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 (ASAQS) Eastern Cape Chapter, and the East Cape Master Builders Association (ECMBA) as part of a qualitative study. A quantitative study was then conducted in the form of a questionnaire survey. This questionnaire was developed from the findings arising from the interviews and was distributed to members of 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

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 in South Africa 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%(R2 401.2m/R56 343m), and 5.4% (R3 041.5m/R56 343m) (Smallwood, 2004 in 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 a 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 CONSTRUCTIONINDUSTRY

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 cost of accidents (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

A mixed method research methodology was adopted for the 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 addressed the subject area in greater detail as it was developed from the results obtained during the exploratory phase in the form of the qualitative study. The main objective of this study was the identification of the actual H&S preliminaries' items 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 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. Sample numbers were governed by availability and four quantity surveyors and five members of construction firms were interviewed. 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 H&S Preliminaries that were identified from the interview protocol as well as from the literature. Using a likert type 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 number ASAQS population in the Eastern Cape, which equates to a response rate of 15.6%. 14 responses were received from the 58 number 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 <=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, based on a scale of importance of 1 (not at all important) to 7 (extremely important), 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 relative to 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 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 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 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 committee. 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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