

Financial Provision for Construction Health and Safety (H&S)

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ABSTRACT

The optimum financial resourcing of H&S is marginalised by competitive tendering, which does not ensure an equitable basis for estimating and bidding as generally there are no detailed items included for H&S in contract documents such as Bills of Quantities. Anecdotal evidence and previous research indicates that a possible solution is the inclusion of an H&S section in the Preliminaries section of such Bills of Quantities.

The paper reports on a follow up study conducted among general contractors. 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; a provisional sum should be provided for H&S in the preliminaries, and contractors generally do not determine the percentage H&S constitutes of tender and project cost. Conclusions include, inter alia, that H&S is marginalised by procurement practices, standard conditions of contract, and the lack of a structured approach to the facilitating of financial provision for H&S. Recommendations include, inter alia, that a detailed H&S section should be included in the Preliminaries section of Bills of Quantities.

INTRODUCTION

All trades and aspects of construction require adequate financial provision at tender or bidding stage, and thereafter. However, the traditional construction procurement process (TCPS), which entails the design of buildings or structures by designers, the preparation of tender or bidding documentation by cost engineers or quantity surveyors, a competitive tendering or bidding process, and the invariable appointment of a contractor on the basis of the lowest price, has a number of implications for H&S (Rwelamila & Smallwood, 1999). In addition to the separation of design from procurement, and construction, contractors seek competitive advantage. Research indicates that while designers do influence H&S during design and construction, the attention is more prevalent during construction through supervisory and administrative interventions, than during design and procurement (Smallwood, 2004a; Smallwood, 2006). Furthermore, procurement systems do not

engender commitment to H&S (Rwelamila & Smallwood, 1999), contract documentation makes limited reference to H&S (Smallwood and Rwelamila, 1996), and competitive tendering or bidding marginalises H&S (Smallwood, 1996).

Given the aforementioned research findings, anecdotal evidence, and a previous study regarding the optimum percentage financial provision for H&S, a follow up study was initiated, the objectives being to determine the:

- Perceived importance of H&S;
- Extent to which H&S has been / is addressed by contract documentation;
- Perceptions relative to the financial provision for H&S, and
- Potential of interventions to contribute to an improvement in H&S.

REVIEW OF THE LITERATURE

Role of procurement in health and safety

There are two reasons why H&S is an important issue to consider during procurement. First, clients have been made increasingly responsible for H&S and therefore that need to ensure that H&S conscious designers, contractors and subcontractors are appointed. Second, although enforcement agencies are responsible for ensuring compliance through, inter alia, inspection of sites, the large number and dispersion of sites is such that enforcement agencies cannot visit all sites (Wells and Hawkins, 2009). Therefore, procurement has a major role to play in assuring H&S through the appointment of H&S conscious contractors and subcontractors. They also highlight the trend in developing countries, namely the award of contracts on the basis of competitive tendering, with tenders evaluated on the basis of price. Therefore, in order to win the tender 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.

The Construction Regulations (Republic of South Africa, 2003) address the role of clients in procurement in terms of H&S in detail. Clients are required to, inter alia, provide the principal contractor with an H&S specification which schedules the H&S requirements for the project, to which the principal contractor must respond in the form of an H&S plan. The client is also required to ensure that during the tendering process, the principal contractor has made adequate provision for the cost of H&S measures. The challenge for the client is not only the approval of the H&S plan, but to determine whether adequate financial provision has been made. Obviously, this process should be facilitated

The role of procurement in H&S is addressed in detail in terms of the recommendations contained on the report 'Construction Health & Safety Status & Recommendations' published by the Construction Industry Development Board (cidb) (2009). Key elements of the recommended strategy to improve construction H&S performance by public sector clients are: prequalify and / or select contractors with recognised H&S competencies; prequalify and / or select contractors with recognised H&S management system abilities applicable to the project risk; specify requirements for H&S management plans on construction projects; specify requirements for H&S management systems and plans from designers, and require

the completion of assessment reports of contractors upon project completion, which can be used in selecting contractors during tender evaluation.

Contract documentation

According to the cidb (2009), the predominating standard forms of contract used in South Africa make explicit or implicit reference to the fact that the forms of contract are subject to legislation impacting on construction H&S. More specifically, however the:

- General Conditions of Contract (GCC) does not make any explicit reference to H&S other than the requirement for ‘reporting of accidents’;
- Joint Building Contracts Committee (JBCC) conditions of contract does not make any explicit reference to H&S, but does make explicit reference to the parties complying with all laws, regulations and bylaws regarding the execution of the works, and
- International Federation of Consulting Engineers (FIDIC) and the New Engineering Contract (NEC) conditions of contract, which are of overseas origin, do make specific reference to H&S. However, in some cases the terminology or referencing does not fully align with the requirements of the South African H&S legislative framework.

Clearly, scope exists for the standard forms of contract to include more direct reference to construction H&S, the Construction Regulations and the obligations of contractors – as well as providing for additional client driven H&S requirements.

Form of financial provision for health and safety

Wells and Hawkins (2009) state that to avoid misunderstanding of what is required and to facilitate the checking of contractors’ financial provision for H&S, it is recommended that H&S items that can be separately priced be listed as prime cost items, provisional sums, or the use of another form of pricing mechanism. They provide examples of items that can be addressed in such a manner, namely the preparation and updating of an H&S plan; provision of temporary works such as scaffolding and hoarding, H&S Officer, H&S training, attendance of H&S Committee meetings, provision of welfare facilities, provision of personal protective equipment (PPE), and medical examinations. Wells and Hawkins (2009) also state that it is possible, and may be considered preferable, to take the cost of meeting the client’s H&S requirements out of competition by pre-pricing H&S items, and they cite the approach adopted in Hong Kong in 1996 under the ‘Pay for Safety’ scheme.

Cost of health and safety

The maximum payment for all H&S items in terms of the Hong Kong ‘Pay for Safety’ scheme was set at approximately 2% of the estimated value of the contract on small projects, and 1% on large projects (Wells and Hawkins, 2009). However, H&S items that are not delivered are not paid for.

In terms of research conducted to determine the cost of H&S, international findings vary. Research conducted among a group of ‘better practice H&S’ general contractors (GCs) in South Africa included, inter alia, the question: “On average, approximately what percentage does the cost of H&S constitute of total project cost?”

(Smallwood, 2004) Of the eight (88.9%) GCs that responded, two GCs (25%) recorded a percentage, namely 3% and 0.5%, and six (75%) identified ranges: three (50%) ‘ $0 \leq 1\%$ ’, and three (50%) ‘ $> 1 \leq 2\%$ ’. More recent research conducted among GCs that had achieved a place in the Kwazulu-Natal Master Builders Association H&S competition, determined the mean percentage H&S constitutes of tender and project cost to be 1.6% and 1% respectively (Smallwood, 2011).

RESEARCH

Method and Sample Stratum

The study was descriptive in nature and the self-administered quantitative questionnaire consisted of six questions, five being closed end and one being open end, the latter allowing for the recording of general comments. The five closed end questions included thirty-four sub-questions.

The sixty medium and large sized general contractor (GC) members of the East Cape Master Builders Association (ECMBA) constituted the sample strata. The list of members was supplied by the ECMBA, and the survey was addressed to the manager / owner. 11 Responses were received which equates to a response rate of 18.3%.

Analysis of the data

The analysis of the data consisted of the calculation of descriptive statistics to depict the frequency distribution and central tendency of responses to fixed response questions to determine the extent of contribution, degree of concurrence, and the degree of importance.

To rank fixed response items according to the central tendency of responses, mean scores (MSs) were calculated as follows:

$$MS = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{n_1 + n_2 + n_3 + n_4 + n_5}$$

The variables are referenced in Table 1.

Table 1. Definition of Likert scale points and related variables

Likert scale point			Variable
Minor extent	Strongly disagree	Not important	n ₁
Near minor extent	Disagree	Less than important	n ₂
Some extent	Neutral	Important	n ₃
Near minor extent	Agree	More than important	n ₄
Major extent	Strongly agree	Very important	n ₅

Findings

Table 2 indicates the extent to which documents / references address / mention H&S in terms of percentage responses to a scale of 1 (minor) to 5 (major), and a MS between 1.00, and 5.00. It is notable that all the MSs are < 3.00, which indicates that the respondents deem the extent to which documents / references address / mention H&S to be minor as opposed to major. However, from a MS range perspective, given that all the MSs are $\geq 1.00 \leq 1.80$, the respondents deem the documents / references to address / mention H&S between a minor to near minor extent.

Table 2. Extent to which documents / references address / mention H&S

Document / Reference	Response (%)						MS	Rank
	U	Minor.....Major						
		1	2	3	4	5		
General Conditions of Contract	9.1	36.4	36.4	18.2	0.0	0.0	1.80	1
FIDIC (CoC)	72.7	18.2	0.0	9.1	0.0	0.0	1.67	2
Model preambles	0.0	63.6	27.3	9.1	0.0	0.0	1.45	3
JBCC (CoC)	0.0	90.9	0.0	9.1	0.0	0.0	1.18	4
Standard System of Measuring Builders Work	9.1	90.9	0.0	0.0	0.0	0.0	1.00	5
NEC (CoC)	81.8	18.2	0.0	0.0	0.0	0.0	1.00	6

Table 3 indicates the basis on which contract documents have facilitated financial provision for H&S subsequent to the promulgation of the Construction Regulations (18 July 2003).

63.6% of respondents maintain that provisional sums never facilitated financial provision for H&S and 27.3% $> 0\% \leq 20\%$ of projects. Only 9.1% identified $> 80\% < 100\%$ of projects.

36.4% of respondents maintain that financial provision for H&S is always (100%) facilitated by a preliminaries item, 36.4% on between $> 80\% < 100\%$ of projects, and 18.2% on between $> 60\% \leq 80\%$. Only 9.1% identified on between $> 40\% \leq 60\%$ of projects.

18.2 % of respondents maintain that detailed H&S preliminaries items never facilitated financial provision for H&S, 27.3% on $> 60\% \leq 80\%$, 27.3% on $> 40\% < 60\%$ of projects, and 18.2% $> 0\% \leq 20\%$ of projects.

45.6% of respondents maintain that detailed H&S 'trade' / section never facilitated financial provision for H&S of projects, and 27.3% on $> 0\% \leq 20\%$ on projects. Only 9.1% identified each of $> 40\% \leq 60\%$, $> 60\% \leq 80\%$ and 100% of projects.

Table 3. Basis on which contract documents have facilitated financial provision for H&S after the promulgation of the Construction Regulations (18 July 2003)

Form of provision	Response (%)							
	Unsure	0%	0% ≤ 20%	20% ≤ 40%	40% ≤ 60%	60% ≤ 80%	80% < 100%	100%
Provisional sum	0.0	63.6	27.3	0.0	0.0	0.0	9.1	0.0
Preliminaries 'item'	0.0	0.0	0.0	0.0	9.1	18.2	36.4	36.4
Detailed H&S preliminaries	9.1	18.2	18.2	0.0	27.3	27.3	0.0	0.0
H&S 'trade' / section	0.0	45.6	27.3	0.0	9.1	9.1	0.0	9.1

Table 4 indicates the extent to which respondents concur with fourteen statements based upon percentage responses to a scale of 'strongly disagree' to 'strongly agree', and a MS between 1.00, and 5.00. In terms of the mean, 10 of the 14 (71.4%) statements have MSs > 3.00 which indicates that the respondents can be deemed to agree as opposed to disagree.

It is notable that the top two MSs are $4.20 \leq 5.00$, which indicates that the degree of concurrence is between agree to strongly agree / strongly agree. Notable, as statements directly related to the subject of the study such as 'Contract document enabled financial provision for H&S promotes H&S' and 'A detailed H&S section should be included in the Preliminaries' fall within this range.

MSs $3.40 \leq 4.20$ indicate that the degree of concurrence is between neutral to agree / agree: 'Appropriate contract documentation promotes H&S'; 'Competitive tendering without reference to H&S marginalises H&S'; 'Competitive tendering marginalises H&S'; 'A provisional sum should be provided for H&S in the preliminaries'; 'Standard contract documentation generally makes cursive reference to H&S'; 'H&S specifications are project specific', and 'H&S specifications are included with tender documentation'. The concurrence relative to the aforementioned statements reinforces the role of contract documentation in promoting H&S, the negative impact of competitive tendering on H&S, and the current inadequacy of standard contract documentation. However, the concurrence with respect to the provision of project specific H&S specifications is notable as previous research indicates the contrary.

MSs $2.60 \leq 3.40$ indicate that the degree of concurrence is between disagree to neutral / neutral: 'Contract documentation promotes H&S', and 'H&S specifications highlight hazards'. H&S specifications should be included with tender documentation and highlight hazards due to the necessity for contractors to make

adequate allowance for H&S. Furthermore, the current inadequacy of standard contract documentation is further reinforced.

Table 4. Extent of concurrence with various statements

Statement	Response (%)						MS	Rank
	Unsure	Strongly disagree	Disagree	Neutral	Agree	Strongly agree		
Contract document enabled financial provision for H&S promotes H&S	0.0	0.0	0.0	9.1	45.5	45.5	4.36	1
A detailed H&S section should be included in the Preliminaries	0.0	0.0	0.0	9.1	54.5	36.4	4.27	2
Appropriate contract documentation promotes H&S	0.0	0.0	0.0	18.2	54.5	27.3	4.09	3
Competitive tendering without reference to H&S marginalises H&S	0.0	0.0	9.1	27.3	9.1	54.5	4.09	4
Competitive tendering marginalises H&S	0.0	0.0	9.1	27.3	18.2	45.5	4.00	5
H&S specifications are project specific	0.0	9.1	9.1	18.2	36.4	27.3	3.64	6
A provisional sum should be provided for H&S in the preliminaries	0.0	18.2	9.1	9.1	18.2	45.5	3.64	7
Standard contract documentation generally makes cursive reference to H&S	0.0	0.0	18.2	18.2	54.5	9.1	3.55	8
H&S specifications are included with tender documentation	0.0	9.1	0.0	18.2	72.7	0.0	3.55	9
Contract documentation promotes H&S	0.0	9.1	9.1	27.3	45.5	9.1	3.36	10
H&S specifications highlight hazards	0.0	9.1	36.4	27.3	27.3	0.0	2.73	11
Contractors are afforded the opportunity to price H&S on an equitable basis	0.0	36.4	18.2	18.2	27.3	0.0	2.36	12
Contractors are afforded the opportunity to price items included in H&S specifications on an equitable basis	0.0	27.3	27.3	27.3	18.2	0.0	2.36	13
H&S specifications include designer 'design and construction' method statements	9.1	9.1	45.5	36.4	0.0	0.0	2.30	14

MSs $> 1.80 \leq 2.60$ indicate the degree of concurrence can be deemed to be between strongly disagree to disagree / disagree: ‘Contractors are afforded the opportunity to price H&S on an equitable basis’; ‘Contractors are afforded the opportunity to price items included in H&S specifications on an equitable basis’, and ‘H&S specifications include designer ‘design and construction’ method statements’. The aforementioned further reinforce the current inadequacy of standard contract documentation. Furthermore, the provision of ‘design and construction’ method statements is required in terms of the Construction Regulations.

Table 5 indicates the extent to which respondents’ organisations compute the cost of H&S and the mean percentage H&S constitutes of tender and project cost.

It is notable that only 30% of respondents’ organisations compute the percentage that H&S constitutes of tender cost and that only 10% compute the percentage that H&S constitute of project cost. The absolute mean percentage that H&S constitutes of tender cost is 2.5%. The respondents that responded relative to project cost did not record a percentage.

Table 5. Extent to which respondents’ organisations compute the cost of H&S and the mean percentage H&S constitutes of tender and project cost

Cost type	Yes (%)	Mean (%)
Tender cost estimate	30.0	2.5
Project cost	10.0	NR

Table 6 indicates the degree of importance of parameters to respondents’ organisations in terms of percentage responses to a scale of 1 (not) and 5 (very), and a MS between 1.00 and 5.00. Given that all the MSs are > 3.00 the respondents can be deemed to perceive the parameters to be important, as opposed to not important. However, MSs $> 4.20 \leq 5.00$, indicate that the parameters can be deemed to be more than important to very important / very important. It is notable that project H&S is ranked fourth and that the traditional project parameters of project quality, project cost, and project time are ranked higher than project H&S. Given that the MSs of environment and construction ergonomics are $> 3.40 \leq 4.20$, they can be deemed to be important to more than important / more than important.

Table 6. Importance of project parameters to respondents’ organisations

Parameter	Response (%)						MS	Rank
	U	Not Very						
		1	2	3	4	5		
Project quality	0.0	0.0	0.0	0.0	18.2	81.8	4.82	1
Project cost	0.0	0.0	0.0	0.0	27.3	72.7	4.73	2
Project time	0.0	0.0	0.0	0.0	27.3	72.7	4.73	3
Project H&S	0.0	0.0	0.0	9.1	36.4	54.5	4.45	4
Environment	0.0	0.0	0.0	54.5	27.3	18.2	3.64	5
Construction ergonomics	0.0	0.0	0.0	45.5	45.5	9.1	3.64	6

CONCLUSIONS

Contract documentation, documents, and other references do not address H&S to the requisite extent. Therefore, it can be concluded that the originators are not committed to H&S, do not view H&S as a project value, and that the overall construction environment is not conducive to optimizing H&S. The aforementioned is reinforced by the finding that contract documents have not facilitated financial provision for H&S subsequent to the promulgation of the Construction Regulations on 18 July 2003, H&S specifications included. The committees responsible for the development of contract documentation should commit themselves to raising the profile and status of H&S through the inclusion of appropriate H&S related clauses, which reflect the requirements of the OH&S Act and the Construction Regulations. H&S specifications should be linked to the facilitating of financial provision for H&S. Adequate financial provision for H&S should be facilitated through the inclusion of a detailed H&S section in the Preliminaries, or at the very least the inclusion of a provisional sum for H&S.

The mean percentage H&S constitutes of tender cost is 2.5%. Given that 30% of respondents' organisations compute the percentage H&S constitutes of tender cost, and 10% that of project cost, it can be concluded that contractors are not committed to determining the cost of H&S, and / or that their project cost or cost reporting system does not facilitate the recording of H&S costs. Contractors should determine the cost of H&S. Furthermore, the mean percentage constitutes a dilemma as the percentage is dependent upon a number of variables, inter alia: project cost; duration; sector of construction; type of construction; type of building; number of floors; floor area; structural frame; number of workers, and degree of subcontracting.

Based upon the cited importance of six parameters, it can be concluded that the traditional project parameters of cost, quality, and time are more important than H&S. This finding leads to the conclusion that H&S is not a value to the respondents' organisations. Employer organisations should raise the status of H&S within their constituencies through the conveyance of the role of optimum H&S in overall project performance.

Finally, given the size of the sample stratum and the response rate, the findings should be deemed 'exploratory'. However, the findings to corroborate the findings of a previous 'exploratory' study and anecdotal evidence.

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