting evidence on this matter with Mayo (1933) stating they ‘dropped out’, while Roethlisberger (1941) suggests that there were not any replacements after the first year and a half, stating that ‘everyone was happy’. Regardless of whether the method was sloppy or not, the research work presented in the Hawthorne studies was ground-breaking.

The research on the Hawthorne experiments were incredibly detailed, which has given the opportunity for researchers to repeatedly re-interpret the findings. However, according to Kompier (2006) many have misinterpreted, which has meant there is no universal agreement on the findings of the Hawthorne studies and on the definition of the Hawthorne effect itself. More recently, it has become common to attribute any unexpected result within an experiment with human participants to the Hawthorne effect (Wickstrom & Bendix, 2000). Authors, such as Olson et al. (2004) and Chiesa & Hobbs (2008), have argued that the term ‘Hawthorne effect’ is often used inappropriately and
refers to such a wide range and often contradictory phenomena. Such phenomena include the John Henry effect, reactivity, social facilitation (Chiesa & Hobbs, 2008) and the placebo effect, a term sometimes used as a social equivalent to the Hawthorne effect (Wickstrom & Bendix. 2000).

It appears that in almost every academic piece of work, each author has their own definition for the Hawthorne effect and some even have two (as in Davis and Shackleton, 1975), which can be confusing. Nevertheless, the central idea appears to consistently be that the Hawthorne effect is a change in behaviour or increase in performance due to the subject’s knowledge that they are being observed. For the purpose of clarity in this study, the Hawthorne effect has defined here as *a change in the subject’s normal behaviour, attributed to the knowledge that their behaviour is being watched or studied.*

In an effort to overcome any adverse reactions from the Hawthorne effect, a separate control group – a group separated from the rest of the experiment, independent of the variable being tested, that can be used as a comparison – could be used. However, the Hawthorne effect can still occur in these situations, just in another and more specific form known as the ‘John Henry effect’, where the control group behaves differently based on the knowledge that they are the control group. This term was first used by Gary Saretsky (1972) to describe the story of an American steel driver in the 1870s. John Henry is an American folk hero that has his own statue in West Virginia and has many songs, stories, novels and plays based on him. Henry was a steel driver, a profession which involved hammering into rocks to create space for explosives to blast away the rock. In the legend, his work rate was being measured against a steam powered hammer. In
reaction to being compared with this machine, Henry worked so hard and tirelessly that he died in victory holding his hammer. The 'John Henry effect' was based on this 'tall tale' as when made aware he was essentially an experimental control, Henry reacted by working extremely hard.

Another attempt to overcome the Hawthorne effect is the process of triangulation. Triangulation is the use of more than one approach to an investigation in order to enhance confidence in the findings (Bryden, 2004). This approach may overcome the problems arising from the Hawthorne effect better than single method approaches such as control group tests (Holden, 2000). It is an important technique for the researcher in any observational study and should be used to cross-check, compare and triangulate any information before it builds the basis of a knowledge foundation (Fetterman, 1989). In some research projects it is possible that full participant observation can reduce subjects altering their behaviour when they are being observed (Bernard, 1994).

The Hawthorne experiments accidently discovered what is now known as the Hawthorne effect. This effect can contaminate the natural social environment being studied, and hence overcoming any adverse effects of this phenomenon is very important. For this particular study on a large civil engineering project, this was achieved using the following six-stage protocol as a guideline for establishing rapport and making the subjects feel relaxed in the presence of a participant observer.

**Application: Developing the Six-Stage Protocol**

‘You must be clever to be at University... aged 12.’
This was a light-hearted and cheeky comment made in reference to my youthful looks by one of the construction workers, before he proceeded to answer his mobile phone in an unsafe area. Most people would probably take this comment as an offence, but I was in fact delighted. Becoming immersed into a social setting without changing behaviours is very challenging and this was a message that, even though I was researcher investigating behavioural safety. I appeared not to be perceived as a threat, not to be influencing their behaviour and that the workers seemed relaxed around me. I was making headway in becoming what Kellehear (1993) calls an unobtrusive researcher.

The experience of feeling like an outsider is not uncommon amongst ethnographers (Pink et al., 2013). Agar (1996) even titled his book as the ‘Professional Stranger: An Informal Introduction to Ethnography’. It is necessary for an ethnographer to build relationships with surrounding participants (Jorgensen, 1989) in order to extract more accurate and detailed data. The construction industry in particular has been highlighted for having a confrontational nature (such as in Smith, 1992 and Latham, 1994). Loosemore (1998) stated that the confrontational nature of the industry was as much of a threat to effective research as it is to effective construction management. In methodological terms, there are particular challenges of emotion, sensitivity, tension, stress, pressure and uncertainty that the researcher needs to address. Though this confrontational nature only exacerbates the researchers challenge, an ethnographic approach does hold considerable promise for addressing practical, problem-based research concerned with construction sites, despite being infrequently used by construction researchers (Pink et al., 2010).
Building Relationships through Conversation

Relationships are built through conversations with surrounding participants and are a key part of participant observation. This is a significant challenge for the ethnographer especially in industries that are fraught with confrontation such as the construction industry. Building relations will not only improve the quality of data but also reduce the chances of the findings being influenced by the Hawthorne effect. But there are challenges in developing these conversations, which can be summarised as follows:

- Becoming immersed and accepted in the community (Fetterman, 2010)
- Building relationships with surrounding participants (Jorgensen, 1989).
- Ensuring people find you trustworthy and are relaxed around you (Fetterman, 2010).
- Extracting accurate information of interest from the conversation (Fetterman, 2010).
- Language barriers (Guest, Namey & Mitchell, 2013)
- Ethical issues (Kellehear, 1993).
- Conversation time restrictions.

A Protocol for Hawthorne Effect Mitigation

The six key stages developed in this paper (shown in Figure 1) are proposed to act as a protocol for participant researchers during conversations. It is more likely that the data collected from the conversation will be more accurate if the first five stages are completed before the conversation is led in the direction the
participant wishes to explore i.e., in the area that the observer is researching. To demonstrate this protocol and understand its development, a case example is provided, based on a real conversation with a worker on a large civil engineering construction project in the UK.

Figure 24 – Six stage protocol for Hawthorne Effect mitigation
Stage 1 – Gauge the Person:

The first stage can be challenging. As previously discussed ethnographers are often perceived as and feel like ‘outsiders’ in the community. As an outsider, it can be difficult to gauge the types of participants with whom the ethnographer will engage (or liaise). It is important to not only gauge the type of participants but also gauge the setting. The setting is important as people change their image and behaviour dependent on the setting, whether a professional or more social setting. It is often a good idea to try to engage with the participants in different types of settings. In this particular study, though, the work setting was where the majority of data were gathered, when in a more social setting, the data was often richer and of high quality. This was due to the participants being more relaxed in the social setting and that there was less time pressure on the conversation lengths since the participants were not working.

Case example:

In this case example, from the subject’s appearance it was evident he was a labourer and from his accent (from hearing his voice as he walked past) he was Scottish. From past experience, Scottish labourers generally have a broad accent and a ‘laddish’ nature, with interests of football, beer and woman amongst others. Though this is a stereotypical approach these are the presumptions I would make in order to adapt my behaviour and become immersed in the setting.

Stage 2 – Create a Non-Threatening Perception:

Once within the setting, creating a non-threatening perception is vitally important for the researcher. From gauging participants in the previous stage,
the researcher should have a better idea of what image to portray. Often it is a good idea to dress in a casual manner to look non-threatening. It is also worth planning your behaviour within the setting. The ethnographer is going to feel like an outsider, so thinking what type of participant observation is most suitable for the research is important. For those that are using complete or active participation, their roles within the setting are generally clear, and therefore their behaviour within the setting is more apparent. They are completely integrated into the population and therefore generally have the same roles as the other participants but this also risks ‘going native’. Going native is a danger for ethnographers that become too involved and lose their objectivity and distance (O’Reilly, 2009). Moderate participant observers avoid this problem by having ‘insider’ and ‘outsider’ roles which allow for involvement and necessary detachment to remain objective (DeWalt et al., 1998). However, their roles are not as clear and hence their behaviour within the setting becomes very important. Unlike complete participants they are not present all the time and may not undertake the same roles as the others within the setting. Therefore, they may feel more like an outsider without a clear role. In this scenario, the researcher needs to identify a clear role and behaviour within this setting. In this study a moderate participant observation approach was used. The researcher’s role is to observe, communicate and interact with the workers, but not to work with them. The behaviour of the researcher becomes important here, as the workers need to be at ease when the researcher is present. After discussions with the workers, it was clear that the workers found that those who directly observe without introducing themselves were quite daunting. It would
make the workers question themselves as to whether they were carrying out their role correctly and make them more likely to make a mistake. Therefore, as a moderate participant observer, I have since made an effort to always introduce myself on each occasion I enter a works area. My behaviour within the works areas then becomes consistent, normal and the workers know what to expect. This approach is more likely to keep the workers at ease, as they are aware who I am, my purpose and this is also the first stages in establishing rapport.

Case example:

Managing your self-presentation is a technique that can be used for building relationships (Jorgensen, 1989). For example, to go out observing construction workers in a suit with a clipboard would potentially be intimidating for the workers and hence would create a potentially threatening perception. Therefore it is important to wear clothing that will fit in with the culture, have a relaxed demeanour, be smiley and approachable. It is also an advantage to use different approaches to data collection and observation as this leads to a richer understanding of the participants and the social context (Kawulich, 2005). Therefore, in this study, different points of reference were used when observing. For example, when on-site I have been accompanied by various different personnel such safety advisors, works managers, students and PR officers as well as going alone. When with these different points of reference, I witnessed changes in behaviours from the workforce. For example, when accompanying a group of undergraduate students on a site visit and during a large concrete pour, a student and I happened to be standing next to the operator controlling the extraction of concrete with a remote control. This was one rare occasion when a direct
observation method (rather than participant observation) and unintentional covert positioning was used. Assuming I was an undergraduate student, rather than a researcher, the operator opened conversation by offering the student beside me to use the remote control. Offering a student and visitor to take control of a major concrete pour, knowing the visitor was unqualified for this task is a behaviour that would have been very unlikely to have occurred if there was a safety advisor present rather than a group of students. Behaviours that are more common when alongside the safety advisor are for the workforce to briefly stop work and quickly put on any required personal protective equipment that they are not wearing (e.g., gloves or safety glasses) and clean and clear the work area.

While it is important to realise how these different points of reference influence behaviour, the observer should also try to be aware of how his gender, sexuality, class, ethnicity and approach may influence findings (DeWalt & DeWalt, 2002).

**Stage 3 – Introductions:**

Introductions are the essential foundations in establishing rapport with the participants in the setting. Though meeting new people can be stressful for some it is important to remain calm and relaxed. Being relaxed and calm will not only help the researcher introduce him or herself but is also more likely to create a non-threatening nature. Being interested in their roles is often a good strategy and it is also important to respect their setting, which in this study was the participant’s place of work.

**Case example:**

Researcher: Alright mate, how you doing?
Scaffolder: I’m good pal, you?

Researcher: Aye, I’m no bad. What you working as on the project?

Scaffolder: I’m a Scaff, mate. What you daeing?

Researcher: Class mate - I’m a researcher looking at safety.

Scaffolder: Good son. Someone needs to look at it like! How did you get that gig?

Analysis:

Participant observation has been defined as establishing rapport and learning to act in a certain way so that the members will act naturally, before removing oneself from the community to analyse the data (Bernard, 1994). Here, the use of slang words such as ‘pal’ and ‘class’ as well as standard slang phrases such as ‘alright mate’ and ‘I’m no bad’ are typical amongst working class Scots with a broad accent. Hence, to become immersed in the setting and not to stand out, this act (using such slang words) is used so that the scaffolder is more likely to behave naturally. It is also important not to be judgemental. The slang word ‘scaff’ can be used as an offensive word used to describe someone with little money and a rough appearance. The use of ‘scaff’ within slang is likely to have stemmed from ‘scaffolder’, as scaffolding can be perceived as a relatively low paid profession and due to the nature of the job, scaffolders often have a rough appearance. Being judgemental of such a working class role would be ethnocentric, promote stereotyping and would also ruin any chance of building a friendly relationship, hence my reply: ‘class, mate’. Traits such a non-judgemental approach and openness are key characteristics of participant observation
(DeWalt & DeWalt, 1998) and any errors or miscalculations in such human relations can be detrimental to the research (Fetterman, 2010).

From previous conversations with workers, some have been dismissive when I alluded to myself as a ‘student.’ The workers appeared to be more open with a ‘researcher’ rather than a ‘student’, hence why I introduced myself as a ‘researcher’ investigating safety. From previous conversations on site, this is probably to do with some workers perceptions that students are lazy, drains on society that drink alcohol frequently. In this paper, the scaffolder’s name has remained anonymous to protect the individual’s ethical rights. This is the case for all the subjects and participants in this study, who are purposely not named or given false names. The project itself is also deliberately not identified and given the vague description of: ‘a large civil engineering project in the UK’ or words to that effect. As a participant observer, as well as to protect the participants and the project, it is also important to introduce the purpose for you being there (Kawulich, 2005).

In this case, the introductions have gone very well: the scaffolder has not been dismissive and also has not been judgemental on the fact I’m researching safety responding with: ‘Good son. Someone needs to look at it like’.

Stage 4 – Establishing Rapport

Rapport is a state of harmonious understanding with another individual and is essentially building a friendly relationship. Establishing rapport with your participants is essential for researchers as it improves communication, creates
trust and importantly improves the quality of data. This stage can be established quickly but it can also take days, weeks or even months, depending on the participants and the contact frequency. During conversations it is helpful to:

- have an open and accepting body language
- to maintain some eye contact (if culturally appropriate)
- nod and appear interested
- smile
- try to agree with the participant, as establishing rapport is about finding similarities with each other. Even if you disagree with 90% of what is being said, make it clear you agree with the other 10%
- try to use their name early in conversation. This makes the conversation more personal and helps the researcher remember it
- be complimentary where appropriate
- use previous conversations with the participant to build on for future conversations

Case example:

*Conversation continued:*

Researcher: Well I got a Uni degree in Structural Engineering with Fire Safety, then decided to go down the safety route, and got into research.

Scaffolder: Quality mate, Structural Engineering degree aye!? How old are you?

Researcher: 23 mate.
Scaffolder: That's quality! Here buddy, (turns to his friend, who is passing) this boys got a structural engineering degree at 23! Quality eh?

Scaffolder's Friend: Aye good son – that’s a good job like.

Researcher: Cheers!

Scaffolder: 23... you’re just older than my laddy!

Analysis:

It is clear that a friendly relationship is being built. The scaffolder is being very complimentary about my degree and the conversation is going to turn to his more personal family life and in particular, his son. He appears at ease and comfortable and very soon he confirms, with a cheeky joke, that he is very relaxed around me.

Conversation continued:

Researcher: Aye, how old is he?

Stage 5 – Relaxed Signal:

One of the most important stages to reach during engagement is the point where surrounding participants feel relaxed around you, as then they are more likely to express their true perceptions. The biggest indicator of reaching this stage is generally a light-hearted comment or joke, such as the comment made about my youthful looks at the beginning of the section. This stage usually occurs at some point during Stage 4 (Establishing Rapport) and demonstrates that the relationship has been built to a new level.

Case example:
Scaffolder: He’s 19... Oh I started young (he has a cheeky smile, he laughs and winks)

Researcher: Good man! (laughs and smiles back)

Analysis:

The scaffolder has made a joke that he was sexually active from a young age – a signal that he is relaxed around my presence. I smiled and laughed back, because apart from the fact it was quite funny, this continues to build the relationship as it shows that you are enjoying each other’s company. The conversation now returns to Stage 4, discussing another one of the presumptions gauged: his interest in football.

Stage 4

Researcher: He into any sports or that?

Scaffolder: Aye he’s into his football – you?

Researcher: Yea same, play for the Uni.

Scaffolder: Class mate, they play at Peffermill eh?

Researcher: Aye, got a new 3G pitch there – cost like 800 grand!

Scaffolder: Was gonna say I thought I saw that the other day when I was driving past.

Researcher: Aye its class mate – same size as Hampden!

Scaffolder: Brilliant, Scottish football needs more decent facilities.

Analysis:

Stages 1 to 5 have been successfully completed and now it is important to direct the conversation to the interest area at an appropriate moment. Note the slang language that has been present throughout the whole conversation, to
become immersed in the setting e.g. ‘mate’, ‘aye’, ‘class’, ‘quality’, ‘son’, ‘pal’ and ‘scaff’ rather than scaffold.

Stage 6 – Link to Conversation Area:

Once it is clear that the participant is relaxed in the researcher’s presence, the researcher should try to change the topic of conversation to the researcher’s interest area. The following section is an example of this protocol in use.

Case example:

Researcher: Sure does. So how long you been a Scaff for?

Scaffolder: Since I left school – needed a job for the bairn eh. (note “bairn” = “child”)

Researcher: Aye, course mate, you ever seen any bad accidents in your time?

The conversation now been linked to the interest area, and the rest of the discussion revolved around safety in construction. During this discussion the scaffolder made the following statements of interest to my research:

- He had witnessed fatalities.
- Management just mainly care about money.
- Subcontractors are promised “the world” to get the job done quickly and hence often cut corners.
- Workers coming in to do short jobs on the same site as others, such as joiners, often try to do jobs quickly and unsafely to get onto the next job.
• He had refused to work in an area he thought was unsafe and got moved to another site. Less experienced workers often wouldn't refuse to work even if they thought it was unsafe for fear of their jobs.

• Foreign workers who cannot speak fluent English should not be allowed to work on site in the UK as it is a safety hazard.

• Workers that have been taking risks for 20 years won't change their ways because they have avoided a serious accident.

Reflections

The scaffolder was very open, giving some interesting and, in some cases, controversial statements. These statements may have not been made without passing through the conversation protocol. The factual correctness of these statements is not the issue here; it is that they have been made as a true reflection of the scaffolder’s attitudes. They suggest the observer has been accepted by the scaffolder, and that observations reveal a more natural behaviour, less likely to be affected by the Hawthorne effect.

As the researcher begins to immerse into the setting the protocol becomes easier to implement. The researcher has a greater understanding of the subjects and is able to improve his judgement when attempting to gauge them in stage one. Realising what perception to adapt can also improve through on-site experience, and how to appear non-threatening. Understanding different behaviours that diverse subjects have will come through site involvement and even other seemingly less important details such as what to wear while researching, will become clearer. For example, once on approach two workers were being quite dismissive because of the green jumper I was wearing - as they were big fans of
Rangers, a Scottish football team who predominately wear blue and have a big rivalry with another team, Celtic, who predominately wear green. When blue and green hard hats and gloves were being returned for a different colour, I began to understand that those with this view-point were likely to be more than just the two workers I spoke with. Hence to even avoid this scenario re-occurring, I have avoided wearing green or blue on-site as many workers have a strong passion for football and Celtic and Rangers are two very well-supported clubs in Scotland. This is an example which demonstrates that the six stage protocol does not always work as well as the case example due to different reactions from diverse subjects. There are many other reasons such break down could occur such as language barrier issues or conversation time restriction. However, the success rate of the protocol does improve with more on-site experience and when it is proceeding successfully it is often clear to the observer. This is important as it is then obvious to the researcher when the Hawthorne effect has been overcome and avoided. The data collected from these types of successful conversations are likely to be richer, detailed and more accurate.

**Other Challenges for the Participant Observer**

**Observing Evidence**

Observation of evidence can be a powerful tool for learning about certain behaviours. In this study, evidence could be used to learn about the workers’ safety behaviours, though it was crucial to have a good understanding of the research area. For example, the following photo is taken from inside the scaffold.
Researchers without any prior knowledge in the construction industry may not recognise anything unusual, (i.e., the single planks at the end of the scaffold). Even if the researcher did notice this, he/she may not think it is of any significance. My conclusion was that it was being used for inappropriate access i.e., a scaffolder had been walking along these planks creating a risk of falling from height. Even if the scaffolder was harnessed on during this act, it would still not be acceptable practice. Though to check if this was the case, two independent employees on the project were asked: an experienced safety advisor and a works manager. Both of whom confirmed that this was the case. This process of verifying what is observed through conversations with other participants in the setting significantly reduces the risk of misinterpreting evidence.

Evidence can also become distorted. For example, when on-site I walked into the following poor access route:
My initial thought was that the workers nearby the messy access route had created the trip hazards. Again, to check that there was no misinterpretation, a nearby worker was questioned, and he responded saying that the planks of wood had instead come from the top of the scaffold. It was later confirmed by the supervisor that the planks had been ‘bombed’ or thrown from the top of the scaffold. In this case the evidence had been distorted, originally the messy workplace was at the top of the scaffold, but when I had observed the site, it had been moved. Again, understanding and checking all conclusions based on evidence is key to avoid any misinterpretations. This etic/emic challenge - emic is a view from within, while etic is a view from the outside (Pike, 1966) - is an important challenge (Kellehear, 1993) that a researcher must attempt to
overcome as misinterpreting evidence and data could lead to potentially incorrect conclusions.

**Methodological Positioning of the Study**

Whilst detailed discussions are beyond the scope of this paper, it is still necessary to position the study within its wider methodological context. A realist ontology and interpretive epistemological position have been established, which consequently raises other considerations for the participant observer.

The development of this protocol seeks to support in part the validity and reliability of the research, enabling others to repeat the research process to achieve the same depth and richness of data whilst providing confidence in the process of data collection. Within this epistemological framework, the issue of bias will need to be addressed, and in part the protocol put forward in this paper seeks to address and mitigate such effects. A key criticism of observational data is that the researcher’s own perceptions create bias. Although this point may be valid, observational research does provide a unique holistic perspective of organisational life which many other research methods do not (Hanlon 1980). It can also be argued that within the context of the construction site, some degree and application of an emic perspective is needed to translate this highly specific and unique environment to the wider reader and produce appropriate research outcomes.
Validity

The participant observer is a tool that can be used to increase the validity of the study (Bernard, 1994) as being familiar with and immersed into the surroundings can bring many benefits. For example, the observer can facilitate an involvement in sensitive activities that the researcher may generally not be invited to. Also, an ethnographer can develop questions in the native language or in a way in which the respondents would have greater understanding. With relation to the construction industry, many workers left school with few qualifications and some struggle to or cannot read or write; therefore use of more basic language is important in such a culture.

Though participant observation can increase validity, there are challenges with recording, collecting and analysing the data. Creating a sound strategy for recording observations as completely as possible is an important step for participant observers (DeWalt & DeWalt, 2011). Careful reporting and documentation of how the methodological choices were made, the circumstances under which they were recorded and how they were analysed allows the reader to not only assess the validity but allows for interested parties to reproduce the work if they desire. Bernard (1994) suggests the observer should remain naïve yet competent, to only record what he/she sees rather than what is implied and to not speak to any other participants about what has been seen before recording the data.

The first challenge to address when gathering data is to assess whether the participant observer technique could give valid answers to the researchers questions (DeWalt & DeWalt, 2011). Though this may not be obvious at the
beginning of the work, as the research progresses it will become clearer what questions could be answered using participant observation. The overall aim of the wider research in this study is to identify which factors influence unsafe behaviours on a construction site. While some factors such as ‘time pressure’ could be answered using participant observation, others such as ‘thrill-seeking’ (where risks are taken purely to gain a thrill from it) are more difficult to interpret as how could one state for sure that an unsafe act was taken for thrills? Therefore perhaps a more appropriate research technique to investigate the ‘thrill seeking’ factor may be to use observation techniques alongside a validated psychological risk taking test.

Another challenge is selecting and determining whether the research site will yield valid findings (DeWalt & DeWalt, 2011). It is important to choose an appropriate research site and if there are two or more possible and equally appropriate locations within the site, the researcher should attempt to give the same attention. At the time of writing on the research project in question, there are construction works on land, which are mainly British-based workers and on barges, which are more of a mixture of British and European workers. Both locations are of equal interest to the researcher, so despite access to the barges being more difficult, giving both locations equal attention will help to validate any conclusions of behaviour based on cultural or national background.

As previously mentioned triangulation is an important technique in attempting to overcome the Hawthorne effect, but it is also very useful in cross-referencing observations to validate findings. Heuristic representativeness is a mental shortcut that was proposed by psychologists Tversky and Kahneman
(1974). This mental shortcut occurs when we judge the likelihood of an event by how well it corresponds with previous similar events. While this enables us to make conclusions quicker, it can also lead to errors. Participant observers should avoid making such judgement calls on activities, venues and informants without cross-reference clarification.

DeWalt & DeWalt (2011) also note that the researcher should plan on how to best analyse the collected data. For the research project in question, the majority of the data collected from this type of research will be rich, detailed and varied data, which can be challenging to analyse. Grounded theory is being used as it is a useful technique for rich and detailed data and is ideal for continuous comparisons, which suit the lengthy timescale of the project (over four years).

**Reliability**

The classical approach to ensuring reliability in a laboratory or experiment is to repeat the experiment. Though this approach is only applicable to phenomena that are unchanging and therefore when dealing with social phenomena, this would be very shaky approach, since it is almost unquestionable that social conditions are always shifting (DeWalt & DeWalt, 2011). If two researchers were to investigate the same research at the same setting but at a different time, due to the nature of social change, this may not necessarily be a fair test of reliability.

Therefore another, more appropriate way to test reliability for this research project, is to carry out several observations at around the same time (Dewalt & DeWalt, 2011). Since similar types of construction work will be reoccurring for a fairly significant period, this approach is possible for this
research. The same issues can also be discussed with a wide range of participants from varying nationalities and backgrounds. Another method for testing reliability is to have another participant observer gathering data at around the same time period (DeWalt & DeWalt, 2011), allowing direct comparisons of findings.

**Conclusion**

In ethnography, participant observation is one of the main tools for gathering and analysing data. Whilst a challenging research method if participant observation is utilised successfully, the researcher can be rewarded with unique and detailed findings. Ethnographers have been concerned with reactivity such as the Hawthorne effect - where the subjects change their behaviour as a result of being observed or studied. Establishing rapport with the subjects is essential for overcoming the Hawthorne effect and gathering quality data. A six stage conversation protocol has been outlined in this paper as a process to overcoming the challenges of this Hawthorne effect phenomenon.

There has been decades of debate over the Hawthorne studies and the true meaning of the Hawthorne effect. Through lived researcher experience on this project the early indications suggest that the Hawthorne effect does exist and remains a key challenge a participant observer must overcome. The most important stages to reach in order to overcome this challenge are to build a good relationship with the surrounding participants and to ensure they are relaxed in your presence. A signal that the surrounding participant is completely relaxed in
your company is often a joke or light-hearted comment. Through a case study example, it has been shown that the observer's subject eventually reveals behaviour which would not ordinarily be observed before establishing rapport. Despite being in a confrontational industry, this protocol will ensure further behavioural safety research can be conducted in a more robust manner, providing a better platform upon which interpretations can be made.

References


EXPLORING FACTORS AFFECTING UNSAFE BEHAVIOURS IN CONSTRUCTION

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Why do workers take a chance and work from height without any safety protection? Is it because of their age, inexperience or lack of training? Is it to do with their risk perception or desire for risk taking and thrill seeking? Is it bad management style, poor safety culture or a substandard design? Does this happen everywhere around the globe or is it just one particular culture? To help us understand why there are different behavioural responses to hazards (e.g. working at height) in construction, we must first understand the factors that have affected that individual’s decision-making. This paper presents early investigations taking place on a £1.6B project in the UK involving construction workers from many different backgrounds and nationalities. Through a process of literature exploration, a safety climate survey and focus group discussions, factors have been identified and explored to consider how they impact behaviours. The results suggest that time pressure, training, experience, risk perception, safety culture, culture and management are the factors most likely to be influencing behavioural responses of individuals. Time pressure is perhaps the most important factor as it was often regarded as having the greatest influence by the focus group. Survey results revealed 31% of 475 participants thought that alcohol and drugs were 'always' a factor in accidents, and hence this factor has somewhat surprisingly been identified as having a fairly significant influence. These factors will be further explored in future work using an ethnographic approach, which will yield significant insight from fine-grained, observational analysis on the project.

Keywords: Behavioural safety, construction, human response, factors, time pressure.

INTRODUCTION

Over the last two to three decades, an increase in research and awareness in safety has reduced fatalities by over half (HSE, 2012). However, 22% of UK employee (employed and self-employed) fatalities and 10% of reported major injuries are in the construction industry despite only accounting for 5% of British employment (HSE, 2012). During this period, construction safety has reduced fatalities mainly through focusing on improving the 'hard' issues such as managerial systems, policies and better safety technology e.g. nets, MEWPs, harnesses. However, in recent times many organisations have realised that their accident rates have 'levelled off'. This has ignited a search for improvements in other areas to reduce accident numbers; and has led to the research into behavioural safety issues of the workforce.

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The case study is not only significant in size, but also multi-national in composition; the project team involving eleven major organisations from five different countries, the contractor Joint Venture alone comprising four separate nationalities, and a workforce of over 22 nationalities. This project has therefore provided the opportunity for a PhD study to investigate behavioural safety issues on a significant infrastructure project, and how these may be influenced by the many national cultures and backgrounds involved.

This paper presents the initial findings from the study, in the form of an exploration of the factors influencing behavioural safety issues, evaluated through a workforce-wide survey and further supported by a focus group discussion. Considerations of national culture influence will form the next stage in the project and are consequently not presented here.

IDENTIFYING BEHAVIOURAL SAFETY FACTORS

Within previous health and safety research, various factors have been identified as potentially contributing to behavioural safety issues. These are summarised below:

**Alcohol and Drugs**

Using the validated AUDIT test, a study (Biggs & Williamson, 2012) of nearly 500 construction workers in Australia deemed 286 (58%) were above the cut off score (8) for hazardous alcoholic consumption. Though it is not clear how great an affect hazardous drinking out of work hours will have on safety during construction, it would be naïve to think that none of the workers would be impaired. This problem is unlikely to be just isolated to Australia, especially when the global drinking habits are considered: vast areas of Europe, including the UK, consume more pure alcohol than Australia (World Drug Report, 2012). Regarding other drug use, 292 (59%) had used cannabis at some point during their life, with 16% admitting to using it within the last 12 months. 196 (40%) had used ecstasy or meth/amphetamine type substances (ATS) during their life, with 162 (32%) having used it within the last year. Comparing that with the whole of Australia: 10.3% admitted to taking cannabis within the last year, 3% ecstasy and 2.1% ATS (World Drug Report, 2012). Drug takers of such highs, are generally high risk takers that live for the “buzz” (sensation seeking). They are aware of the risks (e.g. heart attacks, addiction etc.) but the “buzz” feeling still outweighs this consequential thinking. Therefore, one would suspect that employees with such a buzz or high thrill personality trait would be more willing to chase adrenaline-rushes through risk-taking on site.

**Experience and Training**

These two factors could be strongly linked. Experienced and skilled construction workers are reported to being less prone to hazards than inexperienced workers (Laukkanen, 1999), while human experiences influence safe or unsafe actions on-site and involvement in safety management systems (Fang et al., 2004). There is evidence which suggests that more than half of all accidents on site occur within the victim’s first week (Stokdyk, 1994). This indicates that training and in particular site specific inductions are perhaps important safety initiatives.
Management
The management have the opportunity to control risk and employ behavioural-based management systems. Such techniques are very important considering that 80 to 90% of accidents are triggered by unsafe employee behaviour (Lingard & Rowlinson, 2005) and that, in one study, risk management was a factor in 84% of accidents (Haslam et al., 2005). Unsafe behaviours are in the individual's control and also within the scope of supervisors and management to control effectively (Lingard & Rowlinson, 2005). Evidence implies that behavioural-based safety management systems are very effective in improving performance (Lingard & Rowlinson, 1997).

National Cultural
The most important theme in modern times is that the universal recognition that culture exists (Ankrah, 2007). Hofstede's (1983) cultural dimensions theory expresses the effects that a society's culture has on the values of its members and how behaviours relate to these values. Different cultural backgrounds may influence behaviours on site and could potentially cause cultural clashes leading to unsafe systems and acts; although management itself has been considered a more important determinate of behaviour at work than national culture (Mearns & Yule, 2009).

Risk Perception
General hazard/risk perception of construction workers has been found to be far from ideal (Carter & Smith, 2006). This could be a significant issue as if one does not recognise there is a risk, then one may not act appropriately. Fluctuation of risk perception amongst individuals makes it difficult to identify the causes, effects and prevention techniques for risk-taking behaviour (Haines et al., 2004).

Risk Taking and Thrill Seeking
Sensation/thrill seeking and risk taking have a strong correlation (Zuckerman, 1994). Sensation seekers take risks purely for a thrill factor rather than any other reason. Those that scored highly on the Zuckerman’s sensation seeking scale (Zuckerman, 1994), a validated psychometric test, have been found to be related to higher accident rates (Bierness and Simpson, 1988).

Sleeping Pattern/Tiredness
An alteration to sleep pattern or a lack of sleep could affect awareness and alertness, which could increase the chance of an accident. This could be linked to the use of alcohol or drugs, a shift change, clocks phase change or a return from a holiday period. While one study (Holland & Hinze, 2000) found no statistical evidence between accident rates and clock phase advances, another significantly larger study (Barnes & Wagner, 2009) established that following phase advances employees had 40 minutes less sleep, 6% more accidents and lost 68% more working days, than on non-phase change days. These findings were based on mining injuries between 1983 and 2006 – comparing the Monday after the phase advance with other days.

Safety Culture
The term “safety culture” first appeared in the 1987 OECD Nuclear Agency Report following the devastating Chernobyl disaster in 1986 (Cox & Flin, 1998). A ‘poor safety culture’ has often been identified as contributory factor in accidents, including
high profile disasters such as the Kings Cross Fire (ACSNI, 1993). Safety culture is essentially a subculture of organisational culture, where the three levels of organisation culture (artefacts and behaviours, espoused values and assumptions) (Schein, 2004) can equally be applied to safety culture (Whittingham, 2012). Though this factor is widely publicised as being very important, few authors have been able to pin-point exactly what its influence is, let alone quantify it.

Summary: A Safety 'Equation'

A combination of all these behavioural factors will potentially create a very complex safety equation on site, with behaviours influenced by some factors more than others, at different times and in different situations. These factors have all been highlighted within previous safety literature, and their relevance within a large multinational workforce was explored, in order to establish their perceived influences in practice.

RESEARCH METHOD

This study has three phases. The initial literature review, above, has informed on the likely factors as identified in previous research. The next phase was to take advantage of an existing ‘management safety climate survey’ that had already been established on the project. The third phase was closer examination of the attitudes of the workforce to the factors identified through the literature and the survey via a focus group. The safety climate survey is completed by the vast majority of project workers, office staff and site operatives, on a given day, taking a 'snapshot' of the site. Additional questions were included within the standard project survey by the research team to enable further exploration of the workforce perceptions of the behavioural safety factors identified within the literature.

Restricted by the delivery mechanism of the survey, a four point Likert attitude scale was used to examine 'which factors contribute to on-site accidents?'. Factors could only be presented as headings with no further clarification or explanation as to their content. For example, although national and safety culture are both highly complex constructs, it was not possible to define them in detail within the questionnaire. Therefore the results from the survey are therefore limited to the respondents own understandings of the factors, and which cannot themselves be further explored through this mechanism, they are arguably able to support further directed investigation by providing an indication of the perspectives of the workforce.

Following the survey more detailed understanding was developed via a focus group, which consisted of four employees working on the project: a safety advisor, two works managers from different departments and an operative. The focus group examined ten safety-related case studies (photographs and descriptions) through the findings of the survey, seeking to reinforce and further examine the factors as they related to practice through the perceptions of the group members. The group comprised of two stages, firstly each participant individually determined if the factors were 'likely', 'could be' or were 'unlikely' to be influencing safety behaviours in each of these case studies presented, if the participants felt that from the data provided they were not able to comment, there were able to select a 'not possible to tell' option. After this task was completed, the group then discussed the case studies collectively, and came to a general consensus of the influence of the factors on the case studies presented.
SURVEY FINDINGS AND ANALYSIS

The survey was completed by n=475 respondents. Key sample characteristics are that 92% were male, 55% considered themselves to be labour force, 45% supervised others, and 38% had worked less than 6 months on the project.

Respondents could assign 'always', 'sometimes', 'rarely' or 'never' to the presented factors in terms of their perceived contributions to on-site accidents. Safety culture, risk taking, experience/training and poor risk perception were the most prominent factors, felt to 'always' contribute to on-site accidents. A notable result was the perceived prominence of alcohol and drugs to 'always' be a factor in accidents, possibly suggesting that there is a strong alcohol and drug culture on the site or in wider industry. National/cultural clashes were least likely to 'always' be a factor in on-site accidents, potentially surprising given the multinational nature of the project and its workforce, but also possibly reflecting a harmonious site where this factor is not considered as a safety consideration at all.

![Figure 1 Survey Results](image)

*Which Factors Contribute to on-site accidents?*

Further survey analysis was undertaken in order to draw out the factors that were felt to be most relevant in their contribution to on-site accidents. A score was assigned to each category (always=3, sometimes=2, rarely=1, never=0), and although this four-point scale does not correlate exactly to a linear scale, it can be used to give an indication of the most important factors. The graph below gives a total of the scores in each factor:
A shift in the overall rankings of each factor can now be seen when compared to the Figure 1. Thrill seeking and National/Cultural clashes are still the two least influential factors, whilst lack of experience/training has now become the most significant contributory factor. This ranking now indicates that: lack of experience/training, poor risk perception, risk taking, tiredness and poor safety culture are the factors with the highest (217 - 205) contributory influence to on-site accidents. Alcohol and Drugs and poor management style are factors with moderate (194 - 188) influence, whilst thrill seeking and national cultural clashes have the lowest (132 - 112) influence.

### Addition and Amendment of Factors

In the processing and analysis of the survey results, it emerged that some participants had been motivated to include factors of their own, writing them on the survey unprompted. This act, combined with informal discussions with survey participants post completion, led to the additional of the following factors: 'age', 'gender', 'design' and 'time pressure'. These new factors were consequently taken back to the literature, and explored further.

Age was has been highlighted in investigations seeking a correlation between age of workers and accident rates. However, the findings from such studies have tended to be contradictory with no fixed conclusions (Laflamme & Menckel, 1995). Some studies have concluded younger workers (Lin, Chen, & Luo, 2008) are more accident prone, while others have deemed older workers are (Charg-Cheng et al., 2007). Despite there being contradictions in conclusions, there is one generality: the greatest number of accidents occurs in either the younger or older workers. Gender has also been considered in health and safety research as a contributory factor; Lin, Chen and Luo (2008) found that male workers had a much higher occupational fatality rate than female workers (7.4 compared to 0.9 per 100,000 full time workers).

The influence design has on accident causation has been well documented (for example Donaghy, 2009) and hence the existence of legislation such as the Construction Design & Management regulations in the UK (CDM, 2007) which places duty on designers to eliminate and reduce risk at the design stage.
Szymberski’s (1997) conceptual model hypothesises that the ability to influence safety is reduced through each stage of the project schedule.

Time Pressure as a causal factor has been identified in several studies. A case study in Hong Kong reported that the tight construction schedule was the most serious factor affecting construction site safety (Ahmed et al., 1999). Another study found that production bonuses can cause unsafe acts (Sawacha et al., 1999), while Langford et al. (2000) state that supervisors knowingly ignore unsafe acts due to time pressure set by agreed upon programs.

Following this analysis, 'experience' and 'training' were also separated into two factors as they were deemed not to correlate closely enough to be combined as one factor.

**FOCUS GROUP FINDINGS AND ANALYSIS**

A revised factor list, developed from the literature and survey findings, was then employed within a focus group analysis of ten safety-related case studies, in order to appraise the potential contribution of the factors to the safety issues illustrated in the case study material.

Initially, the group were asked to individually consider the factors and their potential influence within the case study examples. The results from this individual consideration can be seen in Figure 3:

![Individual Results Prior to Discussion](image)

*Figure 3 Focus group results prior to discussion*

Upon completion of the individual assessments, a group discussion was undertaken and collective agreement reached:
Following the focus group discussion, there was an overall reduction in the 'could be' allocation of the factors, a decrease of 44% overall, as participants were swayed one way (likely) or another (unlikely) by other members of the group. Most of the factors increased in the "likely" category by between 30% and 90%. The greatest increase was in design (433%), which was often due to a design change that the majority of the group hadn’t considered in their individual appraisals, but once they had been enlightened by another participant they altered their assessment. Safety culture was the only factor to decrease, although only by 8%. Safety culture also had the highest 'could be' allocation, potentially this was due to the information provided for the case studies from which it may be difficult to disclose whether it was a factor or not. Furthermore this factor is itself highly subjective, although the group did acknowledge that in many of the case studies it 'could be' an influence. Time pressure, a factor developed from the survey findings, was considered to be a very important factor by the focus group. Participants stated 'we all want to save time by taking risks'; 'it is time nowadays, everything is time'; 'we are having to put things together as a budget and a cost and we are cutting it too fine to be fair. We are not given enough time' and 'here we go again, it is time. Time is the first one [factor] guaranteed'. This was a recurring theme throughout the discussions and positioned this factor as a key influential factor in safety issues on site. The top six factors that were defined as 'likely' by the panel to contribute to a safety issue in at least 7/10 case studies were experience, risk perception, time pressure, culture, management and training. Although the survey findings suggested that direct national/cultural clashes were very rarely a factor in an accident, the focus group results imply that culture is an influential factor in accidents. In two case studies, laziness was also suggested.

**DISCUSSION**

The prominence of safety culture within both the survey and focus-group findings, and its perceived influence as a factor in on-site accidents, suggests that this is a
factor that merits further exploration. Indeed, safety culture can be seen as the summation of all other factors in practice, and it is proposed that this factor is further explored in detail, including examination of what this term is perceived to mean to the workforce themselves as a collaborative aspect of the project. The survey findings when ranked suggest a more individual and tangible consideration of the influential factors in accidents. Tiredness, risk taking, lack of experience/training and poor risk perception are all practical characteristics of the individual at work. Risk perception within the industry workforce has been identified as far from ideal (Carter and Smith, 2006), something the workforce themselves seem to acknowledge. Experience scored very highly in the focus group as well as the survey suggesting that the workforce agree with Fang et al. (2004) that human experiences influence safe or unsafe acts. A surprising result was that 31% of participants thought that alcohol and drugs were 'always' a factor in accidents. This could suggest an alcohol and drug culture within the project workforce, or even in the wider construction industry as the findings in Biggs & Williamson (2012) indicate that there is an alcohol and drugs culture within the Australian construction industry. The focus group found it difficult to conclude if alcohol and drugs were a factor from the case study information provided. It was not deemed to be 'likely' a factor in any of the case studies but the group agreed it could have been a factor in one case study, where an incident had occurred early in the morning on return from the Christmas holidays. Again, this is another factor that merits further examination. Perhaps the most important factor however was time pressure, it was suggested unprompted by the workforce as worthy of consideration, and was often regarded as the most important factor by the focus group. The evidence from this research mirrored that found by Ahmed et al. which perhaps indicates that the time pressure factor is not just restricted to a particular country or continent. Laziness was identified in the focus group, by the group's own accord, in two out of the ten case studies. From an investigation into the literature after this suggestion, a case study in Thailand (Aksorn & Hadikusumo, 2007) found laziness to be an important factor in the unsafe act of leaving nails or sharp objects in dangerous locations. From the findings, the factors have been grouped into four categories, from very high to low influence in on-site accidents, and therefore behavioural safety:

**VERY HIGH:** Time Pressure

**HIGH:** National culture, Experience, Management, Risk Perception, Safety Culture, Training

**MEDIUM:** Alcohol & Drugs, Age, Design, Tiredness, Risk-Taking

**LOW:** Gender, Laziness, Thrill-seeking

**CONCLUSIONS**

Through a critical analysis of the literature potential factors that could influence the behavioural response of an individual to hazards have been identified. The combination of results from the questionnaire survey and case studies considered by a focus group suggests that time pressure, training, experience, risk perception, safety culture, national culture and management are the factors perceived to be most likely to influence the behavioural responses. When identified as a factor, time pressure was often regarded as very influential. Perhaps the most surprising
conclusion was the survey results suggested that alcohol and drugs was such an important factor. The findings indicate that safety culture, which could be seen a summation of all the others factors, is an important factor despite an acknowledgement from the focus group that, with the information provided, it was difficult to interpret. Hence alternative methodological approaches will be explored to investigate this factor further, and the others outlined. It is anticipated that fine-grained, observational analyses will yield significant insight as to safety the influence of these factors in practice, and in order to accomplish this, an ethnographic participant observer approach is to be employed. Results of these further investigations will be reported in future ARCOM conferences.

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