

The introduction of H&S preliminaries in the Eastern Cape province

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DECLARATION

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ABSTRACT

Purpose

This paper reports on the results of a study conducted relative to the introduction of health and safety (H&S) preliminaries into contract documentation on building projects within South Africa by considering three objectives. Firstly, to determine the extent of the lack of financial provision made by contractors with regard to H&S; secondly, to determine the causes of inadequate financial provision for H&S by contractors, and lastly, to investigate the introduction of H&S preliminaries in order to assist contractors in making adequate financial provision for H&S.

Design

A literature review was conducted of relevant literature relating to construction H&S and the financial provision therefore on construction projects, which informed the development of an interview protocol. Interviews were conducted with consulting quantity surveyors, general contractors, and representatives of the Association of South African Quantity Surveyors (Eastern Cape Chapter), and the East Cape Master Builders Association (ECMBA) as part of a qualitative study. A quantitative study was then carried out in the form of a questionnaire. This questionnaire was developed from the findings emanating from the interviews, and then distributed to members of the ASAQS (EC Chapter), and general contractor members of the ECMBA.

Findings

Findings include: the two widely used forms of standard conditions of contract make limited reference to or mention H&S; a preliminaries item predominates in terms of the manner which contract documents have facilitated / made financial provision for H&S; competitive tendering without reference to H&S marginalises H&S; detailed H&S preliminaries should be included in bill of quantities (BoQ), and contractors generally do not accurately determine the percentage H&S constitutes of tender and project cost.

Practical implications

The empirical research was delimited to Eastern Cape building projects. In terms of implications, a paradigm shift is needed on the part of the quantity surveying profession with respect to integrating financial provision for H&S into contract documentation.

Originality / Value

The study informs the construction industry, specifically the design team, of the need to include a measurable instrument within BoQs for H&S. The study also introduces the concept of H&S preliminaries based on the understanding that although contractors make some form of financial allowance for H&S, there is still non-facilitation of equitable pricing of H&S within the construction industry. Previous research indicates that the status quo is not viewed favourably by contractors, and clients experience difficulty in determining whether contractors have made adequate financial allowance for H&S, or not.

Keywords: Construction, Financial provision, Health and safety, Preliminaries.

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LIST OF ABBREVIATIONS

H&S	Health & Safety
OH&S	Occupational Health & Safety
ASAQS	Association of South African Quantity Surveyors
cidb	Construction Industry Development Board
ECMBA	East Cape Master Builders Association

CHAPTER 1

THE PROBLEM AND ITS SETTING

1.1 INTRODUCTION

According to the Construction Industry Development Board (cidb) (2009), the global construction industry has one fatal accident every ten minutes, and the fatality rate per 100 000 workers is 25.5 (cidb, 2009). Based upon the value of construction work completed in the year 2002, namely R56 343m (South African Reserve Bank, 2003) the total cost of accidents (COA) could have been between 4.3% (R2401.2m / R56 343m), and 5.4% (R3 041.5m / R56 343m) (Smallwood, 2004; cidb, 2009). Furthermore, the South African construction industry performs poorly in terms of H&S compared to other industries in the country, which is evidence that action needs to be taken in order to improve H&S in the construction industry.

Lingard (2013) states that “In construction, there is a need to manage the interests and influences of multiple project contributors and stakeholders who, either consciously or inadvertently, exert an influence on OHS.” The influence of designers and clients on H&S in the construction industry needs to be realised by all stakeholders, and H&S needs to be addressed at the inception stage of a project.

According to Emuze and Smallwood (2012), South Africa has sufficient H&S legislation, but enforcement of legislation, such as the Construction Regulations is inadequate. The Construction Regulations (Republic of South Africa, 2014) state that the client must provide designers with an H&S specification, and the designers need to submit a report to the client before the client provides the H&S specification to the principal contractor (PC) when the project goes out to tender. This report should include, *inter alia*, all relevant H&S information with respect to the design of the relevant structure that may affect the pricing of the construction work. The client who is required to provide the PC with an H&S specification is also required to ensure that the PC has made adequate financial allowance for H&S. The duties of the PC and contractors include, *inter alia*, ensuring that sufficient financial provision has been made for H&S measures during the construction process. Although these regulations are in place, problems are still experienced with respect to H&S during construction projects.

The study focused on the introduction of H&S preliminaries on building projects within South Africa. The research determined the extent of the lack of financial provision for H&S by contractors, and the causes thereof. Although limited research in terms of the introduction of H&S preliminaries has been conducted, the study investigated the value of introducing H&S preliminaries in order to assist contractors in terms of making adequate financial provision for H&S.

1.2 THE STATEMENT OF THE PROBLEM

Contractors cannot budget for H&S items during tender stage, as there is no equitable provision for pricing H&S items.

1.3 THE SUB-PROBLEMS

1.3.1 Sub-problem 1

Contractors do not make adequate financial provision for H&S during the course of the project

1.3.2 Sub-problem 2

Clients cannot ensure that contractors have made adequate financial provision for H&S items during the tender stage

1.3.3 Sub-problem 3

Contractors encounter design originated hazards during construction

1.3.4 Sub-problem 4

It is not evident whether contractors and quantity surveyors differ in terms of the importance of items that would be included in H&S Preliminaries

1.4 THE HYPOTHESES

1.4.1 Hypothesis 1.1

The non-facilitation of equitable pricing of H&S results in contractors not making adequate financial provision for H&S during the course of the project

1.4.2 Hypothesis 1.2

Contractors that are committed to H&S can be compromised by the competitive tendering process, due to contractors that are not committed to H&S not making adequate financial provision for H&S.

1.4.3 Hypothesis 1.3

Inadequate reference to H&S in contract documentation results in contractors not making adequate financial provision for H&S

1.4.4 Hypothesis 2.1

The non-facilitation of equitable pricing of H&S results in clients being unable to ensure that contractors have made adequate financial provision for H&S at tender stage

1.4.5 Hypothesis 3.1

Contractors encounter design originated hazards due to Quantity Surveyors not conducting 'design' hazard identification and risk assessments

1.4.6 Hypothesis 3.2

Contractors encounter design originated hazards due to lack of consideration and knowledge by designers and architects with regard to potential hazards caused by design

1.4.7 Hypothesis 4.1

Contractors and quantity surveyors differ in terms of their assessment of importance of items that should be included in a H&S Preliminaries

1.5 THE OBJECTIVES

1.5.1 Objective 1

To determine why contractors do not make adequate financial provision for H&S during the course of the project

1.5.2 Objective 2

To determine the method by which clients can ensure that contractors have made adequate financial provision for H&S items during the tender stage

1.5.3 Objective 3

To determine why contractors experience difficulty when pricing H&S

1.5.4 Objective 4

To determine the cause of design originated hazards experienced by contractors during construction

1.5.5 Objective 5

To introduce H&S preliminaries in the Bill of Quantities on building projects within the Eastern Cape

1.6 DELIMITATIONS OF THE STUDY

The study will be limited to building projects in the Nelson Mandela Bay Metropolitan, and the study will be conducted among contractors within the Eastern Cape appearing on the ECMBA list and quantity surveyors registered with the ASAQs Eastern Cape Chapter consulting to construction industry clients.

1.7 THE DEFINITION OF KEY TERMS

Bills of Quantities – the document drawn up in accordance with the measuring system (JBCC 6.1, March 2014)

Client – means any person for whom construction work is being performed (Republic of South Africa, 2014).

Designer – means a competent person who prepares a design, checks and approves a design. A designer is an architect or engineer contributing to, or having overall responsibility for a design. A surveyor who specifies articles or draws up specifications are also designers (Republic of South Africa, 2014).

Hazard – a source of or exposure to danger (Republic of South Africa, 1993).

Health – The state of being well in body or in mind, or a person's mental or physical condition (Thompson, 1995: 626).

H&S Plan – means a site, activity or project specific documented plan in accordance with the client's health and safety specification (Republic of South Africa, 2014).

H&S Specification – means a site, activity or project specific document prepared by the client pertaining to all health and safety requirements related to construction work (Construction Regulations, Republic of South Africa, 2014).

Preliminaries – the priced items listed in the preliminaries document with any additions, alterations or modifications thereof incorporated in the contract documents (JBCC, 2014).

Risk – means the probability that injury or damage will occur (Republic of South Africa, 1993).

Safety – state of being safe, free from danger or risks and the prevention of physical harm (Republic of South Africa, 1993).

1.8 THE ASSUMPTIONS

The assumption made in this study is that contractors do make some form of financial provision for H&S during the course of the project.

1.9 THE IMPORTANCE OF THE STUDY

The South African construction industry contributes a large number of fatalities and injuries in the country and there continues to be a high level of non-compliance with H&S regulations (cidb, 2009). Therefore, it is important that steps are taken in order to assist contractors to comply with H&S regulations.

There is increasing concern with respect to H&S in the South African construction industry. Responsibility not only lies with the contractor, but clients and designers also have a responsibility in terms of H&S on a construction project. In order for the contractor to fulfil his responsibilities with regard to H&S, adequate financial provision for H&S is necessary. Contractors experience difficulty when pricing H&S, and therefore generally do not carry out their responsibilities with regard to H&S during construction.

H&S preliminaries need to be introduced in order to eliminate unfairness in competitive tendering as contractors who make financial allowance for H&S often are not awarded the project due to lower-bidding contractors who may not have made adequate financial provision for H&S.

In order to contribute to the effective improvement of H&S in the South African construction industry, factors beyond H&S specifications and H&S plans need to be addressed. It must be understood that effective implementation of H&S plans and specifications constitute a cost to construction projects.

Therefore, in light of the abovementioned, research was be conducted in order to develop H&S preliminaries to be included as part of the Bill of Quantities. This will assist contractors to make sufficient financial provision for H&S on a project. It will also assist designers and clients to monitor contractors' progress with regard to H&S, as the lack of H&S negatively affects other project parameters such as cost, productivity, and quality.

CHAPTER 2

THE REVIEW OF THE RELATED LITERATURE

2.1 OVERVIEW OF H&S IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY

The South African construction industry produces a disproportionate number of fatalities and injuries (Emuze & Smallwood, 2012). In recent years, many efforts have been made to improve H&S in the construction industry, but there is still no real improvement with regard to H&S in the industry. Emuze and Smallwood (2012) state that the Construction Regulations require clients and designers to take responsibility for H&S. Clients need to provide the principal contractor with an H&S specification, and designers need to inform the contractor via the client of any perceived hazards and dangers.

H&S is still not afforded the necessary status, and clients still tend to believe that cost, quality, and time are the fundamental construction project parameters. H&S is not perceived as a basic requirement during construction and industry stakeholders do not see H&S as contributing to the value of the project.

Despite the introduction of the amended Construction Regulations introduced in 2003, in which case clients and designers had to respond in terms of their responsibilities with regard to H&S during the course of projects, the cidb report (2009) still shows a rise in the number of accidents in 2004/2005, 2006/2007 and 2007/2008. This indicates lack of compliance with the regulations and a need for a method of allowing contractors to make provision for H&S during a project.

In the South African construction industry, small to medium construction firms often fail to provide adequate H&S on site, due to limited resources. Larger construction firms have access to resources that enable these firms to provide for H&S, and have access to the necessary financial resources in order to carry the costs associated with H&S during the course of the project.

Wells and Hawkins (2009) say that there are two reasons why H&S is an important issue to consider during procurement. The first reason is that clients are increasingly responsible for H&S and secondly, although enforcement agencies are responsible for ensuring compliance through inspection of sites, these agencies are not able to visit all the sites. This causes the client to appoint consultants and designers who are aware and knowledgeable regarding H&S. Therefore, procurement has a major role to play in assuring H&S through the appointment of H&S conscious contractors and subcontractors. According to Smallwood (2011), due to competitive tendering contractors need to limit costs and consequently the winning tender is unlikely to make adequate provision for H&S equipment, welfare facilities, and a healthy and safe working environment.

2.2 LEGISLATION WITH REGARDS TO H&S

According to the cidb (2009), the primary objective of any H&S legislation is the prevention of accidents and their consequences in the form of injuries, disablement, and fatalities, and ill health within the work environment. However, the success of such H&S legislation lies in the effective implementation thereof. The most important legislation regarding H&S in South Africa, is the Construction Regulations 2014, the Occupational Health and Safety Act, No. 85 of 1993 (OH&S Act), and the complementary Compensation for Occupational Injuries and Diseases Act, No. 130 of 1993 (COID Act). The Construction Regulations 2014, and the Occupational Health and Safety Act. No. 85 of 1993, are discussed in more detail below.

2.2.1 Construction Regulations 2014

In terms of the Construction Regulations of 2003, clients and designers were required to take responsibility for H&S from the project initiation and briefing stage of the project. The Construction Regulations were amended in 2014, the key elements of the amendments being that the client needs to first provide the designer with an H&S specification and ensure that the designer has considered this specification during the design stage of the project. This H&S specification should be evolved from a baseline risk assessment that the client needs to conduct in terms of the Construction Regulations. The most important clause pertaining to this study is that the client needs to ensure that potential principal contractors who submit tenders have made adequate financial provision for the cost of H&S measures.

The duties of the principal contractor include providing the client with an H&S plan, which responds to the provided H&S specification included in the tender documents. The principal contractor is also required to provide an H&S file that is to be made available on request of the client, the client's agent, an inspector, or contractor. The principal contractor needs to ensure that every employee has a valid medical certificate of fitness, specific to the construction work to be performed. In terms of the Construction Regulations (Republic of South Africa, 2014) the principal contractor shall provide one shower facility for every 15 persons. The contractor also needs to provide at least one sanitary facility for each gender, and then for every 30 workers of each. Sheltered eating facilities also need to be provided, as well as changing facilities for each gender. The aforementioned constitute key welfare provisions, which are generally rated poor during South African research studies (Smallwood, 2004).

2.2.2 Health and Safety Act No. 85 of 1993 (OH&S Act)

The focus of this act is providing an environment for employees, which is safe, and without risk to the health of the employee.

The act states that for every 20 employees in the workplace, the employer, in this case being the contractor, needs to appoint an H&S representative. H&S representatives need to, *inter alia*, identify any hazards on site and report these to the employer.

Employers need to identify possible H&S risks for the work processes used. These risks then need to be limited as far as possible, by providing suitable personal protective equipment (PPE), which includes protective footwear, protective overalls, or any similar H&S equipment that will prevent bodily injuries to employees. Protective clothing such as high visibility vests also need to be provided in order to protect the employee against harm.

In terms of this Act, the contractor needs to provide training and supervision to ensure the H&S of their employees carrying out the work. Contractors are also responsible for the H&S of any visitors to the workplace, thus being the site, in terms of Section 9(1) of the OHS Act. Where more than five employees are employed at a workplace, the employer of such employees shall provide a first aid box, which shall be available and accessible for the treatment of injured persons at that workplace.

Section 23 of this Act, which is most relevant in terms of the purpose of this research, states that employers cannot charge employees for any item relating to H&S. The cost of H&S therefore is for the account of the contractor.

2.3 CONTRACT DOCUMENTATION

The most widely used form of contract for construction in South Africa is the Joint Building Contracts Committee (JBCC) Principal Building Agreement, the latest addition being Edition 6.1 – March 2014. Other forms of contracts include the General Conditions of Contract (GCC), International Federation of Consulting Engineers (FIDIC) and the New Engineering Contract (NEC). The GCC does not make any explicit reference to H&S, other than 'reporting of accidents'. The FIDIC and NEC contracts originated overseas, and therefore provide conflicting clauses in terms of the H&S legislation in South Africa.

According to the cidb report (2009), the JBCC does not make any explicit reference to H&S, but does refer to the need for parties to comply with laws and regulations that govern the work that needs to be executed. According to Emuze and Smallwood (2014), scope exists for the standard forms of contract to include more direct reference to construction H&S.

2.4 DESIGNERS' ROLE IN TERMS OF H&S

In terms of the Construction Regulations (Republic of South Africa, 2014) a designer is a competent person who prepares a design, as well as checks and approves a design. A designer includes an architect and an engineer who contributes, or has an overall responsibility for a design. Designers also include a surveyor who specifies articles or draws up specifications.

The Construction Regulations (Republic of South Africa, 2014) state the duties of the designer, which includes that the designer should take into consideration the H&S specification provided by the client. Before the contract is sent out to tender, the designer is also required to produce a report to the client setting out, *inter alia*, the requirements, and all relevant H&S information about the design that might affect the pricing of the construction work. The designer is also required to inform the client in writing of any anticipated or known dangers or hazards relating to the construction work.

It is the designer's duty to refrain from including anything in the design of the structure necessitating the use of dangerous procedures or materials that may negatively affect the H&S of persons. A very important duty of the designer in terms of the Construction Regulations (Republic of South Africa, 2014) is to take cognisance of ergonomic design principles in order to minimise ergonomic related hazards in all phases of the life cycle of a structure.

2.5 CONTRACTOR'S ROLE IN TERMS OF H&S

Following the responsibilities of the client and designers with regard to H&S, the contractor also carries substantial responsibility in terms of the construction regulations.

According to the cibd report (2009) contractor health and safety performance is influenced by a number of internal factors. These include: management commitment, communication and feedback, supervisory environment, supportive environment, H&S rules and procedures, training and competence level, worker's involvement and personal risk appreciation and work pressure.

The cibd (2009) states that: "Positive actions and commitment to H&S by a main contractor and the integration of these into all activities including those of subcontractors are key factors to strengthen H&S actions within subcontractors." It must be noted that the construction industry involves many small contractors working as subcontractors to the principal contractor and the actions of subcontractors impacts heavily on the H&S performance of the principal contractor.

The following points are some of the key factors that the principal contractor is responsible for when dealing with sub-contractors in terms of the Construction Regulations 2014:

- to provide any contractor with the relevant sections of the documented health and safety specification which is provided by the client to the principal contractor at tender stage;

- to take reasonable steps to ensure that each contractor's health and safety plan is implemented and maintained on the construction site;
- to stop any contractor from executing construction work which is not in accordance with the main contractor's and/or contractor's health and safety plan for the site or which poses a threat to the health and safety of persons, and
- to ensure that potential contractors submitting tenders have made provision for the cost of health and safety measures during the construction process.

No main contractor shall appoint a subcontractor to perform construction work unless the main contractor is reasonably satisfied that the contractor he or she intends to appoint, has the necessary competencies and resources to perform the construction work safely.

2.6 FORMS OF FINANCIAL PROVISION MADE FOR H&S

In terms of the Construction Regulations (Republic of South Africa, 2014), clients are required to ensure that the principal contractor has made adequate financial provision for H&S. How can a client do this if a sum is merely provided? Financial provision for H&S needs to be facilitated when pricing tender documentation in order to ensure that sufficient resources are available, and that the issues addressed in the H&S specification are effectively addressed during a project. However, the ASAQS provides a model description (Figure 2.1), which is related to the H&S of a project. It is set out for quantity surveyors for utilisation in the preparation of bills of quantities. An item included in 'Bill No.1' i.e. the preliminaries bill, stating that contractors need to comply with the Construction Regulations and the Occupational Health and Safety Act. It gives the contractor the opportunity to price this 'consolidated' or single item to ensure compliance with the abovementioned and in terms of the H&S specification provided by the employer (ASAQS, 2004). Smallwood (2011) states that H&S specifications should be project specific, record residual hazards, be included in contract documentation, and be linked to the facilitating of financial provision for H&S.

<p>? Health and safety</p> <p>Without limiting the generality of the provisions of clause 2.0, the contractor's attention is drawn to the provisions of Construction Regulations issued in terms of the Occupational Health and Safety Act, 1993. It is specifically stated that the employer shall prepare a documented health and safety specification for the works (refer to Annexure ? for a copy of the relevant specification) and that the employer shall ensure that the contractor has made provision for the cost of health and safety measures during the execution of the works. The contractor shall price opposite this item for compliance with the act and the regulations and the provisions of the aforementioned health and safety specification [2.1] ?</p>			
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Figure 2. 1 ASAQS Model Description

Source: ASAQS (2004)

According to Cameron *et al.* (2006), effective planning can play a major role in the success of a project, but unfortunately the construction industry tends to not plan as effectively as other industries. Geminiani (2008) states that designers can make design decisions with the objective of favourably affecting construction H&S. With limited opportunity given to contractors to price H&S at the tender stage of projects, effective planning for H&S cannot be realised.

2.7 COST OF H&S TO CONTRACTORS

There are two main aspects with regard to the cost of H&S, namely the COA, and the cost of prevention (COP). According to Haupt and Smallwood (2005), the COA can be categorised as being either direct or indirect. The COA are far reaching and are accumulated throughout the project and the organisation.

According to Geminiani (2008), the direct costs of accidents are categorised as follows:

- sick pay;
- employees compensation payments;
- personal injury claims;
- repair of damage to buildings;
- repair of damage to plant and equipment;
- replacement of products, and
- overtime payments.

The indirect costs of accidents includes:

- cost of time of injured employee;
- cost of time lost by other employees who stop work;
- cost of time lost by foremen, supervisors and other executives;
- cost of time spent on the case by first aid attendant and other staff;
- cost due to damage of machinery, tools, property and materials;
- incidental costs due to interference with production;
- cost to employer for continuing wages of injured worker;
- cost due to loss in profit due to reduced worker productivity;
- cost due to loss in profit due to idle equipment;
- cost incurred because of subsequent injuries partially caused by the incident, and
- cost of overheads.

Research conducted in South Africa determined the indirect costs to be 14.2 times the direct costs (Smallwood, 2000).

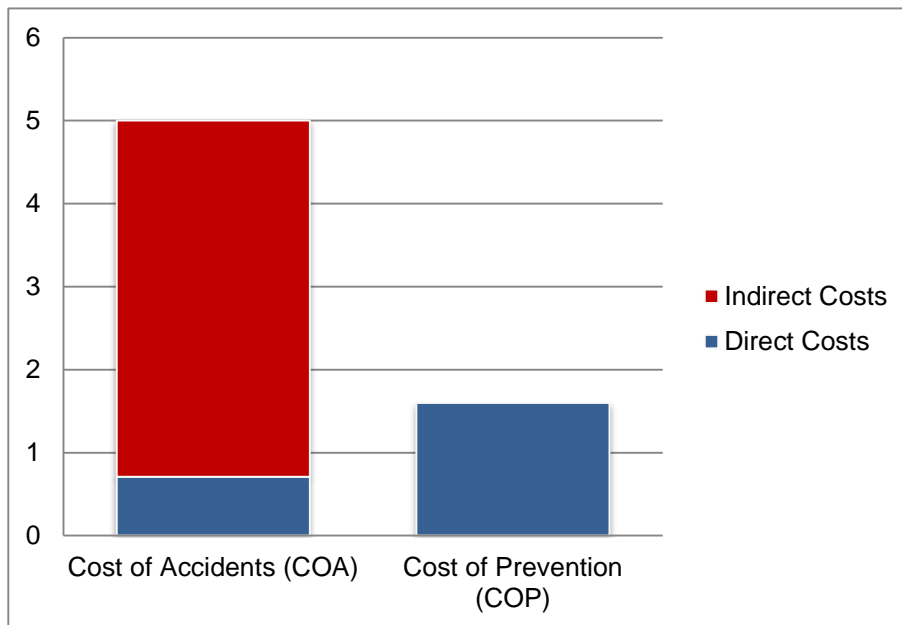


Figure 2. 2 Cost of Accidents

Source: Smallwood (2000)

The COA is estimated to be around 5% of the value of construction costs (Figure 2.2) which ultimately is passed onto clients (cidb, 2009).The main priority for designers should be to

contributing to minimise as far as possible accidents on site, through effective design and implementation of H&S specifications, as the client ultimately incurs the cost of accidents.

Hammond *et al.* (2011) state that there are expenses incurred directly by contractors in order to prevent accidents. The COP includes costs associated with PPE, H&S training, first aid, and H&S personnel. According to Smallwood (2011), the COP is equal to 1.6% of tender cost estimate and 1% of project cost. It is evident that costs invested in accident prevention lead to a reduction in risk, and in turn, a reduction in accidents. A reduction in accidents can influence construction performance and overall profitability by reducing the costs associated with accident occurrence. Contractors and designers need to realise the benefits of investing in H&S, as the COP can be less than the COA on a construction project. According to the cidb (2009), the total COA exceeds the cost of H&S, and therefore, H&S is in essence a profit centre.

Haupt and Smallwood (2005) highlighted benefits of investing in H&S. These fell into two broad categories, namely qualitative and quantitative benefits. These benefits include reducing absenteeism, lower compensation costs as well as increase efficiency. This reduced absenteeism and increased efficiency positively impact on project time. The relevance of the qualitative benefits of H&S to designers is the positive indirect impact thereof on overall project performance. Research indicates that firms that make H&S a priority can reduce lost workday accidents by an average of 37 % in the first year and between 10 % and 20 % in each subsequent year.

2.8 ACCIDENTS ON SOUTH AFRICAN CONSTRUCTION PROJECTS

When looking at accidents on building sites in South Africa it is difficult to obtain statistics pertaining to the accidents, because the Department of Labour is not cooperative in terms of giving us statistics of cases that are under their investigation (cidb, 2009). It is necessary however to investigate accidents on South African building sites and their causes. The purpose of accident investigation is to discover causative factors, the hazardous conditions and practices that brought the accident about, so that proper action may be taken to prevent a recurrence.

In September 2015 there were two fatalities following the collapse of a temporary bridge along the M1 highway in Sandton. A further twenty-three people were injured. The cause of the accident had not been investigated at the time of this research (Shange, 2015).

In 2008 there were five fatalities when a building collapsed in Stellenbosch. Renovation work was being carried out on the building at the time of the accident. It was noted that four other workers were seriously injured. The building collapse was said to have been caused by a wall falling over (Ramutloa, 2009).

In 1998 the Injaka Bridge collapsed in Mpumalanga on 6 July resulting in 14 fatalities, which included the designer of the bridge. A further nineteen people were injured. Most of the people injured or killed were standing on the bridge deck as it was being launched. This case resulted in a four year investigation. It was determined that both the consulting engineers and the contractor were negligent.

According to the Department of Labour (2002) the following were causes of the bridge collapse:

- Lack of competent personnel and supervision;
- The lack of experience on the part of design personnel in incremental launching techniques resulted in poor communications between the parties to clarify understandings and interpretations regarding the slide path position;
- The lack of clear instructions in the project specification and clear indications on the consulting engineers design drawings as to the position of the sliding path, resulted in incorrect interpretations being made;
- Incorrectly placed temporary bearings. The placing of the sliding pads between the deck and temporary bearings was not as specified;
- Incorrect feeding of bearing pads;
- Under-designed deck slab. Insufficient reinforcement in the deck section, especially the bottom slab; and
- No independent design reviews were conducted of either the temporary or permanent works.

According to Othman (2012), falls are by far the main cause of incidents. This includes people falling from heights (roofs, scaffolds, working platforms, ladders and floor openings), people falling on the same level and plant and material falling and striking them, as well as people falling into open trenches and shafts. Other causes on site accidents include workers struck against objects, lifting and carrying, machinery, transport as well as fires and explosions.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH METHODOLOGY

For the purpose of this research, two types of data collection methods were used. The research methodology conducted was a mixed methodology study. This study can be described as a partially mixed sequential dominant status design, as this involves conducting a study with two phases that occur sequentially, such that either the quantitative or qualitative phase has the greater emphasis (Leech & Onwuegbuzie, 2007). The quantitative study had a greater emphasis in this study as it was developed from the results obtained in the qualitative study and facilitates the main objective of this study, namely the introduction of H&S preliminaries in order to assist contractors in making adequate financial provision for H&S.

3.1.1 Qualitative Study

Initially a qualitative study was conducted. A qualitative method suited the objectives of the study, as it facilitated identification of issues and perceptions of reputable industry members that may not be reflected in the literature.

The research included developing a set of questions based upon the standardised open-ended interview approach. Respondents were asked identical questions, and questions were worded so that responses could be open-ended (Gall *et al.*, 2003). Separate interview protocols were designed for each specific population targeting H&S issues common to both disciplines, but yet relevant to each discipline.

Interviews were arranged with a purposefully selected sample of registered quantity surveyors identified from the ASAQS EC Chapter list, and members of construction firms identified from the ECMBA list in the Nelson Mandela Bay Metropole, who were identified as having the necessary years of experience in the industry in order to facilitate the successful implementation of the interview protocol and achieve the required objectives. Interviews were also conducted with representatives of the ASAQS EC Chapter and ECMBA respectively in order to obtain the views of associations that directly influence H&S practices and protocols in the construction industry in South Africa.

The data was recorded using a dictaphone, which allowed for data to be analysed in detail at a later stage, without missing any important information that may not have been comprehended during the interview protocol.

The voice recordings were converted to text. This was done by transcribing them into typed documents. These transcribed documents were then analysed. In interpreting the data, themes

were identified and then interpreted in order to assess the data according to the objectives of the study..

In order to communicate gratitude towards the interviewees the researcher agreed to provide each interviewee with the conference paper presented in accordance with this research (Please see Appendix F).

3.1.2 Quantitative Study

Once the initial qualitative study was conducted a quantitative research method was then carried out. Quantitative research relies on traditional, mathematical and statistical means of measuring data (Shuttleworth, 2008). Quantitative data was decided on in the form of a questionnaire survey, as this method favoured precise, objective and reliable results.

The data obtained from the questionnaire was then interpreted using descriptive statistics set out in an excel document. This included the Mode, Mean and Standard Deviation based on the below scales.

The Mode shall be interpreted using the below scale:

- 1 Not at all important
- 2 Low importance
- 3 Slightly important
- 4 Neutral
- 5 Moderately important
- 6 Very important
- 7 Extremely important

The ranges relative to the mean scores for importance (1 to 7 scale) are defined as follows:

- > 6.16 ≤ 7.00 (Extremely important);
- > 5.30 ≤ 6.16 (Very important);
- > 4.44 ≤ 5.30 (Moderately important);
- > 3.58 ≤ 4.44 (Neutral)
- > 2.72 ≤ 3.58 (Slightly important);
- > 1.86 ≤ 2.72 (Low importance), and
- 1.00 ≤ 1.86 (Not at all important)

The ranges relative to the mean scores of agreement (1 to 5 scale) are defined as follows:

- 1.00 ≤ 1.80 (Strongly disagree);

>1.80 ≤ 2.60 (Disagree);

>2.60 ≤ 3.40 (Neutral);

>3.40 ≤ 4.20 (Agree);

> 4.20 ≤ 5.00 (Strongly agree).

The standard deviation scale shall be interpreted as:

> 0.00 ≤ 1.00 (Responses extremely closely grouped together);

> 1.00 ≤ 2.00 (Responses reasonably closely grouped together), and

> 2.00 ≤ 5.00 (Responses vary and are not closely grouped together).

A Mann Whitney U-Test was also conducted in order to determine the statistical significant difference between the two populations. According to Choudhury (2010), the Mann-Whitney U-Test is a non-parametric test, used in the place of an unpaired t-test and does not require normal distribution. This test combines two samples in a single ordered sample. Rank numbers are then assigned to the combined sample values from the smallest to the largest value. The relevant test statistic is then equal to the sum of the rank numbers of one sample. This test suited the sample sizes of each population, as the sample sizes were unequal.

3.2 DATA COLLECTION

3.2.1 Population

The total population for both the qualitative as well as the quantitative study included all registered quantity surveyors and construction firms who carry out building projects within the Eastern Cape.

3.2.2 Sample

3.2.2.1 Qualitative

The sampling procedures of qualitative research are not rigidly prescribed and are less formal, compared to quantitative research techniques. This allows for some flexibility, however, copious flexibility may also cause perplexity when the results are interpreted (Coyne, 1997:623). Flexibility does not imply random sampling for this research because random sampling may violate the appropriateness and richness of the particular, purposeful sample. The sample has been selected with very specific intentions in terms of reaching the research objectives, therefore the selective sampling method was used in this study.

Selective sampling is a necessity in qualitative research; it is primarily governed by the time, restrictions and resources of the researcher. The particular geographical coverage and the nature

of individuals within the sample also influence the sample size. The sample is selected according to the specific aim of the research (Coyne, 1997:624). The sample of this research has been specifically chosen while considering the objectives and was evidently influenced by the availability of resources and time. The geographical area was also limited to the parameter of Nelson Mandela Bay Metropolitan.

Well-experienced, high status individuals who fulfil top hierarchal roles within organizations have been selected. Directors, members and managing members constituted the sample. This also allowed access to data with the highest level of experience and knowledge regarding the topic.

Selective sampling is therefore considered as purposeful sampling that denotes a calculated decision. Preconceived, but reasonable, criteria are usually considered in order to gain prime accuracy from the sample (Coyne, 1997:624). The main criteria for this research were accessibility and accuracy. The selection of the sample was unquestionably regarded as purposeful.

Four quantity surveyors who are members of the ASAQS (EC Chapter) and five members of construction firms who are members of the ECMBA were interviewed together with a representative from the ASAQS (EC Chapter) and a representative of the ECMBA. Due to time and other resource constraint, the study could not be conducted over the whole of South Africa, or within other provinces.

3.2.2.2 Quantitative

Leedy and Ormrod (2005) states that if the population is less than 100 people, the entire population must be sampled, therefore all quantity surveyors registered with the ASAQS (EC Chapter) and all general contractors registered with the ECMBA where sent questionnaires. A mailing list was obtained from the ASAQS (EC Chapter) as well as the ECMBA.

3.2.3 Primary data

Primary data was sourced through a qualitative study in the form of an interview protocol carried out on a selective sample. Once the initial data had been obtained, a quantitative study in terms of a questionnaire survey was carried out in order to source further primary data.

3.2.4 Secondary data

The secondary data was obtained by sourcing data relating to the subject matter, which included books, journals and articles in order to carry out a literature review for the study. These sources were South African-based as well as international sources. Access to journals was provided through the Nelson Mandela Metropolitan University's databases.

3.2.5 Instrument design

3.2.5.1 Qualitative Interview Protocol

An interview protocol was designed for each population, thus three versions were designed (See Appendix A, B & C). This included a questionnaire for quantity surveyors, contractors and representatives of associations. Questions were adapted for each population without deviating from the main theme of the question. The questions were designed based on the sub-problems identified in the study. The interview included open-ended questions with one question being a closed question referring to a likert-scale of importance of 1 to 5. The first question discussed the demographics of each interviewee and the last question gave the interviewee an option to give general comments regarding the topic.

3.2.5.2 Quantitative Questionnaire

The questionnaire included items that were relevant to a H&S preliminaries that were identified from the interview protocol as well as from the literature. Using a likert scale, respondents were requested to either agree/disagree with the introduction of H&S preliminaries. If respondents agreed with the introduction of such a document, they were then requested to identify the importance of items that should be included in such a document using a likert-scale of 1 to 7. A section in the questionnaire allowed for respondents to give their comments regarding the topic and the final section of the questionnaire identified the demographics of the respondents. (See Appendix D).

3.2.6 Instrument administration

3.2.6.1 Qualitative Study

After the selected sample had been developed, potential interviewees from the selected sample were then sent personalised emails requesting an interview and explaining the purpose of the interview. Once a positive response had been received, the researcher then set up interview time slots, at a time and place convenient for the interviewee. Reminder emails were sent out to the interviewees a day prior to the scheduled meeting.

Potential interviewees who failed to respond to the requested interview were then removed from the sample list.

3.2.6.2 Quantitative Questionnaire

The questionnaire was presented with a covering letter, stating the aim of the proposed study and the value of the response by the respondent. The covering letter provided instructions on how the questionnaire had to be completed. Distribution took place via emails sent out containing an attachment to the questionnaire and covering letter. Respondents were encouraged to scan the questionnaire back and respond via email or were given the option for the questionnaire to be

collected. Reminder emails were sent out to respondents after two weeks if no response was received to date.

CHAPTER 4

RESULTS, ANALYSES AND INTERPRETATION

4.1 RESPONSES

4.1.1 Qualitative Study

The qualitative study was designed to target three populations, namely registered quantity surveyors practicing in the Eastern Cape, general contractors in the Eastern Cape and a representative from the ECMBA as well as the ASAQS EC Chapter, forming part of the association population. Four interview protocols were carried out from the ASAQS population in the Eastern Cape, Five interview protocols were carried out from the ECMBA population and one representative from each association respectively were interviewed.

4.1.2 Demographics

The results pertaining to the demographic profiles of the three sample groups are presented in graphs and will be discussed individually under the headings of: Gender, Age, Academic Qualification and Experience.

4.1.2.1 Gender

Figure 4.1 indicates the gender distribution of the respondents. When looking at each sample group individually, one-hundred percent (100%) of contractor's sample were male and seventy-five percent (75%) of the quantity surveying interviewees were male, whilst the remaining twenty-five percent (25%) of the interviewees were female. The association representative interviewees were split into fifty percent (50%) female and male respectively.

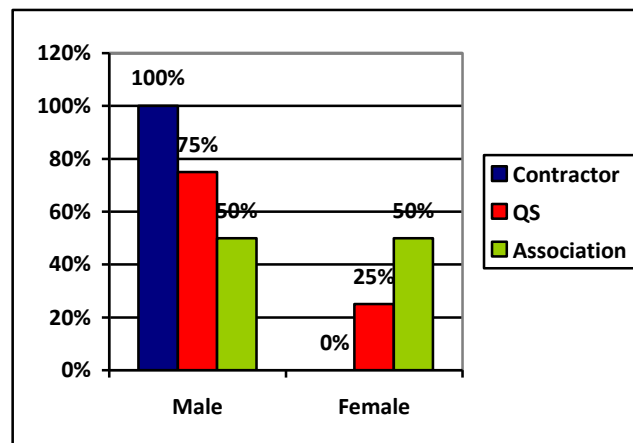


Figure 4.1: Qualitative: Gender of respondents

4.1.2.2 Age

All of the respondents may be considered to be over thirty five (35) years of age. Sixty percent (60%) of the contractors fall within the forty-five to fifty-four (45-54) years of age category, whilst seventy-five percent (75%) of the quantity surveyors fall within the above sixty-five (>65) years of age category. The representatives of the associations fall between the thirty-five to forty-four (35-44) years of age category as well as the forty-five to fifty-four (45-54) years of age category. The age distribution of the three groups may be seen in the figure below (Figure 4.2).

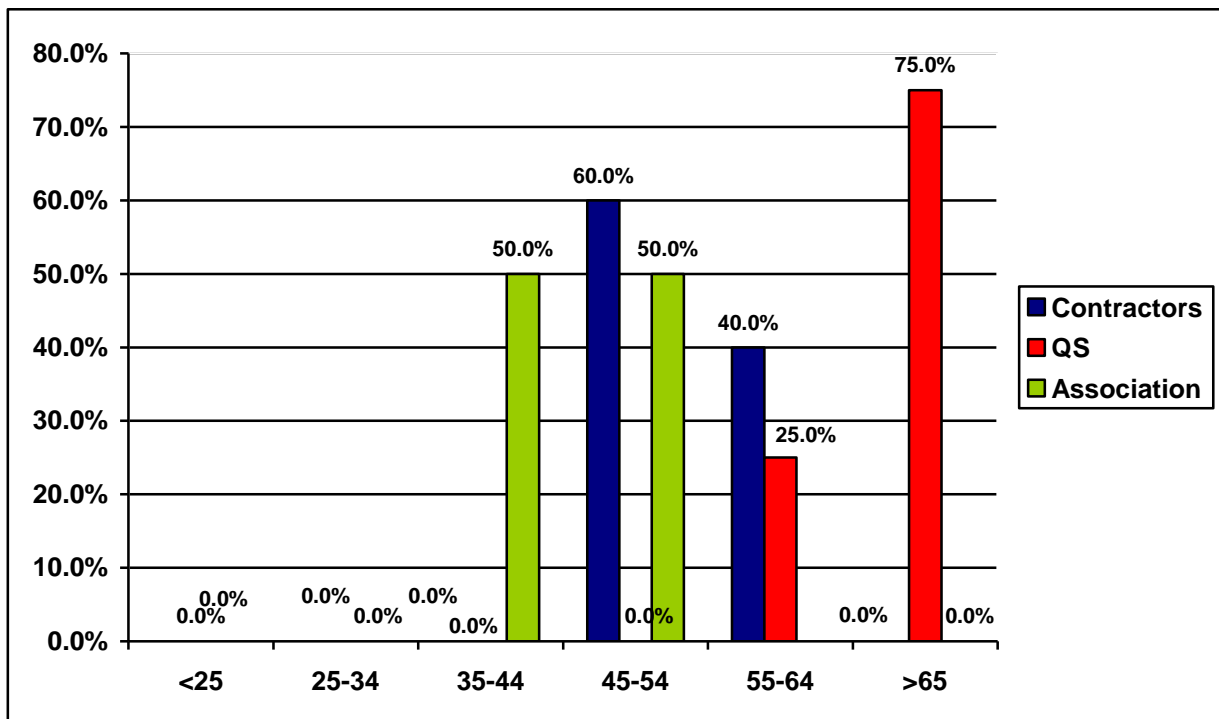


Figure 4. 2 Qualitative: Age of respondents

4.1.2.3 Academic Qualification

The majority respondents from the quantity surveyor's sample have Honours Degrees (75%) or higher. From the graph below (Figure 4.3) it can be seen that from the contractors that were interviewed forty percent (40%) possess a National Diploma, twenty percentage (20%) possess a Post-Graduate Diploma and forty percent (40%) possess a Honours Degree. From the association's representatives interviewed fifty percent (50%) possess a Post-Graduate Diploma and fifty percent (50%) possess a Honours Degree. None of the respondents from either population possess a Bachelors Degree.

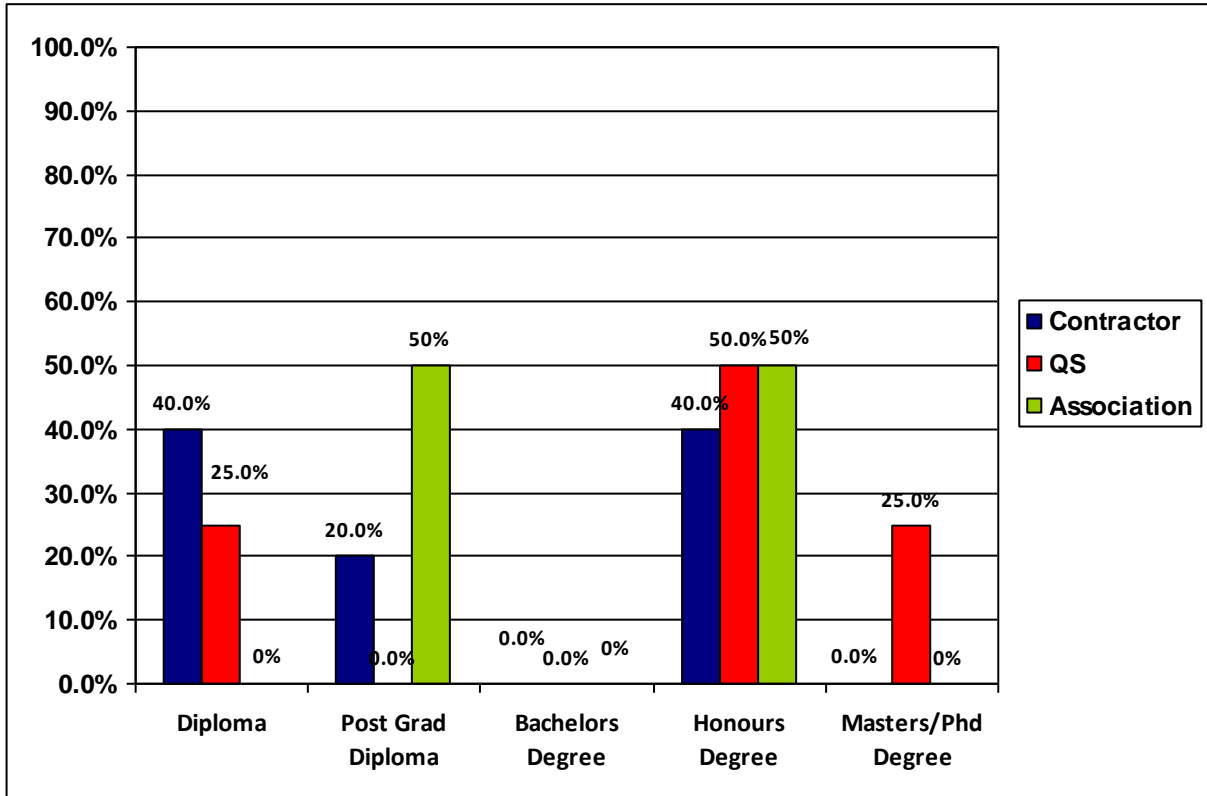


Figure 4. 3 Qualitative: Academic qualification of respondents

4.1.2.4 Experience

One-hundred percent (100%) of all interviewees, from all three sample groups, have more than 18 years of working experience in the industry (Figure 4.4).

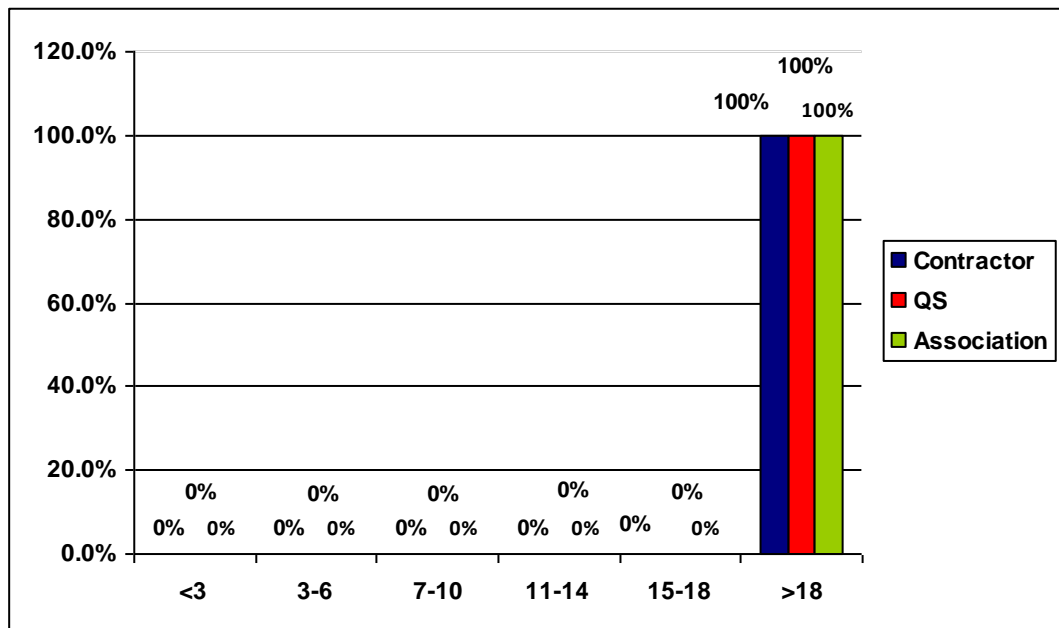


Figure 4. 4 Qualitative: Experience of respondents

4.1.3 Quantitative Study

The quantitative study was designed to target two populations, namely registered quantity surveyors and general contractors in the Eastern Cape. 12 responses were received from the 77 ASAQS population in the Eastern Cape, which equates to a response rate of 15.6%. 14 responses were received from the 58 ECMBA population, which equates to a response rate of 24.1%.

4.1.3.1 Demographics

The results pertaining to the demographic profiles of the two sample groups are presented in graphs and will be discussed individually under the headings of: Gender, Age, Academic Qualification and Experience.

4.1.3.2 Gender

Figure 4.5 indicates the gender distribution of the respondents. When looking at each sample group individually, ninety-two point eight percent (92.8%) of contractor's sample were male and seven point two (7.2%) female, whilst ninety-one point six percent (91.6%) of the quantity surveying sample were male and the remaining eight point four percent (8.4%) female.

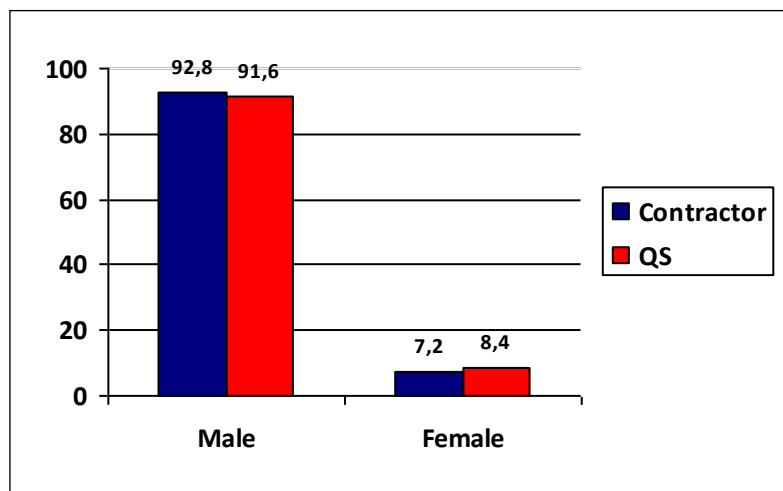


Figure 4. 5 Quantitative: gender of respondents

4.1.3.3 Age

The majority of the respondents may be considered to be over forty five (45) years of age. Thirty-three percent (33.3%) of the quantity surveyors fall within the fifty-five to sixty-four (55-64) years of age category. Thirty point eight percent (30.8%) of contractors fall within the forty-five to fifty-four (45-54) years of age category and the fifty-five to sixty-four (55-64) years of age category respectively. The age distribution of the two groups may be seen in the figure below (Figure 4.6).

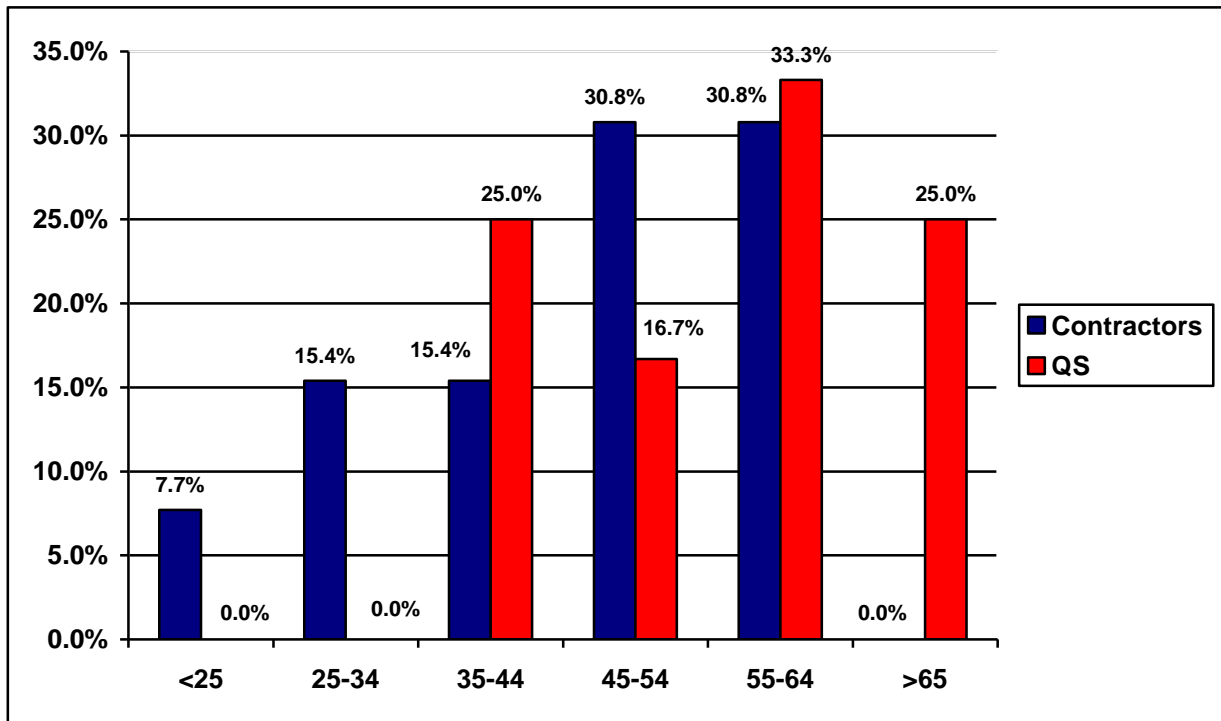


Figure 4. 6 Quantitative: Age of respondents

4.1.3.4 Academic Qualification

The majority respondents from the quantity surveyor’s sample have Honours Degrees (75%). From the graph below (Figure 4.7) it can be seen that the majority of contractors (53.8%) possess a National Diploma. None of the respondents from either population possess a Bachelors Degree.

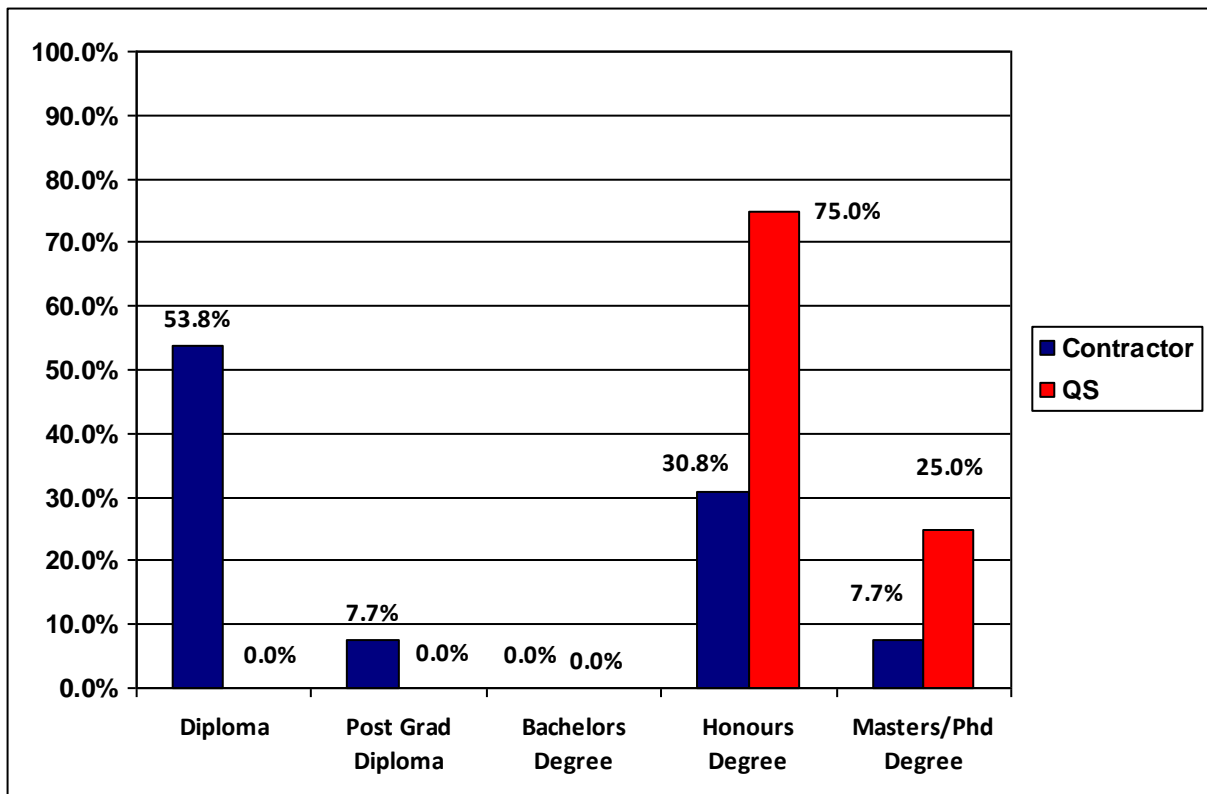


Figure 4. 7 Quantitative: Qualification of respondents

4.1.3.5 Experience

Sixty-nine point two percent (69.2%) of contractors and sixty-six point seven (66.7%) of quantity surveyors have been working in the industry for more than 18 years (Figure 4.8).

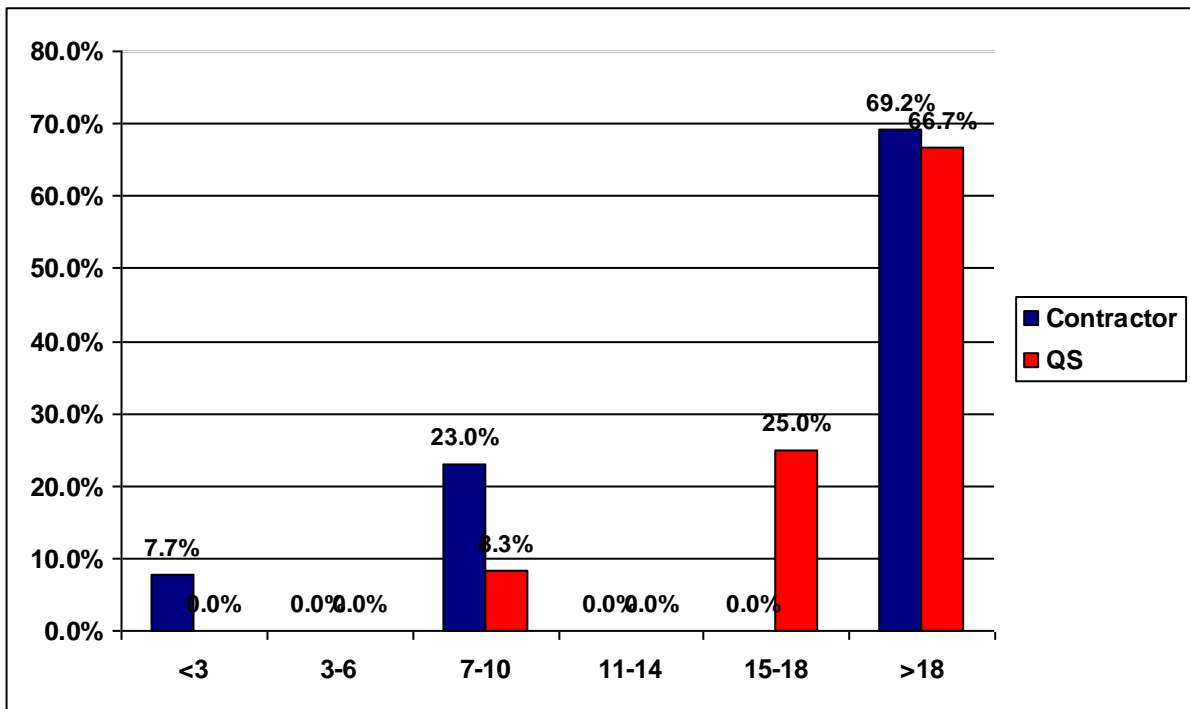


Figure 4. 8 Quantitative: Experience of respondents

4.2 QUALITATIVE STUDY

4.2.1 Results

4.2.1.1 Question 1: Importance of H&S

As an introductory question, interviewees from each respective population were required to indicate the importance of H&S to their organisation on a scale of 1 (not) and 5 (very). A mean score (MS) between 1.00 and 5.00 was computed based upon the percentage responses to the scale and weighted accordingly. Based upon the 4 quantity surveyors interviewed, the MS was 4.00, the 5 construction firms was 5.00, the ASAQS was 3.00, and the ECMBA was 5.00, see Table 4.1.

Table 4. 1: Importance of Health & Safety (H&S) to firm or association

Stakeholder	Respondent No.					MS
	1	2	3	4	5	
ECMBA	5					5.00
ASAQS (EC)	3					3.00
QS	5	4	2	5		4.00
Contractor	5	5	5	5	5	5.00

4.2.1.2 Question 2: Construction Regulation 2014 changes

Quantity Surveyors:

Respondents were asked in terms of the Construction Regulations 2014, if they had made any changes to the methods of producing a BoQ and related quantity surveying services. Three out of the four quantity surveyors (75%) stated that they have made changes to the method of producing a BoQ in terms of Construction Regulations of 2014. One of the respondents stated that they encourage clients to appoint a H&S Agent due to their limit knowledge regarding H&S and the new legislation. An example BoQ that measures H&S items as a separate section was provided by a respondent who produced this section in response to the changes of the construction regulations (Addendum G). A respondent stated that they ensure a H&S Specification is attached to the contract documentation as an addendum and that they include the ASAQS “model description” for H&S.

Contractors:

Each interviewee was asked if their firm had made any changes to the methods of executing a project with the introduction of the Construction Regulations of 2014. Four out of the five (80%) interviewees stated that they had made changes to the methods of executing a project. Changes

included: correct safety lines and harnesses, method of transporting of workers, employing of registered H&S officers, training of current employees, changes to the SHEQ management system employed and scaffold training. One of the interviewees stated that they were already carrying out projects that were beyond the requirements of the construction regulations and therefore no changes were required.

It must be noted that a one of the respondents stated that:

“Unfortunately, a company with my size cannot afford to employ a H&S officer, do that is a very grey area.”

ASAQS (EC Chapter):

The ASAQS stated that they have not made any changes to documents and information available to members, with regard to H&S, apart from the one clause in the preliminaries.

ECMBA:

The ECMBA stated that they have made changes to all their documents in terms of the updated Construction Regulations 2014. The National H&S Audit System has been updated as well as the H&S Manual.

4.2.1.3 Question 3: Design originated hazards

A question relating to design originated hazards were posed to each population. The below graph (Figure 4.9) shows the response from interviewees when asked if contractors experience design originated hazards.

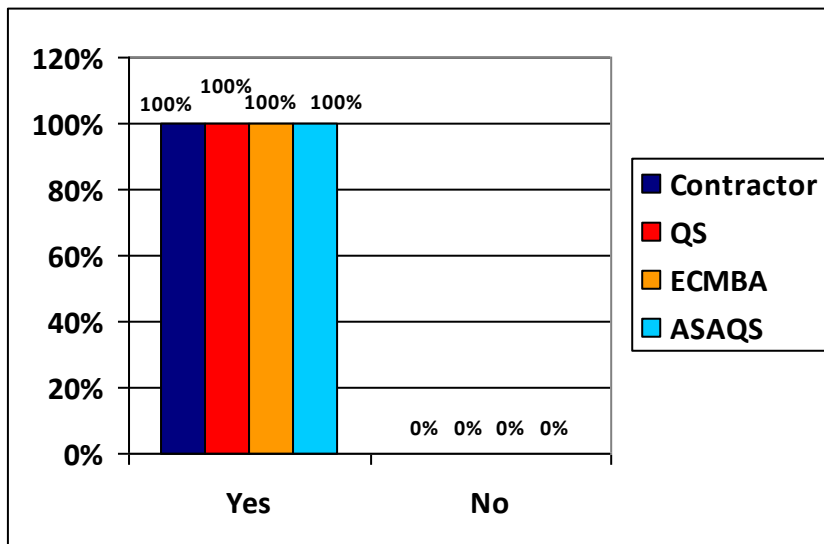


Figure 4. 9 Design originated hazards

Quantity Surveyors:

Two out the four (50%) of the interviewees stated that they identify design originated hazards. The main causes identified by the interviewees include: lack of interest, lack of awareness for hazards

and architects designing building that are aesthetically pleasing rather than constructible. Four out of the four (100%) of the interviewees agreed that architects and engineers are the main causes of design originated hazards.

Contractors:

All interviewees stated that they make the design team aware of hazards that they identify on site and provide alternatives to the design in order to minimize these hazards. Interviewees also all agreed that designers and architects cause design originated hazards, with architects designing buildings without considering the constructability of the design.

A response from an interviewee:

“They (architects) specify something because that’s what they can lay their hands on in terms of information, it is then up to the contractor to bring it up at the technical meeting.”

ASAQS (EC Chapter):

The association stated that they do not identify design originated hazards. The ASAQS (EC Chapter) identified that architects are the main cause of design originated hazards, designing buildings that are aesthetically pleasing without realizing the hazards that are formed through the design, for example the weight of certain materials.

ECMBA:

The representative from the ECMBA stated that the association identifies design originated hazards. The association encourages members to have plans in place to deal with these hazards.

4.2.1.4 Question 4: Percentage of H&S

A question relating to the percentage of H&S that constitutes actual project cost or value on projects was presented to each discipline and association. The below table (Table 4.2) represents the responses.

Table 4. 2 Percentage of H&S

Stakeholder	Respondent No.				
	1	2	3	4	5
ECMBA	unsure				
ASAQS (EC)	unsure				
QS	2-5%	2-5%	unsure	unsure	
Contractor	0.5%	1-2%	1-2%	3.5%	6-8%

4.2.1.5 Question 5: Provision made in the BoQ for H&S

The below responses were received from interviewees regarding the provision made in the BoQ or by the firm for H&S.

Quantity Surveyors:

All interviewees stated that the only provision made in the BoQ for is a one clause item in the preliminaries. Interviewees also stated that a H&S specification is attached as an addendum to the BoQ.

Contractors:

Four out of the five (80%) interviewees make provision for H&S by interpreting the H&S specification and creating a 'spreadsheet' of H&S related items. Once the spreadsheet has been completed a final amount is then taken and placed in the preliminaries section of the BoQ under the H&S item. One out of the five (20%) interviewees allowed for a set amount for H&S, but state that they do not allow for H&S items such as sheltered eating areas and changing facilities on site.

ASAQS (EC Chapter):

The association makes provision for H&S in the 'model' preliminaries bill by providing a single item stating that contractors need to comply with the H&S specification as well as the legislation with regard to H&S.

4.2.1.6 Question 6: Contractor's difficulty in pricing H&S

The below graph (Figure 4.10) depicts the response to whether or not contractors experience difficulty in pricing H&S. Three out of four (75%) quantity surveyors agree that contractors experience difficulty when pricing H&S, with the remaining interviewees (25%) disagreeing. Four out of the five (80%) interviewees from the contractor's population state that they do not experience difficulty when pricing H&S. The remaining interview states that the firm experiences difficulty when pricing H&S due to each project being different with different requirements. Both associations agree that contractors experience difficulty when pricing H&S. The ECMBA states that the H&S specification is not always attached at tender stage and smaller inexperienced contractors struggle to interpret the specification and therefore struggle to price for H&S.

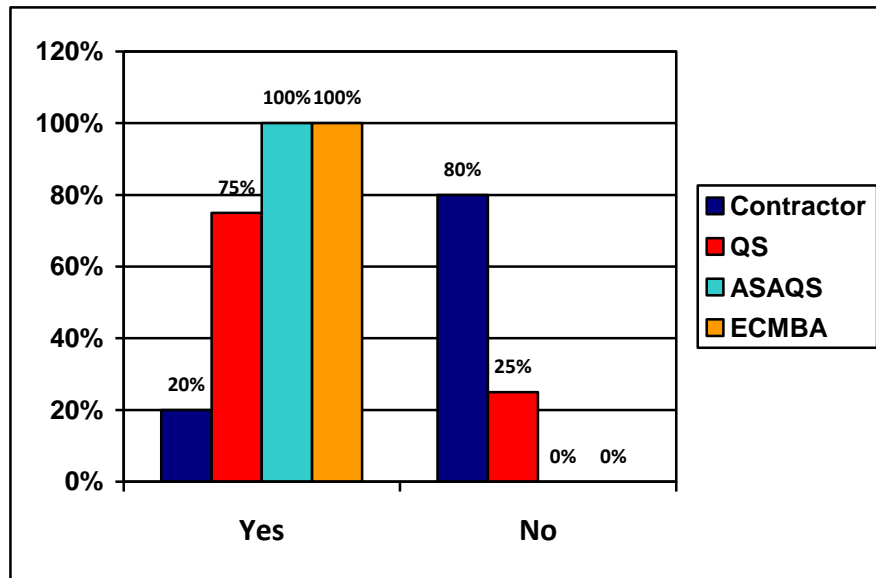


Figure 4. 10 Do Contractors experience difficulty when pricing H&S

4.2.1.7 Question 7: Competitive tendering

Contractors were asked how competitive tendering affect financial provision for H&S. The responses are recorded below:

- “It doesn’t, but that is in the view of my company as we do not take shortcuts with H&S.”
- “It doesn’t, it is such a small percentage.”
- “We never cut H&S to be more competitive. You cannot really say if it affects competitive tendering as we cannot see a break-down of other tenderer’s P&G.”
- “In my opinion, it is the last thing that should be ‘cut’.”
- “I do not see that H&S is a deciding factor as to whether or not you get awarded the project.”

4.2.1.8 Question 8: Steps taken by the client

Quantity Surveyors:

Interviewees from the Quantity surveying profession were asked what steps are taken by the client to ensure contractors have made adequate financial provision for H&S. All respondents suggest that the client cannot take any steps to ensure the contractor has made adequate financial provision for H&S. One interviewee stated that the contractor has to comply whether he has made adequate financial provision for H&S or not, with another interviewee stating that the client does

not have the knowledge to determine whether the contractor has made adequate financial provision for H&S. Two out of the four (50%) interviewees stated that as quantity surveyors they cannot determine if the amount allowed by the contractor is adequate as they do not have the necessary experience and knowledge with regard to H&S.

ASAQS:

The ASAQS stated that they do not provide any methods or documents that allow the client to ensure contractors have made adequate financial provision for H&S.

4.2.1.9 Question 9: Introduction of H&S preliminaries

The below graph (Figure 4.11) shows the interviewees response from each population when asked if H&S preliminaries should be included in the BoQ.

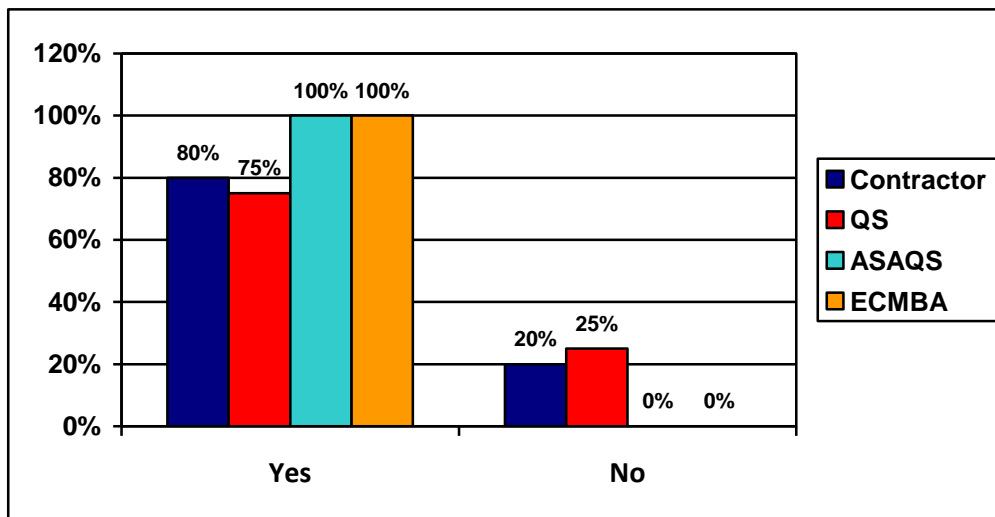


Figure 4. 11 Introduction of H&S preliminaries

Four out of the five (80%) contractors agreed that a H&S preliminaries section should be introduced, while three out of the four (75%) quantity surveyors interviewed were in favour of a H&S preliminaries section. The ASAQS (EC Chapter) as well as the ECMBAs both agreed to the introduction of H&S preliminaries.

Items of relevance to such a document suggested by the interviewees are depicted in the below table (Table 4.3).

Table 4. 3 Items to be included in a H&S preliminaries

Items to be included in a H&S preliminaries
Seasonal climatic issues
Geographical issues
Full-time H&S Officer
Design of temporary works

Shower facilities
Sheltered eating areas
Medicals
PPE
Scaffolding
H&S Audits
Special scaffolding
Allowance for H&S Audits
SWPs and method statements
H&S file
WCs
Suspended scaffolding
H&S file

4.2.1.10 Question 10: General comments

Interviewees were given the opportunity to give their comments regarding the introduction of H&S preliminaries. Below are some of the responses received:

General comments by quantity surveyors relating to the inclusion of an H&S preliminaries in the BoQ included:

- “The H&S agent should be introduced at design stage in order to assist the quantity surveyor with regard to H&S related items.”
- “I feel there is a resistance to introducing this document and people are in denial. I believe there is no possibility of denying the urgency of such a document.”
- “It has possibly been taken too far, with the cost of certain items such as medicals being far too much and it is possibly a money-making scheme.”

General comments by contractors relating to the inclusion of an H&S preliminaries in the BoQ included:

- “I am against constant changes to contract documentation, so writing a whole new section of H&S preliminaries is not an option.”
- “It levels the playing field and everyone will know what is required of them in terms of H&S.”
- “I feel the way forward is getting a standard H&S section in the preliminaries. I think it has to come into effect, whether the contractor then chooses to price an item in this section or not, is up to him. At least then the QS can see what the contractor has allowed for in terms of H&S.”
- “Consumables shouldn’t be quantified, as you will never be able to say how many hard hats, etc. each project will have.”

General comments by the ASAQS (EC Chapter) relating to the inclusion of an H&S preliminaries in the BoQ included:

- “We would like to see more than one item in the preliminaries. This would be beneficial for cost control.”

General comments by the ECMBA relating to the inclusion of an H&S preliminaries in the BoQ included:

- “It has to involve contractors and the QS profession in order to put this document together. The JBCC committee should discuss and implement this type of document.”

4.2.2 Interpretation

Each population acknowledges the importance of H&S with a combined mean score of 4.45 by the various stakeholders. This result is expected as Smallwood (2004) stated that increasing awareness relative to the role of H&S in overall project performance has generated focus on H&S by a range of stakeholders.

With the implementation of the Construction Regulations of 2014, more focus has been placed on the responsibilities of the client. This is further emphasised in the cidb (2009) that states that there has been a redistribution of responsibility for construction H&S away from the contractor, who was previously solely responsible, to include all participants in the construction process. This is further emphasised in the result of 75% of quantity surveyors making changes to their methods of producing a BoQ and related quantity surveying services. It is however identified that these changes are limited and do not provide for the full requirements of the updated Construction Regulations. One interviewee had changed the method of producing a BoQ extensively, by providing a separate section in the preliminaries for H&S (See Appendix G). As per the Construction Regulations 2014: the client needs to ensure that the contractor has made adequate financial provision for H&S. As the client’s representative, no interviewee could provide a clear description regarding the steps taken to ensure that the contractor has made adequate financial provision for H&S. The interviewees stated that they do not have the necessary knowledge regarding H&S in order to advise the client if the contractor has made adequate financial provision for H&S. Therefore, it can be deduced that the client fails to determine whether the contractor has made adequate financial provision for H&S based on the current allowance of a lump-sum figure in the BoQ. As it stands, contract documentation fails to effectively make adequate provision for H&S in terms of the Construction Regulations 2014.

Contractors interviewed were all aware of the implications of the updated Construction Regulations and 80% of the contractors had made changes to methods of executing a project. Contractors

interviewed make use of their own in-house spreadsheets in order to facilitate the calculation of financial provision for H&S. Although contract documentation only facilitates a single item in the BoQ, contractors have adopted their own methods of interpreting the H&S specification in order to arrive at a lump-sum figure for H&S. This in turn, limits equitable pricing for H&S.

The ASAQS (EC Chapter) acknowledges the importance of H&S, but they have made no changes to documents and information available to members. The ECMBA on the other hand, have made changes to all their documentation in order to reflect the update Construction Regulations 2014.

A question relating to the percentage of H&S that constitutes actual project cost or value on projects was presented to both disciplines. All quantity surveyors were unsure of the exact percentage H&S constituted, with estimated guesses and consultation from 'historical data', a figure of 2-5% was suggested from two out of the four (50%) quantity surveyors interviewed. Contractors provided percentages of 0.5%, two responses of 1-2%, 3.5% and 6-8%. This indicating varying answers with no confident answer from contractors with respect to the cost of H&S. From previous research, the cost of prevention is around 1.6% of the tender amount (Smallwood, 2011). It must be noted that H&S is project specific and therefore the financial provision for H&S will vary for each project.

All contractors agreed that pricing of H&S in the BoQ has very little or no implication on competitive tendering, but do feel that on projects where the H&S requirements exceed the standard legislative requirements, it can affect the tender prices submitted by contractors.

All interviewees from the various populations agreed that contractors experience design originated hazards. All interviewees identified architects and engineers as the main causes of design originated hazards, as they do not consider the constructability of their designs. According to Emuze (2011), the philosophy behind the regulations is to instil optimum H&S practices among clients and consultants in the form of designers. Based on the findings designers have failed to carry out optimum H&S practices in terms of the Construction Regulations.

According to Smallwood (2011), contract documentation, documents, and other references do not address H&S to the requisite extent. This can be seen in the findings with all interviewees stating that the only provision made for H&S in the BoQ is one item in the P&G. This results in 81.8% of all interviewees agreeing to the introduction of H&S preliminaries in order to facilitate the financial provision for H&S.

The consensus around the introduction of H&S preliminaries is the risk and responsibility the quantity surveying profession has to carry. The lack of knowledge and experience regarding H&S provides difficulty for quantity surveyors to produce such a document.

4.3 QUANTITATIVE STUDY

4.3.1 Results

With 81.1% of interviewees agreeing to the introduction of H&S preliminaries, further research was conducted in order to establish further agreement of such a document amongst quantity surveyors and contractors within the Eastern Cape. With quantity surveyors unable to determine what items should be included in a H&S preliminaries document, items that were of relevance to H&S were posed in the questionnaire and respondents had to then rate, in terms of their importance for inclusion in a H&S preliminaries, the various H&S related items.

A scale of agreement of 1 (strongly disagree) and 5 (strongly agree) regarding the introduction of H&S Preliminaries was used. Table 4.4 shows the results for each population.

Table 4. 4 Mean score of agreement

	Quantity Surveyor	Contractor
	MS	MS
Inclusion of an H&S Preliminaries section in the BoQ	3.75	4.43

When analysing the first question where respondents had to state their level of agreement based on a likert-scale of 1 (strongly disagree) to 5 (strongly agree), quantity surveyors had a mean score (MS) of 3.75 and contractors had a MS of 4.43. A Mann Whitney U-test was then conducted to compare the two populations, with a p-value of 0,022. This shows statistical significance, as $p \leq 0.05$. This shows that there is a significant difference in the degree of their agreement for the introduction of H&S preliminaries between quantity surveyors and contractors.

Respondents were then requested to rate items in terms of their importance in a H&S Preliminaries section on a likert-scale of importance of 1 (not at all) to 7 (extremely). Based on each samples response, the following Mean Scores (MS) were obtained from quantity surveyors. Based on these MS's items were then given a ranking of importance (Table 4.5).

Table 4. 5 Mean score of quantity surveyors

QUANTITY SURVEYORS		
Item	MS	Rank
First aid	6.44	1
H&S plan	6.33	2
Personal protective equipment	6.33	2
Hoarding and / or public walkways	6.22	4
Storage for flammable goods – Regulation 27 (b)	6.22	4
Risk assessment	6.11	6
Guarding and barricading	6.00	7
Fire precautions	6.00	7
Scaffolding	5.89	9
Temporary electrical installations	5.78	10
Special scaffolding	5.78	10
Allowance for H&S Audits	5.67	12
Engineering design and / or certification	5.67	12
H&S Representatives	5.67	12
WCs	5.67	12
Suspended scaffolding	5.67	12
H&S file	5.56	17
SWPs and method statements	5.56	17
Design of temporary works	5.56	17
WHBs	5.56	17
Catch platforms	5.56	17
Access	5.56	17
Signage	5.56	17
Design of permanent structures	5.33	24
Education and training	5.33	24
Meetings	5.33	24
Inspections	5.33	24
Medicals	5.22	28
Showers	5.22	28
Transport of workers	5.22	28
Full-time H&S Officer	5.00	31
Housekeeping	4.89	32
Maintenance	4.89	32
General administration	4.78	34
Storage	4.78	34
Environmental measurement	4.67	36
Mess room	4.67	36
Biological monitoring	4.33	38
Living accommodation	4.22	39

Contractors had the below MS and Rank for the items to be included in a H&S Preliminaries section, as seen in Table 4.6.

Table 4. 6 Mean score of contractors

CONTRACTOR		
Item	MS	Rank
First aid	6.77	1
H&S plan	6.69	2
Personal protective equipment	6.62	3
Hoarding and / or public walkways	6.54	4
Storage for flammable goods – Regulation 27 (b)	6.54	4
Risk assessment	6.46	6
Guarding and barricading	6.46	6
Fire precautions	6.46	6
Scaffolding	6.46	6
Temporary electrical installations	6.38	10
Special scaffolding	6.31	11
Allowance for H&S Audits	6.31	11
Engineering design and / or certification	6.31	11
H&S Representatives	6.23	14
WCs	6.23	14
Suspended scaffolding	6.23	14
H&S file	6.17	17
SWPs and method statements	6.15	18
Design of temporary works	6.15	18
WHBs	6.15	18
Catch platforms	6.08	21
Access	6.08	22
Signage	6.00	23
Design of permanent structures	6.00	23
Education and training	6.00	23
Full-time H&S Officer	6.00	23
Meetings	5.85	27
Inspections	5.83	28
Medicals	5.82	29
Showers	5.69	30
Transport of workers	5.69	30
Housekeeping	5.62	32
Maintenance	5.62	32
General administration	5.62	32
Storage	5.38	35
Environmental measurement	5.38	35
Mess room	5.31	37
Biological monitoring	5.23	38
Living accommodation	5.08	39

Table 4. 7 Top ranked items for inclusion in BoQs

Rank	Quantity Surveyors		Contractors	
	Item	MS	Item	MS
1	First aid	6.44	Suspended scaffolding	6.77
2	PPE	6.33	Special scaffolding	6.69
3	H&S plan	6.33	Scaffolding	6.62
4	Hoarding	6.22	Access	6.54
5	Storage to flammable goods	6.22	Storage to flammable goods	6.54

The top ranked items for inclusion in an H&S Preliminaries section are presented in Table 4.7. Quantity surveyors and contractors had only a single item similar in their top ranked items (storage to flammable goods), with both populations placing this item at 5 in their top ranked items, with quantity surveyors ranking first aid as the most important item with a MS of 6.44. Contractors ranked suspended scaffolding as the most important item with a MS of 6.77.

When analysing the lowest ranked items in terms of importance, it is evident that quantity surveyors and contractors have similar lowest ranked items (Table 4.8). Although similar items were identified as being least important when ranked against other items, contractors had a mean score of 5.08 for their lowest ranked item (biological monitoring). Quantity Surveyor's lowest ranked item, living accommodation, had a mean score of 4.22.

Table 4. 8 Lowest ranked items for inclusion in BoQs

Rank	Quantity Surveyors		Contractors	
	Item	MS	Item	MS
36	General Administration	4.78	Meetings	5.38
37	Mess Room	4.67	Showers	5.38
38	Environmental measurement	4.67	Living accommodation	5.31
39	Biological monitoring	4.33	Environmental measurement	5.23
40	Living accommodation	4.22	Biological monitoring	5.08

4.3.2 Interpretation

When analysing the top ranked items from each population, it is evident that both populations had a MS which falls into the range of extremely important (Table 4.9 & Table 4.10).

Table 4. 9 Interpretation of MS for quantity surveyors

Rank	Contractors		Interpretation
	Item	MS	
1	Suspended scaffolding	6.77	Extremely important
2	Special scaffolding	6.69	Extremely important
3	Scaffolding	6.62	Extremely important
4	Access	6.54	Extremely important
5	Storage to flammable goods	6.54	Extremely important

Table 4. 10 Interpretation of MS for contractors

Rank	Quantity Surveyors		Interpretation
	Item	MS	
1	First aid	6.44	Extremely important
2	PPE	6.33	Extremely important
3	H&S plan	6.33	Extremely important
4	Hoarding	6.22	Extremely important
5	Storage to flammable goods	6.22	Extremely important

Table 4. 11 Interpretation of standard deviation for quantity surveyors

Quantity Surveyors			
Item	Mode	Std Def	Skewness
Full-time H&S Officer	6.00	0.93	0.00
Allowance for H&S Audits	6.00	1.00	-0.11
H&S plan	7.00	0.87	-0.82
H&S file	6.00	1.13	-1.51
Risk assessment	6.00	0.33	3.00
SWPs and method statements	6.00	1.42	0.36
Design of temporary works	6.00	1.13	-0.18
Design of permanent structures	7.00	1.73	-0.85
Engineering design and / or certification	7.00	1.58	-0.27
Medicals	5.00	0.67	-0.25
Biological monitoring	4.00	1.58	1.49
Environmental measurement	5.00	1.12	-1.92
Education and training	5.00	0.71	-0.61
H&S Representatives	6.00	0.71	0.61
Meetings	6.00	1.00	0.11

General administration	6.00	1.09	-0.19
Hoarding and / or public walkways	6.00	0.44	1.62
WCs	6.00	0.50	-0.86
WHBs	6.00	0.73	-1.50
Showers	5.00	0.67	-0.25
Mess room	4.00	0.87	0.82
Living accommodation	4.00	1.79	0.93
Catch platforms	6.00	0.88	-1.62
Guarding and barricading	6.00	0.50	0.00
Storage	6.00	1.09	-0.19
Storage for flammable goods – Regulation 27 (b)	7.00	0.97	-1.60
Temporary electrical installations	6.00	0.67	-3.00
Scaffolding	6.00	0.78	-1.80
Special scaffolding	6.00	0.83	-1.17
Suspended scaffolding	6.00	1.12	-0.54
Access	6.00	0.73	-1.50
Signage	6.00	1.24	-1.44
Housekeeping	6.00	1.17	-0.34
Fire precautions	6.00	0.71	0.00
Personal protective equipment	6.00	0.50	0.86
First aid	6.00	0.53	0.27
Transport of workers	5.00	1.09	0.93
Inspections	5.00	0.50	0.86
Maintenance	5.00	0.60	-0.02
Emergency plan	6.00	0.78	-0.22

When interpreting the standard deviation of the responses from the quantity surveying sample, it can be deduced that there are no items where respondent's responses vary and are not closely grouped together in their response (Table 4.11). The biggest variance in response was for the item 'living accommodation' with a standard deviation of 1.79, falling in the category of reasonably closely grouped together.

When interpreting the mode, the lowest rating of 4.00 was recorded for biological monitoring, mess room and living accommodation, respectively. This falls in the range of neutral.

Table 4. 12 Interpretation of standard deviation for contractors

Contractors			
Item	Mode	Std Def	Skewness
Full-time H&S Officer	6.00	1.63	-1.90
Allowance for H&S Audits	6.00	1.25	-2.33
H&S plan	7.00	0.69	-0.20

H&S file	6.00	1.35	-2.38
Risk assessment	6.00	0.75	-0.61
SWPs and method statements	6.00	0.79	-0.16
Design of temporary works	6.00	1.03	-0.99
Design of permanent structures	7.00	1.89	-1.97
Engineering design and / or certification	7.00	1.80	-2.06
Medicals	5.00	0.66	-1.19
Biological monitoring	4.00	1.73	-1.29
Environmental measurement	5.00	1.36	-0.26
Education and training	5.00	0.95	-0.17
H&S Representatives	6.00	0.99	-0.97
Meetings	6.00	1.71	-1.42
General administration	6.00	1.71	-1.77
Hoarding and / or public walkways	6.00	0.78	-1.11
WCs	6.00	1.01	-1.11
WHBs	6.00	1.01	-1.11
Showers	5.00	1.66	-1.50
Mess room	4.00	1.66	-1.85
Living accommodation	4.00	1.93	-1.25
Catch platforms	6.00	1.35	-2.38
Guarding and barricading	6.00	0.66	-0.86
Storage	6.00	1.25	-0.82
Storage for flammable goods – Regulation 27 (b)	7.00	1.21	-0.98
Temporary electrical installations	6.00	0.90	-0.34
Scaffolding	6.00	0.65	-1.58
Special scaffolding	6.00	0.48	-0.95
Suspended scaffolding	6.00	0.44	-1.45
Access	6.00	0.52	-0.18
Signage	6.00	0.77	-0.85
Housekeeping	6.00	0.85	-0.71
Fire precautions	6.00	0.85	-0.71
Personal protective equipment	6.00	0.66	-0.86
First aid	6.00	0.66	-0.86
Transport of workers	5.00	0.93	-1.27
Inspections	5.00	1.00	-0.59
Maintenance	5.00	1.04	-0.62
Emergency plan	6.00	1.22	-0.64

When interpreting the standard deviation of the responses from the contractor sample, it can be deduced that there are no items where respondent's responses vary and are not closely grouped together in their response (Table 4.12). The biggest variance in response was for the item 'living

accommodation' with a standard deviation of 1.93, falling in the category of reasonably closely grouped together.

When interpreting the mode, the lowest rating of 4.00 was recorded for biological monitoring, mess room and living accommodation. This falls in the range of neutral. These are the same items identified by the quantity surveying population with a mode of 4.00 for each respective item.

A Mann Whitney U-test was conducted on the two populations in terms of the importance of the items to be included in the H&S Preliminaries. Table 4.13 presents the items which had statistical significance between the two populations, i.e. there was a significant degree in difference as to the importance of these items between the two populations. Nine items out of a possible forty items on the list had a statistical difference.

Table 4. 13 Mann Whitney U-test results

No	Item	p-value
1	Medicals	0,001072
2	Access	0,002933
3	Special scaffolding	0,005501
4	Suspended scaffolding	0,007424
5	Housekeeping	0,007640
6	Scaffolding	0,017838
7	Full-time H&S Officer	0,026250
8	Mess room	0,027534
9	Transport of workers	0,039914

4.4 TESTING OF HYPOTHESES

Based on the results of this research, the following conclusions can be drawn, relating to the sub problems:

4.4.1 Hypothesis 1.1

Hypothesis 1.1 stated that the non-facilitation of equitable pricing of H&S results in contractors not making adequate financial provision for H&S during the course of the project. This hypothesis is not supported, as contractors feel they do make adequate financial provision for H&S during the course of the project.

4.4.2 Hypothesis 1.2

Hypothesis 1.2 stated that contractors that are committed to H&S can be compromised by the competitive tendering process, due to contractors that are not committed to H&S not making

adequate financial provision for H&S. This hypothesis is not supported, as contractors that are committed to H&S are not comprised by the competitive tendering process.

4.4.3 Hypothesis 1.3

Hypothesis 1.3 stated that inadequate reference to H&S in contract documentation results in contractors not making adequate financial provision for H&S. This hypothesis is not supported, as although there is inadequate reference to H&S in contract documentation, contractors make use of in house pricing systems in order to make adequate financial provision for H&S.

4.4.4 Hypothesis 2.1

Hypothesis 2.1 states that the non-facilitation of equitable pricing of H&S results in clients being unable to ensure that contractors have made adequate financial provision for H&S at tender stage. This hypothesis is supported, as clients have no measures in place to ensure that contractors have made adequate financial provision for H&S at tender stage.

4.4.5 Hypothesis 3.1

Hypothesis 3.1 states that contractors encounter design originated hazards due to quantity surveyors not conducting 'design' hazard identification and risk assessments. This hypothesis is not supported.

4.4.6 Hypothesis 3.2

Hypothesis 3.2 states that contractors encounter design originated hazards due to lack of consideration and knowledge by designers and architects with regard to potential hazards caused by design. This hypothesis is supported, as according to this architects and engineers are the main causes of design originated hazards.

4.4.7 Hypothesis 4.1

Hypothesis 4.1 stated that there is a significant difference in Contractors and quantity surveyors assessment of the importance of items that should be included in a H&S Preliminaries. From the statistical Mann-Whitney U-Test analysis (Table 4.10) it can be seen, that nine (9) items hold significant differences by the two populations. In each case the p-value is less than the critical value of 0.05, thus, the differences are considered significant. However, this only represents 22.5% of the items presented to each population and therefore it can be deduced that the hypothesis, which stated that there is a significant difference in contractors and quantity surveyors assessment of the importance of items that should be included in a H&S Preliminaries, is not supported.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

This research aimed to introduce H&S preliminaries on building projects in the Eastern Cape. The study took the form of a mixed methodology study where initially a qualitative study was carried out in the form of an interview protocol, followed by a quantitative study in the form of a questionnaire survey.

The research investigated whether contractors experience difficulty when pricing H&S and aimed to determine the causes of inadequate financial provision made by contractors for H&S at tender stage. The results revealed that contractors do not experience difficulty pricing H&S and although they cannot determine the percentage that H&S constitutes of actual project cost or value, they are able to make adequate financial provision for H&S using their own in-house methods.

A concerning finding in the research was that clients are unable to determine if contractors had made adequate financial provision for H&S at tender stage. This study further aimed to provide a method of allowing clients to ensure that contractors have made adequate financial provision for H&S at tender stage.

5.2 CONCLUSIONS

Although H&S is seen as an important aspect to contractors and quantity surveyors alike, contract documentation, specifically the BoQ, lack in terms of facilitating financial provision for H&S. The committees responsible for the development of contract documentation should include appropriate H&S related clauses, which reflect the requirements of the OH&S Act and the Construction Regulations of 2014.

The main concern with the lack of provision for H&S in the Bill of Quantities, is that the client is unable to ensure that the contractor has made adequate financial provision for H&S at tender stage. In terms of the Construction Regulations 2014, a designer needs to provide a report to the client, before the project goes out to tender, regarding all relevant H&S information about the design of the relevant structure that may affect the pricing of the construction work. It is evident that as designers, quantity surveyors have failed to provide clients with such a report at tender stage. This is observable as, such a report would allow quantity surveyors to price H&S related items and forecast costs for potential H&S related items and would therefore have methods in place in order to assist the client in determining if contractors had made adequate financial provision for H&S.

According to the research, contractors experience design originated hazards. Contractors make the design team aware of hazards that they identify on site and provide alternatives to the design in order to minimize these hazards. Designers and architects are seen as the main causes of design originated hazards, with architects designing buildings without considering the constructability of the design. Designers also lack knowledge and understanding of H&S and the hazards that form part of the design. According to the Construction Regulations 2014, the designer has a responsibility of taking the cognisance of ergonomic design principles in order to minimize ergonomic related hazards in all phases of the life cycle of a structure. The Regulations also states that the designer needs to inform the client, in writing, of any known or anticipated hazards relating to the construction work and make available all relevant information required for the safe execution of the work upon being designed or when the design is subsequently altered. Based on the requirements of these regulations, designers fail to fulfil their responsibility in terms of design originated hazards.

Associations such as the ASAQS have not, and do not facilitate the financial provision for H&S, with little change to available information and documents to members even with the amended Construction Regulations of 2014, which superseded the original Construction Regulations of 2003. The ASAQS acknowledges the importance of H&S in the construction industry, but has not taken the responsibility of amending documentation according to the latest regulations, due to duties and responsibilities not being agreed upon by members of the ASAQS board. The ASAQS has also failed, indirectly, to assist clients in terms of ensuring that contractors have made adequate financial provision for H&S. According to the ASAQS Code of Conduct (2005) members need to comply with the laws of the land in which he or she operates. With limited changes being made even with the advancement of H&S legislation ASAQS need to reconsider the information and documentation made available to members.

The ECMBA has provided extensive changes to information and documents available to members in order to facilitate the Construction Regulations 2014. Changes to the H&S. The ECMBA provide information regarding the changes to the legislation and alert members with regard to the requirements of H&S legislation. They also provide explanatory articles in their bulletin with regard to the H&S legislation. Workshops are also provided to members with regard to H&S, for example road shows of workshops regarding the new Construction Regulations 2014 and their implications. Audits on building sites are carried out with a limited number of free audits offered to members. A regional and national H&S competition is run, based on the audits and the National MBA Audit System. That audit system has been specifically designed for building sites and it is reviewed on an annual basis to keep up to date with legislation. Various publications and material are released by the MBA, for example the National MBA Safety Manual, which comprises of proformas and

reports. Members have access to proforma H&S plans and assistance in putting together their H&S plan. The ECMBA also provides training on H&S, such as a safety rep course, a scaffold inspection and scaffold erector course.

When investigating items that would be of relevance to a H&S preliminaries document, consensus is reached amongst quantity surveyors and contractors regarding the importance of items to be included in such a document. The responsibility lies with the relative industry associations in order to establish such a document. The JBCC, being the most widely used form of contract in South Africa, does not facilitate the financial provision for H&S and should therefore relook at contract documentation in order to comply with the requirements of the Construction Regulations 2014.

Although respondents to the study argue that provision for H&S in the BoQ does not affect competitive tendering, H&S preliminaries would allow contractors to tender on a level basis with regards to H&S. It should be noted that previous studies determined that H&S preliminaries would also assist quantity surveyors with respect to cost control and in terms of assisting the client to ensure that contractors have made adequate financial provision for H&S.

Industry members have in recent times recognised the importance of H&S, but still fail to act in terms of the recognition thereof. The COA is ultimately carried by the client as such cost is built into contractors' cost structures, and furthermore, the COA on construction projects far outweighs the cost of prevention. The COP, or H&S, is still mostly unknown to quantity surveyors, with contractors starting to place more importance and effort on determining the COP on projects. With the inclusion of an H&S preliminaries section, clients, through the assistance of quantity surveyors, will be able to monitor the COP in carrying out a successful profit-driven project.

5.3 LIMITATIONS

The following limitations have been encountered during the research process:

- Results were limited to experienced and well-established contractors in the industry and therefore the findings excludes small emerging contractors

5.4 RECOMMENDATIONS

H&S preliminaries should be included in the BoQ based on the project specific H&S specification provided by the client. A H&S Agent should be appointed at the first, or at the latest, the third stage (design development stage) of a project in order to assist the quantity surveyor in interpreting the H&S specification when drawing up H&S items for the BoQ.

The relevant associations and more specifically the JBCC committee needs to consider the inclusion of H&S preliminaries in order to keep abreast with regulation relating to H&S.

Associations representing each profession, namely the MBA and ASAQS, need to inform members of their responsibilities with regard to the Construction Regulations 2014.

The client needs to become more aware of their pivotal role they place in influencing H&S during the construction of the building. According to the cidb (2009) experience indicates that high H&S standards are achieved on projects where clients are committed to H&S and provide appropriate management oversight. The challenge is to educate and motivate clients regarding the importance of their role and the benefits of well-managed, healthy and safe projects which will require clear evidence of the costs and benefits. The design team needs to assist clients in becoming more of their role with regard to H&S.

5.5 AREAS OF FURTHER RESEARCH

Further research can be conducted on smaller emerging contractors who experience difficulty when pricing H&S. This research targeted interviewees who had experience and knowledge in the industry. These firms often do not experience difficulty when pricing H&S and make adequate provision for H&S at tender stage.

CHAPTER 6

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APPENDICES

APPENDIX A

INTERVIEW PROTOCOL: Contractor

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (CONTRACTORS)**

1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).
2. What type (commercial, residential, or other) and value of projects does your firm undertake?
3. How important is H&S to your firm (1 = Not and 5 = Very)
4. In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?
5. Does your firm experience design originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?
6. What percentage does H&S constitute of actual project cost or value on projects?
7. What provision is made at tender stage by your firm for H&S?
8. Does your firm experience difficulty when pricing H&S? If so, why?
9. What items are included in the BoQ at tender stage with consideration to H&S?
10. How does competitive tendering affect financial provision for H&S?
11. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

12. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

APPENDIX B
INTERVIEW PROTOCOL: Quantity Surveyor

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (QUANTITY SURVEYOR)**

1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).
2. What type (commercial, residential, or other) and value of projects does your firm undertake?
3. How important is H&S to your firm (1 = Not and 5 = Very)
4. In terms of the Construction Regulations 2014, have you made any changes to your methods of producing a BOQ and related quantity surveying services?
5. Design originated hazards:
 - 5.1 Does your firm ever identify these?
 - 5.2 Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you advise the designers of these hazards?
6. What percentage does H&S constitutes of actual project cost or value on projects?
7. What provision is made in the BOQ for H&S?
8. Do contractors experience difficulty when pricing H&S? If so, why?
9. What steps are taken by the client to ensure contractors have made adequate financial provision for H&S?

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

APPENDIX C
INTERVIEW PROTOCOL: Association

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**EXPLORATORY SURVEY INTERVIEW PROTOCOL (ASSOCIATION)**

1. Association affiliated with, position in association, years of experience working with the association as well as years of experience working in both a QS firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).
2. How important is H&S to your association? (1 = Not and 5 = Very)
3. What does the association provide in terms of H&S information and services to members of the association?
4. In terms of the Construction Regulations 2014, have you made any changes to your documents and information available to members?
5. Design originated hazards:
 - a. Does your association or members ever identify these?
 - b. Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you provide any guidance in terms of minimising these hazards?
6. Has your association identified what percentage H&S constitutes of actual project cost or value on projects?
7. Does your BoQ template available to members make provision for H&S? If so, what provision is made?
8. Do contractors experience difficulty when pricing H&S? If so, why?
9. Do you provide for any methods or documents that allow the client to ensure contractors have made adequate financial provision for H&S?

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

APPENDIX D
Questionnaire

THE INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES

1. On a scale of **strongly disagree** to **strongly agree**, to what extent do you disagree / agree with the inclusion of an H&S Preliminaries section in the BoQ in the South African construction industry **[please note the 'Unsure' (U) response]**?

Unsure	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
U	SD	D	N	A	SA

- 1.1 If 'Strongly disagree', 'Disagree', or 'Neutral', please record the reason for your response below. If 'Agree' or 'Strongly agree', please proceed to question 2.
2. If 'Agree' or 'Strongly agree' to question 1, on a scale of **1 (not at all)** to **7 (extremely)**, how important are the following items in terms of the inclusion of a H&S preliminaries section in the BoQ **[please note the 'Unsure' (U) response]**?

	Item	Unsure	1 – Not at all important	2 – Low importance	3 – Slightly important	4 – Neutral	5 – Moderately important	6 – Very important	7 – Extremely important
2.1	Full-time H&S Officer	U	1	2	3	4	5	6	7
2.2	Allowance for H&S Audits	U	1	2	3	4	5	6	7
2.3	H&S plan	U	1	2	3	4	5	6	7
2.4	H&S file	U	1	2	3	4	5	6	7
2.5	Risk assessment	U	1	2	3	4	5	6	7
2.6	SWPs and method statements	U	1	2	3	4	5	6	7
2.7	Design of temporary works	U	1	2	3	4	5	6	7
2.8	Design of permanent structures	U	1	2	3	4	5	6	7
2.9	Engineering design and / or certification	U	1	2	3	4	5	6	7
2.10	Medicals	U	1	2	3	4	5	6	7
2.11	Biological monitoring	U	1	2	3	4	5	6	7
2.12	Environmental measurement	U	1	2	3	4	5	6	7
2.13	Education and training	U	1	2	3	4	5	6	7
2.14	H&S Representatives	U	1	2	3	4	5	6	7
2.15	Meetings	U	1	2	3	4	5	6	7
2.16	General administration	U	1	2	3	4	5	6	7
2.17	Hoarding and / or public walkways	U	1	2	3	4	5	6	7
2.18	WCs	U	1	2	3	4	5	6	7
2.19	WHBs	U	1	2	3	4	5	6	7
2.20	Showers	U	1	2	3	4	5	6	7
2.21	Mess room	U	1	2	3	4	5	6	7
2.22	Living accommodation	U	1	2	3	4	5	6	7
2.23	Catch platforms	U	1	2	3	4	5	6	7
2.24	Guarding and barricading	U	1	2	3	4	5	6	7
2.25	Storage	U	1	2	3	4	5	6	7
2.26	Storage for flammable goods – Regulation 27 (b)	U	1	2	3	4	5	6	7
2.27	Temporary electrical installations	U	1	2	3	4	5	6	7
2.28	Scaffolding	U	1	2	3	4	5	6	7

2.29	Special scaffolding	U	1	2	3	4	5	6	7
2.30	Suspended scaffolding	U	1	2	3	4	5	6	7
2.31	Access	U	1	2	3	4	5	6	7
2.32	Signage	U	1	2	3	4	5	6	7
2.33	Housekeeping	U	1	2	3	4	5	6	7
2.34	Fire precautions	U	1	2	3	4	5	6	7
2.35	Personal protective equipment	U	1	2	3	4	5	6	7
2.36	First aid	U	1	2	3	4	5	6	7
2.37	Transport of workers	U	1	2	3	4	5	6	7
2.38	Inspections	U	1	2	3	4	5	6	7
2.39	Maintenance	U	1	2	3	4	5	6	7
2.40	Emergency plan	U	1	2	3	4	5	6	7

3. Do you have any comments in general regarding the introduction of H&S Preliminaries in South African construction?

4. Please record your level of education / qualification(s) you possess:

5. Please record your occupation:

6. Please record the length of time you have worked for your current employer:

_____ Years _____ Months

7. Please record the length of time you have worked in construction:

_____ Years _____ Months

8. Please record your age:

_____ Years

9. Please record your gender:

Female	Male
<input type="checkbox"/>	<input type="checkbox"/>

Please record your details below to facilitate contacting you, in the event that a query should arise. **Please note that the data provided in this questionnaire will be treated in the strictest confidence.**

NAME: _____ MOBILE: _____

ORGANISATION: _____ E-MAIL: _____

Thank you for your contribution to efforts directed towards contributing to improving construction H&S in the South African construction industry.

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APPENDIX E
Interview Minutes

ROXY MALAN

BSc (Hons) Quantity Surveying



INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES

INTERVIEW PROTOCOL (QUANTITY SURVEYOR)

MINUTES

INTERVIEW 1

12 June 2015 @ 9.30am

1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).
2. What type (commercial, residential, or other) and value of projects does your firm undertake?

Not too much commercial or residential, but due to the increased value of residential property, we do get involved in the odd residential project. Generally government work, including prisons, schools, and hospitals. We involved with three universities, providing various building requirements from accommodation to lecturing facilities, to kitchen and dining facilities. Value of projects range from R1 million or R2 million right through to R100 million.

3. How important is H&S to your firm (1 = Not and 5 = Very)

5, it's legislative and one has to be compliant.

4. In terms of the Construction Regulations 2014, have you made any changes to your methods of producing a BOQ and related quantity surveying services?

Yes, you have to include the H&S addendum to your BoQ and over and above that there is an item in the P&G that allows for pricing of the H&S specification, based on the ASAQS guideline item.

5. Design originated hazards:

a. Does your firm ever identify these?

As quantity surveyors we do not identify these. The designer, being the architect or engineer, should be more on top of that as opposed to us. If we see something that is blatantly a problem, we will identify these.

(Follow up question)

In the Construction Regulations 2014, a designer is seen as anyone who draws up drawings and specifications and in these regulations the description of a designer includes a surveyor, so you do not agree with that?

No, we are not equipped to specify, even though we do, but ultimately the specification should come from the principal agent, the architect, or from the engineer. Architect should approve whatever the quantity surveyor specifies.

b. Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you advise the designers of these hazards?

These hazards happen, but it depends on the type of buildings. They do occur, for example one does not realize the weight of a pre-cast concrete kerb. Architects do cause these hazards, as it comes down to aesthetics, as they design buildings that are aesthetically pleasing that may be dangerous to construct.

6. What percentage does H&S constitute of actual project cost or value on projects?

2%-5%, it is going to increase.

7. What provision is made in the BOQ for H&S?

The project specific H&S plan is attached as an addendum and within the P&S is one item, provision is made for the costing of that item.

8. Do contractors experience difficulty when pricing H&S? If so, why?

If they have a competent in house H&S officer and a project specific H&S plan, they should be able to price H&S. The contractor should put prices against the relevant items required in the H&S plan. It is inevitably a guesstimate. To be competitive is the other problem, but how far is a quantity surveyor expected to go in order to fragment a project specific H&S plan into items that need to be priced. A manhole is measured in number and to go quantify that into its various components such as excavations, risk of collapse, concrete, bricks etc., you will end up with pages of items. The contractor carries out the pricing and quantifying of such an item based on historical data and in an excel spreadsheet, where he just adjusts the figures for that specific manhole, and in a similar fashion the H&S should be done. In excel, as he goes through the H&S plan, he puts costs against items, gets a total and that goes into the item in the P&G.

9. What steps are taken by the client to ensure contractors have made adequate financial provision for H&S?

None, at the end of the day, the contractor prices, he wins the project and the client will have an H&S consultant who will ensure the contractor is complying to H&S on site.

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

How would you fragment it? What do you include, what don't you include? It would mean that the QS would have to study the H&S plan every time and fragment it into key items that the contractor needs to price. It would be very risky for a QS to do this, in case key items are left out. Answer to question is no, keep it as a single item and make it the contractor's responsibility as he is deemed to be the expert in his field.

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

It has possibly been taken too far with the cost of certain items such as medicals being far too much and it is possibly a money-making scheme.

ROXY MALAN

BSc (Hons) Quantity Surveying



INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES

INTERVIEW PROTOCOL (ASSOCIATION)

MINUTES

INTERVIEW 2 – ASAQs (EC Chapter) Representative

17 June 2015 @ 10.00am

- 1. Association affiliated with, position in association, years of experience working with the association as well as years of experience working in both a QS firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. How important is H&S to your association? (1 = Not and 5 = Very)**

3, reason being that despite arguments from members of the industry, the ASAQs board only makes provision for one clause in the preliminaries for H&S in the available documents. Although only one clause is included in the preliminaries, this does not mean the ASAQs sees H&S as not important, but if it was more important the ASAQs would have more items for H&S. Although saying the above, the ASAQs does not take H&S lightly.

- 3. What does the association provide in terms of H&S information and services to members of the association?**

The ASAQs makes provision in the preliminaries for H&S. There are and have been several courses and/or seminars offered and published on the ASAQs website for our members nationwide. I would say that the ASAQs acknowledge the importance of health & safety in the construction industry but duties and responsibilities as to what we should measure and/or allow for in our Bills of Quantities are not 100% clear and agreed on.

- 4. In terms of the Construction Regulations 2014, have you made any changes to your documents and information available to members?**

No, apart from the one clause in the preliminaries for H&S.

5. Design originated hazards:

5.1 Does your association or members ever identify these?

The association does not identify these; it is more the members as individuals that need to identify these.

5.2 Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you provide any guidance in terms of minimising these hazards?

Contractors do experience design originated hazards. Especially from the architectural perspective, as they design aesthetically, therefore architects are the main cause of these design originated hazards, although the engineer should pick the hazard up in their design and make amendments to it. We as designers do not realize what a pre-cast concrete kerb weighs, yet we expect people to pick it up, especially heavy material at heights.

6. Has your association identified what percentage H&S constitutes of actual project cost or value on projects?

The association has not identified this.

7. Does your BoQ template available to members make provision for H&S? If so, what provision is made?

No, does not make provision for H&S apart from the item in the P&G's. The more experienced developers may have their own H&S plan, which when provided at design stage, the QS can incorporate that into the bill, but this plan is not always available to the QS.

8. Do contractors experience difficulty when pricing H&S? If so, why?

The association cannot really speak for contractors. At tender stage the contractor does not always have all the drawings and specifications available to them, so this may make it difficult for them to price H&S. They will however have the

construction period, which will assist them to calculate the workforce needed and safety equipment needed.

9. Do you provide for any methods or documents that allow the client to ensure contractors have made adequate financial provision for H&S?

No.

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, if there is no measured "bill" for H&S, then there should be items included in the preliminaries. Items could include the cost of a H&S officer on site, H&S equipment and the cost to the contractor for their H&S file.

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

I would like to see more than the one item in the preliminaries. This would be beneficial for cost control. When a contractor prices against the one item currently allowed for in the preliminaries, a QS cannot determine what the contractor has allowed for in terms of H&S.

ROXY MALAN

BSc (Hons) Quantity Surveying



INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES

INTERVIEW PROTOCOL (CONTRACTORS)

MINUTES

INTERVIEW 3

18 June 2015 @ 11:02am

1. **Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
2. **What type (commercial, residential, or other) and value of projects does your firm undertake?**

Commercial and alterations of residential buildings. Value of projects is around R4 million rand per year

3. **How important is H&S to your firm (1 = Not and 5 = Very)**

5, it is important.

4. **In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?**

We do medicals for all our labourers as per the new regulation. We make sure our H&S file is up to date. We now have to do a bit more training for scaffold erectors, etc. Unfortunately, a company with my size cannot afford to employ a H&S officer, so that is a very grey area. I was doing a restaurant fit out at Baywest, and the project manager told me his client does not have enough money to comply with the new regulations. In that case, what do you do? If there is not enough money, you do without it. You sign a contract stating you working with the old regulations. When the contract value is only around R1 million rand, you cannot afford all the H&S extras.

5. Does your firm experience design-originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?

In my business I haven't really experienced major hazards. We encounter very few problems when it comes to architects designing something that may cause a hazard. When we come across a design that may be hazardous or at an inconvenient height, we spend time on planning the execution of the design. Some details can be simplified, but this depends on the contractor's experience, as he can then suggest alternatives to the professional team. I think architects and engineers do not think about the building the same way as the contractor does when it comes to the design. They would specify something because that's what they can lay their hands on in terms of information. It is then up to the contractor to bring it up in a technical meeting, and bring up the specifications he does not agree with.

6. What percentage does H&S constitute of actual project cost or value on projects?

0.5%, it depends on the project.

7. What provision is made at tender stage by your firm for H&S?

If it is a straight forward project, I would normally allow an amount for drawing up my H&S plan. I use the MBA H&S manual to assist me to draw up my H&S plan. Hard hats and boots are a yearly expense, so I just allow for an amount for dust masks and the few extra items I will need on the job. I normally allow for around R4000.00 for projects under R1 million. I don't allow for or provide sheltered eating areas and changing facilities for my workers.

8. Does your firm experience difficulty when pricing H&S? If so, why?

No. I am aware of the new regulations and what is required. I am aware that if you price for everything that is in the regulations, you will never get a job, so you have to be practical about it and take a calculated risk. The new regulations are first world regulations and are not practical, on small jobs you cannot price for showers and allow for them on site. If the client provides a H&S specification and informs the

contractor the items that he wants, then we will price for those items and allow for them.

9. What items are included in the BoQ at tender stage with consideration to H&S?

The client's H&S specification, as a separate document to the BoQ and then an item in the preliminaries to price for compliance to the regulations and the H&S specification

10. How does competitive tendering affect financial provision for H&S?

I do not see H&S as the deciding factor as to whether you get the project or not. H&S seems to be an easy option to leave out or price lower in order to become more competitive. When a client has decided on what contractors to approach in order to provide a tender, he would know what those contractors track record is. Anyone that has a reasonable reputation, generally will not price H&S as a R0.00 amount in order to be more competitive. It is not in your interest as a contract to not allow for H&S, as one fatality on one project could affect your reputation negatively for future projects.

11. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

No, it should not be measured out items. With regard to H&S the tender documents should include the H&S specification and if the client cannot provide a H&S specification at tender stage then it should allow for PC amounts for H&S items.

12. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

I am against constant changes to contract documentation, so writing a whole new section of H&S preliminaries, I am against it.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (QUANTITY SURVEYOR)****MINUTES****INTERVIEW 4**

19 June 2015 @ 9.30am

1. **Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
2. **What type (commercial, residential, or other) and value of projects does your firm undertake?**

Type of projects include commercial, schools and health. Total value of projects undertaken is equivalent to +/-R150 million.

3. **How important is H&S to your firm (1 = Not and 5 = Very)**

4.

4. **In terms of the Construction Regulations 2014, have you made any changes to your methods of producing a BOQ and related quantity surveying services?**

No, besides the P&G item that states that the contractor has to comply with Construction Regulations 2014 and H&S Regulations. The H&S clause has always been there, we have just updated it so that it is relevant to the latest regulations. In some of the BoQ's, it has reference to the H&S specification, which is then attached as an addendum, this occurs mainly in Department of Public Works and CDC Projects.

(Follow up question)

Do you find in projects that the client provides this H&S specification at tender stage?

No, often this document is not available. H&S is however becoming more and more important.

**5. Design originated hazards:
a. Does your firm ever identify these?**

No. It is the H&S agent's responsibility to do this. If it is very obvious design error, we will identify it and inform the engineer, but as a QS, when you measure, you are thinking of the area and not looking to identify hazards.

(Follow up question)

In the Construction Regulations 2014, a designer is seen as anyone who draws up drawings and specifications and in these regulations the description of a designer includes a surveyor, so you do not agree with that?

No, I disagree, as the BoQ is not a specification document. The contractor should follow specifications on the drawing and not what the QS has specified in the BoQ.

b. Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you advise the designers of these hazards?

Yes, they do experience design originated hazards. Engineers and architects cause these design originated hazards. They often specify items at design stage and realize when construction commences that the design is not adequate. We do not identify these hazards as this is not part of our job, we are not designers. This is the main problem with H&S, as it is making everyone responsible and as a QS, we do not get paid more for these additional responsibilities.

6. What percentage does H&S constitute of actual project cost or value on projects?

No idea. I do not believe contractors are aware of what H&S costs or constitutes of project cost or value. They do not allow for enough in the BoQ at tender stage and therefore are always looking to take short-cuts in terms of H&S. I am not in a position

to say whether the contractor has allowed for adequate financial provision for H&S at tender stage.

7. What provision is made in the BOQ for H&S?

The item measured in the P&G that allows the contractor to price against this item, while making reference to the H&S specification attached.

8. Do contractors experience difficulty when pricing H&S? If so, why?

Yes, they do not know what is required of them and what to price. So many contractors do not comply with H&S.

9. What steps are taken by the client to ensure contractors have made adequate financial provision for H&S?

The contractor is required to comply with H&S regulations whether he has made adequate provision for H&S or not. It is his own problem if he hasn't made adequate financial provision for H&S. Even if the client "checks" that the contractor has made adequate financial provision for H&S, when construction starts, the contractor may still not comply with H&S eg. He allowed for harnesses in his pricing of H&S, but may not have harnesses on site when construction commences. Quantity surveyors effectively have to go for H&S training in order to take the necessary steps in determining the cost and requirements of H&S. Quantity surveyors cannot determine what a realistic price for H&S is.

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, with regard to the items, a H&S agent should be appointed at design stage and work with the QS to identify items that should be included in the H&S preliminaries.

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

The H&S agent should be involved at design stage.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (CONTRACTORS)****MINUTES****INTERVIEW 5****26 June 2015 @ 11:35am**

- 1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. What type (commercial, residential, or other) and value of projects does your firm undertake?**

Regionally we did R250 million for the financial year of which R80 million was residential, R25 million was agricultural and remainder was industrial (R145 million). We do a lot of industrial projects.

- 3. How important is H&S to your firm (1 = Not and 5 = Very)**

7. Safety always comes first. In 15 months in the Eastern Cape, we had 0 incidents on site.

- 4. In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?**

Working at heights has been the main change with the new regulations. The correct safety lines and harnesses are used. A safety line can be more of a danger than a life saver if it is not done correctly. We use a web-based safety line. We have always been conforming to the Construction Regulations in terms of providing sheltered eating areas (jigga hut). We have always provided showers in our toilet huts. We are still in the process of investigating the transporting of workers. To make

bakkies and trucks legal to transport works is not easy and we still face a challenge in this regard.

Follow up question:

Do you think it is easy for you to comply with the Construction Regulations 2014 because you are one of the larger construction companies?

No, the cost is the same, smaller companies hide behind the fact that they are smaller and therefore struggle to comply with H&S regulations. A smaller project will also have a 10% P&G and this should allow the contractor to provide sheltered eating areas on a smaller scale, as required.

- 5. Does your firm experience design originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?**

Yes and no. We look at it in terms of constructability. When we analyse the drawings and it is not possible to construct or is hazardous, we will go back to the architect and point it out, in order for it to be changed. This happens more with residential, where architects design fancy houses that aren't constructible. Architects and engineers cause these hazards, as constructability is up to them. Generally, a value engineering session is held in order to address these hazards and we identify alternatives in building.

- 6. What percentage does H&S constitute of actual project cost or value on projects?**

3.5% of the P&G.

- 7. What provision is made at tender stage by your firm for H&S?**

Between 2.5% and 3.5% of the P&G. We have our own "spreadsheet" that allows for all H&S related items and is adjusted for each and every project. We also allow for about 5 harnesses per project.

8. Does your firm experience difficulty when pricing H&S? If so, why?

No. Different clients have different requirements, but we allow for the most extreme H&S requirements (Coega requirements).

9. What items are included in the BoQ at tender stage with consideration to H&S?

Nothing, only one line item that says allows for H&S requirements. Takes very long for contractors to price who have inadequate experience.

10. How does competitive tendering affect financial provision for H&S?

In my opinion, it is the last thing that should be "cut" when pricing a tender project. There have been occasions where contractors have come in at 2% lower in their tender and this could be due to H&S related items that were not allowed for. E.g. Coega has so many H&S requirements, e.g. Medicals at Coega cost R575.00 per worker.

11. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, it will allow everyone to tender on the same basis. The minimum should be a full-time H&S safety manager on site, allowance for working at heights, safe scaffolding, risk of collapse, scaffold supervisor, scaffold inspector and H&S audits. Consumables should not be included and an item should also be included for a safety methodology.

12. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

Consumables shouldn't be quantified, as you will never be able to say how many hard hats, etc. each project will have. Careful thought has to be taken when putting together such a document. Allowances should be made, e.g. an item that

states the contractor should allow for safe transport of workers to site. An item which allows for a full-time registered H&S officer on site, as this is very important.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (CONTRACTORS)****MINUTES****INTERVIEW 6**2.30pm on 1st July 2015

- 1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. What type (commercial, residential, or other) and value of projects does your firm undertake?**

No residential, mainly commercial, office blocks and warehousing. Value of projects are up to R150 million, dependant on the type of project

- 3. How important is H&S to your firm (1 = Not and 5 = Very)**

5.

- 4. In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?**

Yes, training has been carried out to meet the regulations, mainly scaffolding, formwork access and designs. The new regulations have a bigger impact on the client rather than the contractor.

- 5. Does your firm experience design originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?**

When the design is of a technical nature we are unable to identify if it is going to cause a hazard, as we are not specialists in those fields. If something appears to be incorrect or cause a possible hazard, then we will point it out to the design team. We however are not experts and base the identification of the hazard from experience and not from knowledge. We are also not employed to identify these design originated hazards. Architects can cause these hazards as they design things that are aesthetically pleasing and to suit their egos and designers do not take enough thought into their designs. We generally build what we get told to build to the best of our ability. If we identify that something cannot be built we will inform the design team and try address these problems in the design. Everything can be built, it will just cost more.

6. What percentage does H&S constitute of actual project cost or value on projects?

This varies depending on the project and the intensity of the project, but around 1-2%.

7. What provision is made at tender stage by your firm for H&S?

We calculate H&S for every tender based on the H&S Specification. However, not every tender provides a H&S Specification, therefore assumptions need to be made. Percentage is calculated for consumables.

8. Does your firm experience difficulty when pricing H&S? If so, why?

Yes, it is a grey area. One project is different to another and each H&S requirement is different.

9. What items are included in the BoQ at tender stage with consideration to H&S?

One item. There are some quantity surveyors who have started measuring some important items of H&S.

10. How does competitive tendering affect financial provision for H&S?

It doesn't, but that's from the view of my company because we don't believe you can take short-cuts with H&S. It is noted in competitive tendering that if you need to save/cut-down the tender, this can be done in H&S.

11. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes. H&S officer, formwork designs, shower facilities, sheltered eating areas etc. H&S Preliminaries does not have to be quantified, it should be allowances.

12. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

Very much in favour of it. It levels the playing field and everyone will know what is required of them in terms of the H&S. QS's do not want to take the responsibility for it, so I do not think it will happen any time soon.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (QUANTITY SURVEYOR)****MINUTES****INTERVIEW 7**3:00pm on 7th July 2015

- 1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. What type (commercial, residential, or other) and value of projects does your firm undertake?**

Commercial, retail, warehousing, offices and government jobs, ranging between R2million – R200 million. Within residential, we get involved in townhouse schemes and low cost housing development.

- 3. How important is H&S to your firm (1 = Not and 5 = Very)**

2.

- 4. In terms of the Construction Regulations 2014, have you made any changes to your methods of producing a BOQ and related quantity surveying services?**

Yes, we are aware of the new regulations and we make clients aware of the requirements in terms of H&S and the Construction Regulations of 2014. We are encouraging clients to get H&S Agents involved as we have limitations in terms of our knowledge.

5. Design originated hazards:**a. Does your firm ever identify these?**

Yes we do.

5.2 Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you advise the designers of these hazards?

Yes they do. Sometimes the design of the scheme hasn't been thought through before the construction. Sometimes the trouble is that the hazards only get revealed at a late stage during construction. For example, project currently working on, the access at shopping centre caused a problem and ultimately a H&S risk, and now it has to be rectified, as architects and designs do not consider their implications of their design. If we see a design hazard we will raise it with the architect or designer.

6. What percentage does H&S constitutes of actual project cost or value on projects?

I think H&S has been under-priced up until now and it is going to get more expensive. 1-3% and jobs that require extensive H&S requirements 2-5%.

7. What provision is made in the BOQ for H&S?

We always make sure at tender stage that the H&S Specification is included at the back as an annexure to the tender documentation. If the client does not have a H&S Specification, we have a 'general' H&S Specification which we then attach to the back of the tender documentation. In the Preliminaries we make provision for compliance with H&S, and on some of the bigger jobs we have itemized some of the H&S requirements. These include medicals, boots, goggles, overalls, etc. All items are listed for pricing, but item is still included in the Preliminaries which states that the contractor must comply with specification and regulations.

8. Do contractors experience difficulty when pricing H&S? If so, why?

Yes, you never know what your full work-force is going to be, and what about sub-contractors compliance and SMME's. They will allocate various H&S costs, but there are some costs that are not priced and unknown.

9. What steps are taken by the client to ensure contractors have made adequate financial provision for H&S?

Very difficult question. I have had tenders come back where the H&S hasn't been priced, but just because it hasn't been priced, does not mean it isn't applicable. We do then ask the contractor, and often he says H&S has been included in his rate. I would prefer to see it as an allocated cost. It is difficult to determine if the contractor has made adequate financial provision for H&S, and it is a problem as I do not have the knowledge or expertise to say if the contractor has made adequate provision for H&S. Preliminaries can amount to 10-20% of a contract value and we glibly accept these 'lump-sum' figures provided, yet we worry about R0.10 in the price of brickwork.

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

We have already in certain BoQs, listed items for H&S within the preliminaries section. In asbestos removal we keep items with regard to H&S separate and measurable. I would agree with the introduction of a specific preliminaries for H&S with the new legislation.

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

Provided an example of H&S section in the Preliminaries of a BoQs.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES

INTERVIEW PROTOCOL (CONTRACTORS)

MINUTES

INTERVIEW 8

8 July 2015 @ 9:54am

1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).

2. What type (commercial, residential, or other) and value of projects does your firm undertake?

Commercial, residential, airports, hotels. We do any projects above R50 million

3. What type (commercial, residential, or other) and value of projects does your firm undertake?

Commercial, residential, airports, hotels. We do any projects above R50 million.

4. How important is H&S to your firm (1 = Not and 5 = Very)

5.

5. In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?

We haven't made specific changes due to the regulations. We were probably already ahead of those regulations. Safety is one of our core values and we go

beyond what is required by law. All of our workers go on training to get updated on the new regulations.

6. Does your firm experience design originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?

It is not really the design issue, it is more the hazard related to the nature of the works that you are carrying out. If there are specialized systems, such as cantilevered formwork, then these come with their own hazards. What we then do is a complete method statement as well as a risk assessment in order to carry out this specific task. This then mitigates these risks/hazards. Architects and engineers do at times specify or design buildings that can cause hazards. As the contractor we will then identify these hazards and inform the design team that we cannot construct what has been designed. We would also look at alternative methods in order to construct the building in a safe manner. Architects also design aesthetically pleasing buildings that do not consider the constructability,

7. What percentage does H&S constitute of actual project cost or value on projects?

6-8%

8. What provision is made at tender stage by your firm for H&S?

We have a section in our internal P&G's for H&S. So we first determine how many people we are going to have on site. We will then provide full PPE, medicals, medicals for heights, edge protection, protection of foundations and a full-time safety officer.

9. Does your firm experience difficulty when pricing H&S? If so, why?

No, we have the experience and know what is required of us. The only issue is when you get onto site and there are hazards you were not aware of.

10. What items are included in the BoQ at tender stage with consideration to H&S?

It is a one clause item that states that the contractor must comply with the H&S Act as well as the H&S Specification.

11. How does competitive tendering affect financial provision for H&S?

It doesn't, it is such a small percentage. Although the big costs are in the salaries and medicals, so if a contractor hasn't allowed for that, his tender amount may be lower.

12. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, if they allow for just a 'check-list' of items that would be sufficient for smaller contractors who may struggle to price H&S. For 'The Big 5' in the construction industry, H&S is such a critical part of your business that there is no way they would price less for H&S. If they got a check-list in the P&Gs, they would probably still price beyond those items. I think in smaller projects, the H&S portion is more significant in the overall tender amount, then H&S needs to be broken up.

13. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

They should be introduced on smaller projects and government projects. I do however feel that the responsibility for H&S lies with the responsible contractor. Perhaps what needs to be done when tenders are received, they need to be analysed more in detail as to what has been allowed for H&S. The QS must also request from the contractor a break-down of his allowance, if the allowance isn't adequate.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (CONTRACTORS)****MINUTES****INTERVIEW 9**1:40pm on 8th July 2015

- 1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. What type (commercial, residential, or other) and value of projects does your firm undertake?**

We mainly undertake commercial and industrial with a little bit of residential. The value of projects is anything from R5 million to R1 billion.

- 3. How important is H&S to your firm (1 = Not and 5 = Very)**

5.

- 4. In terms of the Construction Regulations 2014, has your firm made any changes to the methods of executing a project? If so, what are these changes?**

We have employed registered construction H&S officers, as well as getting our current employees through the process of registering. We have made changes to our current SHEQ management system in order to comply with legislation.

- 5. Does your firm experience design originated hazards? If so, what form do they take, what are the causes, and what steps does your firm take in order to address these hazards?**

Yes, it doesn't happen that often these days. Most of the time the designers will not take into account the constructability when designing a building. A lot of aspects could be simplified. When we have technical meetings, we do give our ideas of alternatives.

6. What percentage does H&S constitute of actual project cost or value on projects?

1-2%. It is project specific, so changes depending on the nature of the works.

7. What provision is made at tender stage by your firm for H&S?

We allow for various H&S items based on the H&S specification.

8. Does your firm experience difficulty when pricing H&S? If so, why?

No, before the regulations came out, we had much stricter requirements within our group already, so we have a very precise way of pricing H&S. We have the experience of jobs and know what is expected. Even if we don't price a H&S item, we still do it anyway and carry the costs.

9. What items are included in the BoQ at tender stage with consideration to H&S?

One line item. I have come across a 'H&S Section' in the bill, but only on one or two jobs.

10. How does competitive tendering affect financial provision for H&S?

We never cut H&S in order to be more competitive. We price for all H&S items we are aware of. You can't really see, we do not know the breakdown of each tenderer's P&G amount. We do find that our P&G amount is generally higher than other tenders, but we never cut down on H&S in the P&G.

11. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, then everyone is tendering on the same basis. It should include medicals, PPE, edge protection and all items relevant to H&S. This document should be produced by the ASAQs and the MBA together. It should be an agreed list and should include all relevant items to H&S. It can then show the person adjudicating the tender what the contractor has allowed for.

12. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

I really feel the way forward is getting a standard H&S section in the Preliminaries. I think it has to come into effect, whether the contractor chooses then to price an item in this section or not, is up to him. At least then the QS can see what the contractor has allowed for. A detailed H&S specification has to be made available at tender stage with the contract documentation, so that the contractor is aware of the requirements.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (ASSOCIATION)****MINUTES****INTERVIEW 10****9th September 2015 @ 11:40am**

- 1. Association affiliated with, position in association, years of experience working with the association as well as years of experience working in both a QS firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**

- 2. How important is H&S to your association? (1 = Not and 5 = Very)**

5.

- 3. What does the association provide in terms of H&S information and services to members of the association?**

We provide information regarding the changes to the legislation and alerting members with regard to the requirements with regard to the legislation. We provide explanatory articles in our bulletin with regard to the H&S legislation. We do news flashes with regard to H&S, these are around 50 per annum. We do workshops for members with regard to H&S, for example we did a road show of workshops regarding the new construction regulations 2014 and their implications. We do audits on building sites and we offer a limited number of free audits to our members. We run a regional and national H&S competition based on the audits and the National MBA Audit System. That audit system has been specifically designed for building sites and it is reviewed on an annual basis to keep up to date with legislation. We have various publications and material, for example the

National MBA Safety Manual which comprises of proformas and reports. We provide proforma H&S plans and assist members in putting together their H&S plan. We do training on H&S, such as a safety rep course, a scaffold inspection and scaffold erector course.

4. In terms of the Construction Regulations 2014, have you made any changes to your documents and information available to members?

Yes, to all of our documents. The National H&S Audit System has been updated as well as the H&S Manual and any documents which relate to H&S.

5. Design originated hazards:

5.1 Does your association or members ever identify these?

Yes, it is more of the contractor's responsibility.

5.2 Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you provide any guidance in terms of minimising these hazards?

Yes, they do. We try encourage members to have the necessary plans in place. For example if work is being carried out at heights we will encourage members to have the necessary fall protection plans in place. Most of these hazards are dealt with on site between the contractor and design team. A building in general is a dangerous thing and you can't eliminate all hazards. Architects could think of certain designs to consider the hazards.

6 Has your association identified what percentage H&S constitutes of actual project cost or value on projects?

People have discussed it, but we are unsure. It varies depending on the client's requirements.

7 Does your BoQ template available to members make provision for H&S? If so, what provision is made?

N/A

8 Do contractors experience difficulty when pricing H&S? If so, why?

Yes, they certainly do have difficulty when they price for H&S. The H&S Specification is not always attached and smaller inexperienced contractors struggle to interpret the spec and price for H&S.

9 Do you provide for any methods or documents that allow the client to ensure contractors have made adequate financial provision for H&S?

We have a model H&S Specification , but otherwise no, its not really part of scope of works.

10 Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, more project specific items that go beyond the norm, not including consumables. It should be items that cannot be allocated to a specific trade, but generally apply to all trades.

11 Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

It has to involve contractors and the QS profession in order to put this document together. The JBCC committee should discuss and implement this type of document.

ROXY MALAN

BSc (Hons) Quantity Surveying

INTRODUCTION OF HEALTH & SAFETY (H&S) PRELIMINARIES**INTERVIEW PROTOCOL (QUANTITY SURVEYOR)****MINUTES****INTERVIEW 11**

20 October 2015 @ 12.09pm

- 1. Firm name, position in firm, years of experience working in both the firm and construction, qualifications, age, and gender (confidentiality when analysing the data will be exercised).**
- 2. What type (commercial, residential, or other) and value of projects does your firm undertake?**

I am a consultant on risk management and policy frameworks. I write policy documents. I am a multi-disciplinary work amongst all professions, so I deal with a range of policies and documentation. Most of it is voluntary done or I charge by the hour.

- 3. How important is H&S to your firm (1 = Not and 5 = Very)**

5, it is extremely important.

- 4. In terms of the Construction Regulations 2014, have you made any changes to your methods of producing a BOQ and related quantity surveying services?**

I see no reason why a full H&S BoQ cannot be inserted in a BoQ. You cannot merely expect the contractor to put in a lump sum figure.

5. Design originated hazards:**a. Does your firm ever identify these?**

H&S in construction and the whole life appraisal of a building is H&S orientated; you cannot stop looking after H&S on a project. H&S originates in design, and yes I identify these.

b. Do contractors experience design originated hazards? If so, what causes these design originated hazards and do you advise the designers of these hazards?

If the management is far removed from the construction site, they are not going to identify them. It is only the people on site that experience design originated hazards. I think architects and engineers cause design originated hazards intentionally, they are simply not aware. They do not see the problem, they think in terms of image of the building and in engineers cases they think in terms of strength and stability. They do not think about the person picking up the blocks or climbing up onto the walkway. Design originated hazards are therefore caused by lack of interest and lack of awareness. I do advise designers of these hazards if I identify them on site.

6. What percentage does H&S constitute of actual project cost or value on projects?

I do not believe it constitutes a percentage. You have to do an elemental bill in order to determine the cost of H&S.

7. What provision is made in the BOQ for H&S?

Just one item in the preliminaries, but I am saying it must be a trade in the standard system and the contractor must have an opportunity to price every single item relating to H&S.

8. Do contractors experience difficulty when pricing H&S? If so, why?

Yes, unless they measure it themselves and give a detailed price themselves. They do not know what they pricing when they price against the one item. The more sophisticated contractor would have made an effort to try and break it down and price it.

9. What steps are taken by the client to ensure contractors have made adequate financial provision for H&S?

The client doesn't know and therefore cannot take steps, unless their consultants have informed them and made them aware of H&S and what costs are associated with H&S.

10. Should H&S preliminaries be included in the BoQ? If you agree, what items would be of relevance to such a section?

Yes, if the JBCC committee do not want to expand the preliminaries, they should make it a separate trade in the Standard System and make it a prerequisite for all BoQ. All H&S related issues as well as seasonal/climate issues and extra precautions that need to be taken, provision for geotechnical issues.

11. Do you have any recommendations or comments in general regarding the introduction of H&S preliminaries?

I feel that there is a resistance to introducing this document and people are in denial. I believe there is no possibility of denying the urgency of such a document.

APPENDIX F
Conference Paper

The Introduction of Health & Safety (H&S) Preliminaries in the Eastern Cape Province

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ABSTRACT

Purpose

This paper reports on the results of a study conducted relative to the introduction of health and safety (H&S) preliminaries into contract documentation on building projects within South Africa by considering three objectives. Firstly, to determine the extent of the lack of financial provision made by contractors with regard to H&S; secondly, to determine the causes of inadequate financial provision for H&S by contractors, and lastly, to investigate the introduction of H&S preliminaries in order to assist contractors in making adequate financial provision for H&S.

Design

A literature review was conducted of relevant literature relating to construction H&S and the financial provision therefore on construction projects, which informed the development of an interview protocol. Interviews were conducted with consulting quantity surveyors, general contractors, and representatives of the Association of South African Quantity Surveyors (Eastern Cape Chapter), and the East Cape Master Builders Association (ECMBA) as part of a qualitative study. A quantitative study was then carried out in the form of a questionnaire. This questionnaire was developed from the findings in the interview protocol and was distributed to quantity surveyors on the ASAQS (EC Chapter) list and general contractors on the ECMBA list.

Findings

Findings include: the two widely used forms of standard conditions of contract make limited reference to or mention H&S; a preliminaries item predominates in terms of the manner which contract documents have facilitated / made financial provision for H&S; competitive tendering without reference to H&S marginalises H&S; detailed H&S preliminaries should be included in bill of quantities (BoQ), and contractors generally do not accurately determine the percentage H&S constitutes of tender and project cost.

Practical implications

The empirical research was delimited to Eastern Cape building projects. In terms of implications, a paradigm shift is needed on the part of the quantity surveying profession with respect to integrating financial provision for H&S into contract documentation.

Originality/value

The study informs the construction industry, specifically the design team, of the need to include a measurable instrument within BoQs for H&S. The study also introduces the concept of H&S preliminaries based on the understanding that although contractors make some form of financial allowance for H&S, there is still non-facilitation of equitable pricing of H&S within the construction industry. Previous research indicates that the status quo is not viewed favourably by contractors, and clients experience difficulty in determining whether contractors have made adequate financial allowance for H&S, or not.

Keywords: Construction, Financial provision, Health and safety, Preliminaries.

1. INTRODUCTION

According to the Construction Industry Development Board (cidb) report (2009), the global construction industry has one fatal accident every ten minutes and the fatality rate per 100 000 workers: 25.5 (cidb, 2009). Based upon the value of construction work completed in the year 2002, namely R56 343m (South African Reserve Bank, 2003) the total cost of accidents (COA) could have been between 4.3% (R2 401.2m/R56 343m), and 5.4% (R3 041.5m/R56 343m) (Smallwood, 2004; cidb, 2009). Furthermore, the South African construction industry performs poorly in terms of H&S compared to other industries in the country, which is evidence that action needs to be taken in order to improve H&S in the construction industry.

Lingard (2013) states that "In construction, there is a need to manage the interests and influences of multiple project contributors and stakeholders who, either consciously or inadvertently, exert an influence on OHS." The influence of designers and clients on H&S in the construction industry needs to be realised by all stakeholders, and H&S needs to be addressed at the inception stage of a project.

According to Emuze and Smallwood (2012), South Africa has sufficient H&S legislation, but enforcement of legislation, such as the Construction Regulations is inadequate. The Construction Regulations (Republic of South Africa, 2014) state that the client must provide designers with an H&S specification, and the designers need to submit a report to the client before the client provides the H&S specification to the principal contractor (PC) when the project goes out to tender. This report should include, *inter alia*, all relevant H&S information with respect to the design of the relevant structure that may affect the pricing of the construction work. The client who is required to provide the PC with an H&S specification is also required to ensure that the PC has made adequate financial allowance for H&S. The duties of the PC and contractors include, *inter alia*, ensuring that sufficient provision has been made for H&S measures during the construction process. Although these regulations are in place, problems are still experienced with respect to H&S during construction projects.

The study focused on the introduction of H&S preliminaries on building projects within South Africa. The research determined the extent of the lack of financial provision for H&S by contractors, and the causes thereof. Although limited research in terms of the introduction of H&S preliminaries has been conducted, the study investigated the value of introducing H&S preliminaries in order to assist contractors in terms of making adequate financial provision for H&S.

2. OVERVIEW OF H&S IN THE SOUTH AFRICAN CONSTRUCTION INDUSTRY

The South African construction industry produces a disproportionate number of fatalities and injuries (Emuze & Smallwood, 2012). In recent years, much effort has been taken in order to improve H&S in the construction industry, but there is still no real improvement with regard to H&S in the industry. Emuze and Smallwood (2012) state that the Construction Regulations require clients and designers to take responsibility for H&S. Clients need to provide the principal contractor with an H&S specification, and designers need to inform the contractor via the client of any perceived hazards and dangers.

H&S is still not afforded the necessary status, and clients still tend to believe that cost, quality, and time are the fundamental construction project parameters. H&S is not perceived as a basic requirement during construction and industry stakeholders do not see H&S as contributing to the value of the project.

Despite the introduction of the amended Construction Regulations introduced in 2003, in which case clients and designers had to respond in terms of their responsibilities with regard to H&S during the course of projects, the cidb report (2009) still shows a rise in the number of accidents in 2004/2005, 2006/2007 and 2007/2008. This indicates lack of compliance with the regulations and a need for a method of allowing contractors to make provision for H&S during a project.

In the South African construction industry, small to medium construction firms often fail to provide adequate H&S on site, due to limited resources. Larger construction firms have access to resources that enable these firms to provide for H&S, and have access to the necessary financial resources in order to carry the costs associated with H&S during the course of the project.

2.1 Legislation with regards to H&S

According to the cidb report (2009), the primary objective of any H&S legislation is the prevention of accidents and their consequences in the form of injuries, disablement, and fatalities, and ill health within the work environment. However, the success of such H&S legislation lies in the effective implementation thereof. The most important legislation regarding H&S in South Africa, namely the Construction Regulations 2014,

the Occupational Health and Safety Act, No. 85 of 1993 (OH&S Act) and the complementary Compensation for Occupational Injuries and Diseases Act, No. 130 of 1993 (COID Act). The Construction Regulations 2014, and the Occupational Health and Safety Act, No. 85 of 1993, are discussed in more detail below.

2.1.1 Construction Regulations 2014

In terms of the Construction Regulations of 2003, clients and designers were required to take responsibility for H&S from the project initiation and briefing stage of the project. The Construction Regulations were amended in 2014, the key elements of the amendments being that the client needs to first provide the designer with a H&S specification and ensure that the designer has considered this specification during the design stage of the project. This H&S specification should be evolved from a baseline risk assessment that the client needs to conduct in terms of the Construction Regulations. The most important clause pertaining to this study is that the client needs to ensure that potential principal contractors who submit tenders have made adequate provision for the cost of H&S measures.

The duties of the principal contractor include providing the client with an H&S plan, which responds to the provided H&S specification included in the tender documents. The principal contractor is also required to provide an H&S file that is to be made available on request of the client, the client's agent, an inspector, or contractor. The principal contractor needs to ensure that every employee has a valid medical certificate of fitness, specific to the construction work to be performed. In terms of the Construction Regulations (Republic of South Africa, 2014) the principal contractor shall provide one shower facility for every 15 persons. The contractor also needs to provide at least one sanitary facility for each gender and for every 30 workers. Sheltered eating facilities also need to be provided, as well as changing facilities for each gender. The aforementioned constitute key welfare provisions, which are generally rated poor during South African research studies (Smallwood, 2004).

2.1.2 Health and Safety Act No. 85 of 1993 (OH&S Act)

The focus of this act is providing an environment for employees, which is safe, and without risk to the health of the employee.

The act states that for every 20 employees in the workplace, the employer, in this case being the contractor, needs to appoint an H&S representative. H&S representatives need to, *inter alia*, identify any hazards on site and report these to the employer.

Employers need to identify possible H&S risks for the work processes used. These risks then need to be limited as far as possible, by providing suitable personal protective equipment (PPE), which includes protective footwear, protective overalls, or any similar H&S equipment that will prevent bodily injuries to employees. Protective clothing such as high visibility vests also need to be provided in order to protect the employee against harm.

In terms of this Act, the contractor needs to provide training and supervision to ensure the H&S of their employees carrying out the work. Contractors are also responsible for the H&S of any visitors to the workplace, thus being the site, in terms of Section 9(1) of the OHS Act. Where more than five employees are employed at a workplace, the employer of such employees shall provide a first aid box, which shall be available and accessible for the treatment of injured persons at that workplace.

Section 23 of this Act, which is most relevant in terms of the purpose of this research, states that employers cannot charge employees for any item relating to H&S. The cost of H&S therefore is for the account of the contractor.

2.3 Contract documentation

The most widely used form of contract for construction in South Africa is the Joint Building Contracts Committee (JBCC) Principal Building Agreement, the latest addition being Edition 6.1 – March 2014. Other forms of contracts include the General Conditions of Contract (GCC), International Federation of Consulting Engineers (FIDIC) and the New Engineering Contract (NEC). The GCC does not make any explicit reference to H&S, other than 'reporting of accidents'. The FIDIC and NEC contracts originated overseas, and therefore provide conflicting clauses in terms of the H&S legislation in South Africa.

According to the cidb report (2009), the JBCC does not make any explicit reference to H&S, but does refer to the need for parties to comply with laws and regulations that govern the work that needs to be executed. According to Emuze and Smallwood (2014), scope exists for the standard forms of contract to include more direct reference to construction H&S.

2.4 Designers' role in terms of H&S

In terms of the Construction Regulations (Republic of South Africa, 2014) a designer is a competent person who prepares a design, as well as checks and approves a design. A designer includes an architect and an

engineer who contributes, or has an overall responsibility for a design. Designers also include a surveyor who specifies articles or draws up specifications.

The Construction Regulations (Republic of South Africa, 2014) state the duties of the designer, which includes that the designer should take into consideration the H&S specification provided by the client. Before the contract is sent out to tender, the designer is also required to produce a report to the client setting out, *inter alia*, the requirements, and all relevant H&S information about the design that might affect the pricing of the construction work. The designer is also required to inform the client in writing of any anticipated or known dangers or hazards relating to the construction work.

It is the designer's duty to refrain from including anything in the design of the structure necessitating the use of dangerous procedures or materials that may negatively affect the H&S of persons. A very important duty of the designer in terms of the Construction Regulations (Republic of South Africa, 2014) is to take cognisance of ergonomic design principles in order to minimise ergonomic related hazards in all phases of the life cycle of a structure.

2.5 Forms of financial provision made for H&S

In terms of the Construction Regulations (Republic of South Africa, 2014), clients are required to ensure that the principal contractor has made adequate financial provision for H&S. How can a client do this if a sum is merely provided? Financial provision for H&S needs to be facilitated when pricing tender documentation in order to ensure that sufficient resources are available, and that the issues addressed in the H&S specification are effectively addressed during a project. However, the ASAQS provides a model description, which is related to the H&S of a project. It is set out for quantity surveyors for utilisation in the preparation of bills of quantities. An item included in 'Bill No.1' i.e. the preliminaries bill, stating that contractors need to comply with the Construction Regulations and the Occupational Health and Safety Act. It gives the contractor the opportunity to price this 'consolidated' or single item to ensure compliance with the abovementioned and in terms of the H&S specification provided by the employer (ASAQS, 2004). Smallwood (2011) states that H&S specifications should be project specific, record residual hazards, be included in contract documentation, and be linked to the facilitating of financial provision for H&S.

According to Cameron *et al.* (2006), effective planning can play a major role in the success of a project, but unfortunately the construction industry tends to not plan as effectively as other industries. Geminiani (2008) states that designers can make design decisions with the objective of favourably affecting construction H&S. With limited opportunity given to contractors to price H&S at the tender stage of projects, effective planning for H&S cannot be realised.

2.6 Cost of H&S to contractors

There are two main aspects with regard to the cost of H&S, namely the COA, and the cost of prevention (COP).

According to Haupt and Smallwood (2005), the COA can be categorised as being either direct or indirect. Direct costs are those associated with the treatment of injuries. These costs include compensation offered to workers, covered by workmen's compensation insurance premiums. Indirect costs include, *inter alia*, those costs carried by the contractor due to reduced productivity, costs resulting from delays, and any costs associated with paying the employee while he is injured. Research conducted in South Africa determined the indirect costs to be 14.2 times the direct costs (Smallwood, 2000). The COA is estimated to be around 5% of the value of construction costs which ultimately is passed onto clients (cidb, 2009). The main priority for designers should be to contributing to minimise as far as possible accidents on site, through effective design and implementation of H&S specifications, as the client ultimately incurs the cost of accidents.

Hammond *et al.* (2011) state that there are expenses incurred directly by contractors in order to prevent accidents. The COP includes costs associated with PPE, H&S training, first aid, and H&S personnel. According to Smallwood (2011), the COP is equal to 1.6% of tender cost estimate and 1% of project cost. It is evident that costs invested in accident prevention lead to a reduction in risk, and in turn, a reduction in accidents. A reduction in accidents can influence construction performance and overall profitability by reducing the costs associated with accident occurrence. Contractors and designers need to realise the benefits of investing in H&S, as the COP can be less than the COA on a construction project. According to the cidb (2009), the total COA exceeds the cost of H&S, and therefore, H&S is in essence a profit centre.

3. RESEARCH METHODOLOGY

The research methodology conducted was a mixed methodology study. This study can be described as a partially mixed sequential dominant status design, as this involves conducting a study with two phases that occur sequentially, such that either the quantitative or qualitative phase has the greater emphasis

(Leech & Onwuegbuzie, 2007). The quantitative study had a greater emphasis in this study as it was developed from the results obtained in the qualitative study and facilitates the main objective of this study, namely the introduction of H&S preliminaries in order to assist contractors in making adequate financial provision for H&S.

3.1 Qualitative Study

Initially a qualitative study was conducted. A qualitative method suited the objectives of the study, as it facilitated identification of issues and perceptions of reputable industry members that may not be reflected in the literature. The total population included all registered quantity surveyors and construction firms who carry out building projects within the Eastern Cape.

The research included developing a set of questions based upon the standardised open-ended interview approach. Respondents were asked identical questions, and questions were worded so that responses could be open-ended (Gall *et al.*, 2003). These questions were developed in order to be posed to quantity surveyors, members of construction firms, as well as representatives of the ECMBA and the ASAQS EC Chapter. Separate interview protocols were designed for each specific population targeting H&S issues common to both disciplines, but yet relevant to each discipline.

Interviews were arranged with a purposefully selected sample of registered quantity surveyors identified from the ASAQS EC Chapter list, and members of construction firms identified from the ECMBA list in the Nelson Mandela Bay Metropole, who were identified as having the necessary years of experience in the industry in order to facilitate the successful implementation of the interview protocol and achieve the required objectives. Interviews were also conducted with representatives of the ASAQS EC Chapter and ECMBA respectively in order to obtain the views of associations that directly influence H&S practices and protocols in the construction industry in South Africa. Sample numbers were governed by availability and four quantity surveyors and five members of construction firms were interviewed together with a representative from the ASAQS (EC Chapter) and a representative of the ECMBA. The data was recorded using a dictaphone, which allowed for data to be analysed in detail at a later stage, without missing any important information that may not have been comprehended during the interview protocol. In interpreting the data, themes were identified and then interpreted in order to assess the data according to the objectives of the study.

3.2 Quantitative Study

Once the initial qualitative study had been conducted, a quantitative study was developed in the form of a questionnaire distributed to a sample population. The questionnaire included items that were relevant to a H&S Preliminaries that were identified from the interview protocol as well as from the literature. Using a likert scale, respondents were requested to either agree/disagree with the introduction of H&S Preliminaries and were then requested to identify the importance of items that should be included in such a document. A section in the questionnaire allowed for respondents to give their comments regarding the topic and the final section of the questionnaire identified the demographics of the respondents.

The quantitative study was designed to target two populations, namely registered quantity surveyors and general contractors in the Eastern Cape. A sample was then identified as quantity surveyors registered with the ASAQS (EC Chapter) and general contractors on the ECMBA list. Distribution took place via emails sent out containing an attachment to the questionnaire. Respondents were encouraged to scan the questionnaire back and respond via email or were given the option for the questionnaire to be collected. Reminder emails were sent out to respondents after two weeks if no response was received to date. 12 responses were received from the 77 ASAQS population in the Eastern Cape, which equates to a response rate of 15.6%. 14 responses were received from the 58 ECMBA population, which equates to a response rate of 24.1%.

The data obtained from the questionnaire was then interpreted using descriptive statistics set out in an excel document. A Mann Whitney U-Test was also conducted in order to determine the statistical significance between the two populations.

4. FINDINGS AND DISCUSSION

Respondents were required to indicate the importance of H&S to their organisation on a scale of 1 (not) and 5 (very). A mean score (MS) between 1.00 and 5.00 was computed based upon the percentage responses to

the scale and weighted accordingly. Based upon the 4 quantity surveyors interviewed, the MS was 4.00, the 5 construction firms was 5.00, the ASAQS was 3.00, and the ECMBA was 5.00, see Table 1.1.

Table 1.1 Importance of Health & Safety (H&S) to firm or association

Stakeholder	Respondent No.					MS
	1	2	3	4	5	
ECMBA	5					5.00
ASAQS (EC)	3					3.00
QS	5	4	2	5		4.00
Contractor	5	5	5	5	5	5.00

The ASAQS EC Chapter acknowledges the importance of H&S, but the only provision made for H&S by the ASAQS on a national basis is a single item in the preliminaries of the model BoQ provided to their members. Four out of the 5 (80%) contractors agreed that an H&S preliminaries section should be introduced, while 3 out of the 4 (75%) quantity surveyors interviewed were in favour of an H&S preliminaries section, with the exception of agreement that an H&S agent appointed by the client specifies items of relevance for this preliminaries section. The concern amongst all quantity surveyors was the risk and responsibility an H&S preliminaries section would entail, with the general comment being: "H&S is out of a quantity surveyor's field of expertise."

All contractors agreed that pricing of H&S in the BoQ has very little or no implication on competitive tendering, but do feel that on projects where the H&S requirements exceed the standard legislative requirements, it can affect the tender prices submitted by contractors.

A question relating to the percentage of H&S that constitutes actual project cost or value on projects was presented to both disciplines. All quantity surveyors were unsure of the exact percentage H&S constituted, with estimated guesses and consultation from 'historical data', a figure of 2-5% was suggested from 2 out of the 4 (50%) quantity surveyors interviewed. Contractors provided percentages of 0.5%, two responses of 1-2%, 3.5% and 6-8%. This indicating varying answers with no confident answer from contractors with respect to the cost of H&S.

In terms of the quantitative study, a scale of agreement of 1 (strongly disagree) and 5 (strongly agree) regarding the introduction of H&S Preliminaries was used. Quantity surveyors had a mean score (MS) of 3.75 and contractors had a MS of 4.43. A Mann Whitney U-test was conducted on this item to compare the two populations, with a p-value of 0,022. This shows statistical significance, as $p \leq 0.05$. It is then proven that there is a significant difference in the degree of their agreement.

The top ranked items for inclusion in an H&S Preliminaries section are presented in Table 1.2. Quantity surveyors and contractors had only a single item similar in their top ranked items (storage to flammable goods), with both populations placing this item at 5 in their top ranked items, with quantity surveyors ranking first aid as the most important item with a MS of 6.44, thus falling in the category of extremely important. Contractors ranked suspended scaffolding as the most important item with a MS of 6.77.

Table 1.2 Top ranked items for inclusion in BoQs

Rank	Quantity Surveyors		Contractors	
	Item	MS	Item	MS
1	First aid	6.44	Suspended scaffolding	6.77
2	PPE	6.33	Special scaffolding	6.69
3	H&S plan	6.33	Scaffolding	6.62
4	Hoarding	6.22	Access	6.54
5	Storage to flammable goods	6.22	Storage to flammable goods	6.54

When analysing the lowest ranked items in terms of importance, it is evident that quantity surveyors and contractors have similar lowest ranked items (Table 1.3). Although similar items were identified as being least important when ranked against other items, contractors had a mean score of 5.08 for their lowest ranked item (biological monitoring), which still falls in the category of 'moderately important'. Quantity Surveyor's lowest ranked item, living accommodation, had a mean score of 4.22.

Table 1.3 Lowest ranked items for inclusion in BoQs

Rank	Quantity Surveyors		Contractors	
	Item	MS	Item	MS
36	General Administration	4.78	Meetings	5.38
37	Mess Room	4.67	Showers	5.38
38	Environmental measurement	4.67	Living accommodation	5.31
39	Biological monitoring	4.33	Environmental measurement	5.23
40	Living accommodation	4.22	Biological monitoring	5.08

Contractors had little variance in responses, with the largest standard deviation being 1.93 for the item relating to living accommodation. This item was also identified as the largest variation amongst the responses from quantity surveyors with a standard deviation of 1.79.

A Mann Whitney U-test was conducted on the two populations in terms of the importance of the items to be included in the H&S Preliminaries. Table 1.4 presents the items which had statistical significance between the two populations, i.e. there was a significant degree in difference as to the importance of these items between the two populations. This could be due to the fact that the cost of each item is perceived to be different and therefore more/less important amongst each population.

Table 1.4 Mann Whitney U-test of significance

No	Item	p-value
1	Medicals	0,001072
2	Access	0,002933
3	Special scaffolding	0,005501
4	Suspended scaffolding	0,007424
5	Housekeeping	0,007640
6	Scaffolding	0,017838
7	Full-time H&S Officer	0,026250
8	Mess room	0,027534
9	Transport of workers	0,039914

General comments by quantity surveyors relating to the inclusion of an H&S preliminaries in the BoQ included:

- “The introduction of H&S preliminaries would help contractors to price more uniformly and enable the client to compare apples with apples.”
- “H&S preliminaries would be beneficial for cost control as a QS cannot determine if a contractor has made adequate financial provision for H&S by comparing a one item amount.”
- “The H&S agent should be introduced at design stage in order to assist the quantity surveyor with regard to H&S related items.”
- “A waste of time. Increasing paperwork does not contribute to an increase in production, quality, accuracy and speed.”
- “The ASAQS should consider a separate “Trade” for H&S and include it in the Standard System of Measuring Building Work.”

General comments by contractors relating to the inclusion of an H&S preliminaries in the BoQ included:

- “Health & Safety should be measured in detail. All items having cost implications should be measured by the QS and be included in BoQs. These quantities should be re-measured/quantified at the final account stage.”
- “A lot of projects do not allow for H&S on site. This causes a major financial implication once the project begins.”
- “The longer we wait, the more people are at risk!”
- “Strongly in favour. As you have a BoQ to allow prices to be based on the same information and standardise price structures, surely a H&S trade would standardise this important but sometimes ‘grey’ area. If the argument is “read the H&S specification”, why not then forget the BoQ and say “read the building specs”.”
- “Consumables shouldn’t be quantified, as you will never be able to say how many hard hats, etc. each project will have.”

5. CONCLUSIONS AND RECOMMENDATIONS

Although H&S is seen as an important aspect to contractors and quantity surveyors alike, contract documentation, specifically the BoQ, lack in terms of facilitating financial provision for H&S. The committees responsible for the development of contract documentation should include appropriate H&S related clauses, which reflect the requirements of the OH&S Act and the Construction Regulations of 2014.

Associations such as the ASAQS have not, and do not facilitate the financial provision for H&S, with little change to available information and documents to members even with the amended Construction Regulations of 2014, which superseded the original Construction Regulations of 2003. The ASAQS acknowledges the importance of H&S in the construction industry, but has not taken the responsibility of amending documentation according to the latest regulations, due to duties and responsibilities not being agreed upon by members of the ASAQS board. The ASAQS has also failed, indirectly, to assist clients in terms of ensuring that contractors have made adequate financial provision for H&S.

H&S preliminaries should be included in the BoQ based on the project specific H&S specification provided by the client. An H&S Agent should be appointed at the first, or at the latest, the third stage (design development stage) of a project in order to assist the quantity surveyor in interpreting the H&S specification when drawing up H&S items for the BoQ. Although respondents to the study argue that provision for H&S in the BoQ does not affect competitive tendering, H&S preliminaries would allow contractors to tender on a level basis with regards to H&S. It should be noted that previous studies determined that H&S preliminaries would also assist quantity surveyors with respect to cost control and in terms of assisting the client to ensure that contractors have made adequate financial provision for H&S.

Industry members have in recent times recognised the importance of H&S, but still fail to act in terms of the recognition thereof. The COA is ultimately carried by the client as such cost is built into contractors’ cost structures, and furthermore, the COA on construction projects far outweighs the cost of prevention. The COP, or H&S, is still mostly unknown to quantity surveyors, with contractors starting to place more importance and effort on determining the COP on projects. With the inclusion of an H&S preliminaries section, clients, through the assistance of quantity surveyors, will be able to monitor the COP in carrying out a successful profit-driven project.

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APPENDIX G
Model H&S Section

Brought Forward		R	
<u>Contract Instructions</u>			
A	Contract Instructions issued on site are to be recorded in triplicate in a contract instruction book which is to be maintained on site by the contractor	Item	
	F:..... V:..... T:.....		
<u>Monthly Report</u>			
B	The contractor shall provide the principal agent with a mandatory monthly report in prescribed format reflecting all contract details, progress, weather, delays, extensions of time, labour records, plant and equipment, details and progress of sub-contractors, contract instructions consumables, social and economic deliverables, labour and SMME training and health and safety.		
	The report is to be submitted not later than the twenty fifth (25th) of every calendar month		
	F:..... V:..... T:.....	Item	
<u>Site Diary</u>			
C	The contractor shall keep and maintain a daily site diary recording inclement weather; concrete test cubes; compaction test; etc. as required by the Principal Agent.		
	F:..... V:..... T:.....	Item	
<u>Non Cession of Monies</u>			
D	The contractor shall not cede nor assign his rights or claims to any monies due or to become due under this contract		
	F:..... V:..... T:.....	Item	
<u>SECTION E: OCCUPATIONAL HEALTH AND SAFETY</u>			
Carried Forward		R	
Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ			

<p style="text-align: center;">Brought Forward</p> <p>Without limiting the generality of the provisions of clause 7.0 of the Principal Building Agreement, the Contractors attention is drawn to the provisions of the Construction Regulations, 2014 issued in terms of the Occupational Health and Safety Act, 1993 in which it is specifically stated that the Employer shall ensure that the Contractor has made provision for the cost of health and safety measures during the execution of the works. The contractor is referred to the Occupational Health and Safety Specification for Construction attached to this document as Annexure A and the contractor shall price for compliance with the Act and the regulations and the provisions of the aforementioned Health and Safety Specification.</p> <p>The legal requirements contemplated in Construction Regulations CR 5 (1) (g)</p> <p>"A Client must ensure that potential principal contractors submitting tenders, have made adequate provision for the cost of health and safety measures "</p> <p>and CR 5 (1) (h)</p> <p>"A Client must ensure that the principal contractor to be appointed has the necessary competencies and resources to carry out the construction work safely"</p> <p>shall apply and failure to price the Health and Safety items will result in the tender being deemed non - responsive.</p>		R	
<p style="text-align: center;">Carried Forward</p> <p>Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ</p>		R	

<p>Brought Forward</p>		<p>R</p>	
<p>The contractors attention is further drawn to Section 41 of the OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 1993: THIS ACT NOT AFFECTED BY AGREEMENTS</p>			
<p>Subject to the provisions of sections 10 (4) and 37 (2), a provision of this Act or a condition specified in any notice or direction issued there under or subject to which exemption was granted to any person under section 40, shall not be affected by any condition of any agreement, whether such agreement was entered into before or after the commencement of this Act or before or after the imposition of any such condition, as the case may be.</p>			
<p>Prior to pricing the Contractor must familiarize him/herself with the OCCUPATIONAL HEALTH AND SAFETY ACT NO. 85 1993 as well as the Construction Regulations, 2014, other Relevant Regulations and Standards.</p>			
<p>General</p>			
<p>A Notify the Provincial Director Department of Labour in writing of the commencement of construction work with and including submission of a letter of receipt and acknowledgement of the aforementioned notice by the director or his/ her representative</p>			
<p>F.....V.....T.....</p>	<p>Item</p>		
<p>B Allow for the necessary Workmans Compensation Fund or FEM contributions for the duration of the project with and including renewals.</p>			
<p>F.....V.....T.....</p>	<p>Item</p>		
<p>C Allow for the preparation and approval of project - specific H&S Plan & File(CR7 (1) (a))</p>			
<p>F.....V.....T.....</p>	<p>Item</p>		
<p>Carried Forward</p>		<p>R</p>	
<p>Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ</p>			
<p>-37-</p>			

Brought Forward		R
A	Allow for the implementation and maintenance of project - specific H&S Plan & File. (CR 7) F.....V.....T.....	Item
B	Allow for the appointment of a full - time competent Construction Health & Safety Officer to assist in the control of all health and safety related aspects on site as per CR8 (5) F.....V.....T.....	Item
C	Provide for appointment of responsible and competent person/s to manage and supervise the works and administer and enforce health and safety on site as per CR 8 (1), (2) and (7) F.....V.....T.....	Item
D	Allow for provision of telecommunication facilities for the appointed Construction Health and Safety Officer F.....V.....T.....	Item
E	Allow for provision of basic emergency preparedness and response equipment and minimum Level 2 First Aider/s F.....V.....T.....	Item
	<u>Provide, supply and maintain for each worker the following SANS approved personal protective equipment & clothing as per the site - specific risk assessments:</u>	
F	Hard hats (High density polyethylene with 6 - point lining) F.....V.....T.....	Item
G	Overall / work suit (100% Cotton) F.....V.....T.....	Item
Carried Forward		R
Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ		

Brought Forward		R
A High visibility reflective vests and / or bibs F.....V.....T.....	Item	
B Safety boots / shoes (Steel - toe) F.....V.....T.....	Item	
C Safety gumboots (Steel - toe) F.....V.....T.....	Item	
D Ear plugs/ muffs F.....V.....T.....	Item	
E Dust masks (at least FF2 type) F.....V.....T.....	Item	
F Respirators F.....V.....T.....	Item	
G Safety goggles F.....V.....T.....	Item	
H Temporary handrails, toe boards, etc other than for access scaffolding F.....V.....T.....	Item	
I Personal fall arrest and rescue equipment with and including life lines and associated equipment F.....V.....T.....	Item	
J SANS approved safety netting (orange colour minimum 1,2 meters high) F.....V.....T.....	Item	
Carried Forward		R
Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ		

Brought Forward		R
A	Temporary warning signs and symbols F.....V.....T.....	Item
B	Road traffic signs in terms of the South African Road Traffic Signs Manual F.....V.....T.....	Item
Medical Examinations		
C	Allow for pre-employment medical examinations F.....V.....T.....	Item
D	Allow for baseline psychological examinations F.....V.....T.....	Item
E	Allow for exit medical examinations F.....V.....T.....	Item
Health and Safety Education		
F	Allow for HIV/AIDS Awareness and Implementation programmes, including STI and TB F.....V.....T.....	Item
G	Allow for all compulsory Health and Safety Awareness programmes (e.g. Inductions, toolbox talks, safety promotions, H&S related training, etc.) F.....V.....T.....	Item
Environmental		
H	Provide for adequate handling and storage of materials so as to minimize contamination of ground, air or water F.....V.....T.....	Item
Carried Forward		R
Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ		

Brought Forward		R
<p>A Provide for the adequate and safe collection and disposal of waste material and effluent from site by an approved method.</p> <p>F.....V.....T.....</p>	Item	
<p>B Provide facilities and eating area for workers.</p> <p>F.....V.....T.....</p>	Item	
<p>C Provide for rehabilitation on completion of site areas and temporary access routes not covered by construction or landscaping specifications.</p> <p>F.....V.....T.....</p>	Item	
<p>D Provide for adequate dust control measures, including regular watering of access routes.</p> <p>F.....V.....T.....</p>	Item	
<p>E Provide for an Environmental Officer or responsible person to prepare and update Method Statements, conduct regular inspections, maintain records and report to the Principal Agent</p> <p>F.....V.....T.....</p>	Item	
Carried to Final Summary		R
<p>Section No. 1 PRELIMINARIES Bill No. 1 PRELIMINARIES 1486 -BQ</p>		