

Health and Safety (H&S) awareness and implementation in Botswana's construction industry

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Abstract

A study was conducted to determine the level of awareness and implementation of Health and Safety (H&S) in Botswana's construction industry. Findings from the research revealed that the level of H&S awareness was low; H&S legislation was not implemented; contractors' management are not committed to H&S implementation; there is a lack of H&S management systems, procedures, and protocol; and clients and designers do not participate in the implementation of H&S.

In light of the findings, it is recommended that relevant and adequate rules and regulations be promulgated according to the ILO recommendations. It is also recommended that all stakeholders should be equally responsible for the implementation of H&S.

Keywords: Awareness, Botswana, construction, health and safety, implementation.

1.1 INTRODUCTION

Health and Safety (H&S) in the construction industry is of great importance and its benefits cannot be overemphasized. However, neglect in the observation of H&S has had devastating effects on both the industry and particular organisations. Research has shown that the construction industry poses more dangers concerning H&S than any other industry (Halpin and Woodhead 1996). In view of the above, continuous re-evaluation and much study are encouraged.

An observation of many construction sites in Botswana indicated that H&S tenets were not observed, especially among building contractors. Most project meetings for building construction projects that were attended by the researcher did not have H&S as a major agenda item. Records at the Factories Inspectorate of the Department of Labour revealed that, between 2000 and 2003, more than five fatalities were recorded in Botswana. These emanated from accidents on construction sites. Small as the figure might be in comparison to other nations, for instance, the USA, it is important to appreciate that any loss of life as a result of an industrial accident is a step backwards in human development and cannot be tolerated. The fatalities themselves are a source of concern for the current state of H&S in the construction industry. In fact, if an accident occurs, it serves as an indicator that the system is poor. As Petersen (1996) explains, an unsafe act, an unsafe condition, and an accident are all symptoms that something is wrong in the entire management system. A study conducted by Kabiari (2002) in Murray and Roberts (M&R) Botswana (Pty) Ltd, a category E building contractor, revealed that accidents had occurred and that they had incurred costs of up to 2% of their net profit.

This study is important because of the challenges that the Southern Africa region is currently facing. Issues are the black economic empowerment in South Africa, 100% citizen preference in Botswana, and the general preference of local-citizen contractors in Southern Africa who, unlike large international contractors such as M&R, do not have expertise. The

foregoing poses major obstacles to the implementation of H&S. It is important that workable solutions or actions are found that will ensure sustained income for many empowered and emerging contractors. At the same time, they should be working in healthy and safe environments with a continued supply of developmental facilities by central governments. Further, since the construction industry is one of the largest employers in Botswana, it is envisaged that this study will contribute to finding ways to ensure a healthy and safe labour force.

A vast body of knowledge relative to the subject exists. A study conducted by Smallwood (1996), in South Africa relative to the influence of designers on occupational H&S, indicated that contractors use designers' output to bid, mechanisms are required to ensure the equitable allocation of resources to H&S at the bidding stage, and shortened project periods negatively affect H&S. The study concluded that designer intervention and partnering could greatly improve the implementation of H&S.

Therefore, this study complements and supplements other studies conducted in the region, such as the aforementioned. However, this study takes cognisance of the diverse challenges facing Southern Africa, such as the social economic aspects, prioritising of works for 100% citizen contractors, and institutional arrangements.

The following constitute the objectives of this research, namely to:

- Evaluate the level of H&S awareness and implementation in the construction industry;
- Evaluate the level of commitment by contractor management, clients' and designers to the implementation of H&S, and
- Recommend measures to address the implementation of H&S.

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1.2 IMPACT OF H&S

Occupational fatalities, injuries, and disease contribute to the variability of resources and, thus, an increase in project risk. This is manifested in damage to the environment, reduced productivity, non-conformance to quality standards, and time overruns. These, ultimately, contribute to an increase in the cost of construction (Smallwood 2004). In a study conducted by Rwelamila and Smallwood (1999), 87.2% and 80% of respondents, respectively, identified productivity and quality as being negatively affected by inadequate H&S. According to Kabiaru (2002), a study conducted in Murray & Roberts (M&R), Botswana, determined that accident costs amounted to 2% of the projected net profit on projects

Accidents result in both direct and indirect costs (Smallwood 1999, Ngai and Tang 1999). Clearly, as pointed out by Kolluru (1996), occupational injuries and deaths are costly to an organisation, industry, and, ultimately, to a nation. The National Safety Council (NSC), USA, estimated the cost of occupational injuries and fatalities at \$112 billion, including \$60 billion (54%) in wage and productivity losses, \$21 billion (19%) in medical costs, and the remainder attributable to administrative and other expenses (Kolluru 1996). One hundred and fifteen working days were lost due to disabling injuries in prior years. According to the Social Security Administration, \$41 billion was paid out in workers compensation in 1991 - \$25 billion to income benefits and \$17 billion to medical costs (Kolluru 1996).

According to Smallwood (1999), research conducted by Hinze determined the indirect costs, excluding claims and material costs, to be more than 1.67 times the direct costs of accidents. An injury with a direct cost of \$ 1 000.00, for example, is said to result in indirect costs of \$1 670.00 and consequently a total of \$2 670.00. It was determined that minor injuries entail more than five times the direct costs. As Coble, Hinze, McDermott, and Elliot (1999) correctly noted, construction injuries could seriously compromise the completion of a project and have a significant impact on the profitability of a firm. They argue that, even in the absence of litigation, the high costs of medical treatment can severely impact on corporate profits.

1.3 H&S AWARENESS

The Oxford Advanced Learner's Dictionary (1995) defines the term 'aware' as 'the state of having knowledge of somebody or something.' Knowledge is defined as the facts, information, understanding, and skills that a person has acquired through experience or education (Oxford Advanced Learner's Dictionary 1995). H&S awareness, therefore, can be defined as the state of having knowledge of the risks, hazards, and consequences associated with the construction site. According to Krause (1997), evidence of H&S-oriented artifacts, values, and assumptions indicates the adequacy of H&S implementation. Therefore it can be argued that knowledge is also an indicator of the level of awareness because artifacts, values, and assumptions are influenced by the knowledge that the organisation and workers have of H&S. H&S awareness is an antecedent of displays of behaviour, with accidents and incidents being the consequences of behaviour in the industry. That is why statistics of accidents, injuries, and / or incidents alone as a measure of the level of awareness is misleading and is not sufficient to determine the status quo. In general, determining the H&S culture in the construction industry should be the focus of H&S awareness endeavours (Krause 1997). An example of the importance of behavioural analysis is seen in the way in which organisations have posted up proclamations, vision and mission statements, or even artifacts, such as warning signs concerning H&S, but do not actually 'walk the talk' in the sense that the unsafe behaviour, values, and assumptions that one can observe, do not agree with the proclamations. Their behaviour is not consistent with the proclamations.

Behavioural analysis is reliable in determining the level of H&S awareness because accidents in the construction industry depend on various factors, such as the number of projects being undertaken. This is more so because a reduced number of accidents, or the total lack thereof, does not necessarily suggest that the H&S culture is right (Krause 1997). Behaviour is viewed as emanating from a complex range of personal and situational factors. Personal factors include long-term personal traits as well as short-term psychological states as antecedents to immediate behaviour (Hammer and Price 2001). Situational factors that have been singled out include physical, task, organisational, and cultural immediate psychosocial environments. Smallwood (1996) also maintains that employee behaviour is a direct result of a management system and is the final pathway of most incidents. Behaviour, as Smallwood (1996) correctly point out, vests itself in either a safe or unsafe act. Unsafe acts, according to studies conducted by NOSA, represent about 88% of the causes of accidents (Smallwood 1996). Maloney and Smith (1999) also attribute unsafe behaviour to be at the heart of most construction site accidents and fatalities. According to them, 50% - 90% of all accidents are caused by unsafe behaviour. Unsafe behaviour is greatly influenced by a lack of knowledge, which, in turn, is an effect of the individual's level of awareness. It can, therefore, be argued that the level of H&S awareness is best measured or evaluated through the observation of behavioural patterns, namely, people's actions in all activities on site. Behaviour, which in simple terms is the acts of people, can easily be observed. It is argued that, since the prevalence of the at-risk behaviour indicates the level of the H&S culture, it should be concluded that this is also true about the level of H&S awareness. The prevalence of at-risk behaviour can reliably be used as an indicator of the level of H&S awareness because as Krause (1997) point out, behaviour is at the base and is upstream of all accidents, incidents and fatalities.

The level of H&S awareness in the construction industry has impacted negatively on the implementation of H&S in that it determines the behaviour of individuals and organisations. In fact, the behaviour of management concerning H&S, that is, the way management manages in relation to H&S, to a greater or lesser extent, influences the workforce's behaviour (Smallwood 1996). Krause (1997) also points out that this issue of at-risk behaviour is part of the managerial system that is either implicitly encouraged or condoned by management. In theory the degree of H&S awareness relative to management should be higher than that relative to the workforce.

1.4 BARRIER TO H&S IMPLEMENTATION- SOCIO-ECONOMIC ENVIRONMENT

Economic and labour-market policies have compounded the H&S related problems in the industry. Most of these policies have encouraged insecurity at work. Workers are often

prohibited from complaining about conditions and employers face diminished incentives to invest in newer and appropriate safer methods of work (Daykin 1999). Because of this, it is difficult to rally employees and employers alike to act and behave safely, or contribute to the identification of hazardous conditions and substances at the place of work. According to observations made by Smallwood (2004), market conditions in South Africa and, indeed, in many parts of the world are such that contractors frequently find themselves in an unfair position in that, should they make the requisite allowances for H&S, they run the risk of losing a tender or negotiations to a competitor that is less committed to H&S. Authors such as Loosemore et al. (1999) and Ngowi and Mselle (1999) agree that contractors gain little competitive advantage from a good H&S record. A drive exists for contractors to keep their prices very low in order to obtain work. It could, therefore, be suggested that, since H&S is rarely considered in the award of contracts, this is, in itself, a barrier to the implementation of H&S in the construction industry.

Workers are the worst hit by the economic situation, since they are mostly not involved in decision-making. Workers are seen to be at the mercy of their employers. According to Kabiaru (2002), the perception that workers have of risk is reflected in the way they make a decision. He argues that this is usually based on a subjective risk assessment, that is, the probability and severity of the potential injury. This is then compared to the possibility of losing a job and, ultimately, the loss of income if they refuse to undertake a particular task that is perceived to be risky. His conclusion is that the economy impacts negatively on the improvement of H&S because everybody wishes to survive, one way or the other.

Maloney and Smith (1999) argue that workers focus more on job security and that management focuses more on performance. In support of this, observations made by Oliver, Cheyne, Tomas, and Cox (2002), could be said to be true. Their argument is that there are mainly two fundamental causes of occupational accidents. These are the characteristics of the work and the organisational environments as well as the psychological and behavioural characteristics of the individuals. Both are highly influenced by the focus that workers and management put on job security and performance.

According to Smallwood (2004), clients have to accept that there is an H&S premium to pay in the cost of construction. To date, few clients have explicit policies for the financing of H&S in construction. In as much as contractors are being asked to raise their level of commitment, clients, as well, must be seen to be more committed. A study conducted by Smallwood (2004) revealed that most project managers in South Africa indicated that H&S will be enhanced if the client provides a sum for it, both to remove H&S from the competition between bidding organisations and, obviously, as a way in which the client can contribute. Clients are not investing as much in H&S as contracting organisations are being required to do, and this, as stated earlier, can be cited as one of the barriers to H&S implementation.

1.5 STAKEHOLDER PARTICIPATION

As observed in the last section, it is not possible to achieve the goal of having an industry with a better H&S if what are seen are fragmented efforts by different institutions and organizations. The complexity of our society has necessitated the emergence of many institutions, either by design or because of the increasing need to meet new challenges. Usually, they are reactive actions in response to problems as they arise. Ridley (1995) points out that the structures develop or evolve as society develops and more needs arise to regulate what happens. The problem with this is that there is a danger of organisations later existing in isolation, as more functions become stereotyped into rigid and often exclusive sub-organisations. In order to meet basic health needs on construction sites, it is imperative that all participants cooperate. Management and workers, designers and clients all need to be alert to potential H&S risks (Gould and Joyce 2002). The industry as a whole, rather than separate entities need to strive together for the successful implementation of H&S. A multi-stakeholder approach is advocated by many researchers inter alia, Rwelamila and Smallwood (1999), who maintain that the project manager should understand that H&S is not only the responsibility of the contractor, but of designers and all project stakeholders. Coble and Haupt (1999) also rightly point out that the way to address poor H&S

performance in construction is to require cooperation at all levels and in all forms. However, this requires the combination of limited resources with a shared resolve and purpose.

Stakeholder participation calls for a wider participation from all parties. The responsibility of ensuring that H&S is implemented rests with every one, starting with the government and the people that actually initiate projects. Coble and Haupt (1999) maintain that H&S implementation must also be accompanied by commitment from all construction project clients, all levels of management, and a reciprocal commitment by construction workers.

1.6 RESEARCH

The study was quantitative and was aimed at determining the underlying construct regarding awareness and the implementation of H&S.

Questionnaires were developed and delivered to building construction sites and respondents were requested to complete them. Checklists were also used to collect information obtained from observations. Lists of behaviours, artifacts, or elements were prepared. A check was made against this list if the item was found to be present, exhibited, or true.

Primary data that was obtained through questionnaires and physical observations by using checklists was analysed and interpreted relative to secondary data obtained from the literature review. From observations and responses, inferences were drawn about the larger, and general practices in the industry. Scores were also computed for responses to certain questions to establish the order of importance or severity. This was done by adding up multiples of the opinion and the number of contractors that were of the particular opinion, using a 'weighted' mark.

Table 1: Basis for computation of opinion marks.

Opinion	Mark
Very important	25
Important	20
Fairly important	15
Slightly important	10
Not important	5

1.6.1 The sample stratum

A pilot study was conducted before the primary study and it was determined that there were about 47 building construction sites in and around Gaborone. It is recommended that, for small populations of less than 100, there is little point in sampling (Leady and Ormrod 2001:221). Given this recommendation the entire sample stratum was surveyed and based upon an estimated response rate of 50% to 70%, it was determined that at least 21 building contractors would respond.

A sample of 40 contractors was realised. Each category contributed 8 contractors. The only exception was the lowest category because there were only 5 building construction sites at the time. 3 more construction sites were randomly selected for the survey. In total, 40 questionnaires were distributed to building contractors. 25 questionnaires were completed, which equates to a response rate of 62.5% (Table 2).

Table 2: Response rates per contractor category.

Category	Value (Pula)	Questionnaires distributed (No.)	Response (No.)	Response rate (%)
OC	< 500 000	5	1	20.0
A	> 500 000 < 1 000 000	8	3	37.5
B	> 1 000 000 < 4 000 000	8	8	100.0
C	> 4 000 000 < 10 000 000	8	6	75.0
D & E	> 10 000 000	11	7	63.6
Total		40	25	62.5

1.7 FINDINGS

1.7.1 H&S awareness

Findings from physical observations on construction sites lead to the conclusion that the level of awareness is low. Observations indicated that on 69.6% of sites, slightly less than half of the workers were wearing hard hats in areas that required them. On 96% of the sites, workers were not wearing eye protection while working with power tools. On 91.3% of the sites, workers were carrying sharp tools or materials without wearing the requisite gloves. Scaffolding without fall restraint or toe boards to protect against falling objects was observed on a similar percentage of sites. These observations provided an indication of the level of H&S in the industry, which effectively is the responsibility of all stakeholders.

The level of awareness can also be gauged based upon the audits and inspections that are conducted by contractors, clients, and designers. Table 3 indicates that 32% of the respondents said that their management conducted inspections. As inspections are part of procedures, policies, and programs, the 28% affirmative response to procedures and 20% affirmative response relative to H&S policies is, inconsistent with the response relative to inspections. If inspections are undertaken at all, why is it that the physical observations indicate that management inspections are virtually non-existent. As observed earlier on, 91.3% of the 40 sites, slightly less than half of the workers were wearing hard hats whilst working in areas requiring them to do so, and almost all of the 40 sites had no protection against persons and objects falling from heights. 96% of the sites had workers working with power tools without guarding. This is deemed to be a contradiction and it can be concluded that inspections are generally not undertaken.

Table 3: Frequency of audits and inspections by all stakeholders.

Entity	Response (%)				
	Never	Rarely	Sometimes	Often	Always
Contractor top management	40.0	36.0	0.0	20.0	4.0
Client	56.0	28.0	8.0	8.0	0.0
Supervising consultants	52.0	20.0	16.0	12.0	0.0
Factories Inspector	56.0	32.0	8.0	4.0	0.0
Civil organisations	84.0	4.0	8.0	4.0	0.0

Similarly, the purpose of conducting audits and inspections in an H&S-aware environment is to observe and record risk-taking behaviour, and to use the findings to mitigate or prevent future occurrences of such behaviour. However, only 16% of the respondents stated that their organisations observed and recorded risk-taking behaviour on construction sites (Table 4). This further reinforces the conclusion that the level of H&S awareness is low. Essentially, endeavours to prevent accidents, incidents, and occupational diseases are not taken.

Table 4: Recording of risky behaviours on sites.

Response	(%)
Yes	16.0
No	68.0
Unsure	4.0

No response	12.0
Total	100.0

The level of H&S awareness can also be assessed in terms of whether H&S is a major agenda item during client progress meetings. Only 28% of respondents said that it was, and 72% that it was not (Table 5).

Table 5: H&S in client progress meetings.

Response	(%)
Yes	28.0
No	72.0
Unsure	0.0
Total	100.0

1.7.2 Implementation of H&S

1.7.2.1 Legislation

The implementation of H&S entails implementing the requirements of legislation, namely standards as well as systems, procedures, and protocol. During the research, 32% of the respondents indicated that their organisations were registered with the Department of Labour and 44% of the respondents were unsure. This response can possibly be attributed to the fact that the respondents were line managers based on sites and some of them probably did not have access to information at top management level. However, legislation requires that a copy of the registration certificate be retained in a file on site. Therefore, the expected response should only have been 'Yes' or 'No'. The 44% of respondents that were not sure could then be considered to not have registered with the Department of Labour. Therefore, it can be concluded that legislation is not adequately implemented. The reporting of serious injuries as required by law further reinforces the conclusion that H&S legislation is not implemented. When asked whether serious injuries that caused a worker to be absent from work for at least three days had occurred on their sites, 48% of the respondents responded in the affirmative. However, findings indicate that only 16.7% of the 48% said that they had reported these cases to the Department of Labour. With respect to the retaining of a copy of the Factories Act on site, 52% of respondents said 'Yes', 23% 'No' and 16% were 'Unsure'. Of the 52% that said 'Yes', only 23% indicated that they had displayed a copy of the Factories Act in a prominent place on site. However, physical observations revealed that only one contractor, representing about 2.5% of the 40 sites, had displayed the Act. This indicates untruthfulness on the part of respondents even though it was clear that the Act was not displayed on sites. However, the 23% response is also an indication of what the general practices in construction are. Results of the physical investigations conducted reveal that all health, safety, and welfare provisions of the Act are not adhered to.

The Factories Inspectorate rarely or never conducted inspections. 80% of the respondents said that, despite the requirement of the Act, the Inspector of Factories had never visited their construction sites. In fact, this is consistent with the percentages relative to rarely or never conducted inspections, which equates to 88% when the percentages for those responding rarely and never are combined. These results confirm that H&S legislation is not being implemented.

1.7.2.2 Procedures, Protocol and systems

From a management perspective, it would appear that there is limited effort relative to the implementation of H&S. Protocol relative to the implementation of H&S appears to be non-existent. From the contractor's perspective, H&S policies, programs, meetings, procedures, H&S representatives, and documented work procedures are almost non-existent (Table 6). On average, 19.3% of respondents stated that they had H&S policies, programs, meetings, representatives, and documented work procedures, 62.7% stated that they did not have, and 15% did not respond to the question. It is argued that if the aforementioned existed or took place, all employees would be aware thereof. In essence, the 15% unsure response equates to non-existence and non-occurrence. However, if they genuinely were unsure, then it can be concluded that certain documents were available, but had not been communicated and used, and that there is a general problem in terms of communication from management. Literature informs that without protocol or a system of rules governing the implementation of H&S, it is unlikely that efforts directed towards the implementation of H&S will be successful.

Table 6: Existence of H&S programme elements.

Element	Response (%)			
	Yes	No	Unsure	No response
H&S policy	20.0	64.0	4.0	12.0
H&S procedures	28.0	60.0	0.0	12.0
H&S programs	4.0	64.0	8.0	24.0
H&S meeting	20.0	64.0	0.0	16.0
H&S representatives	12.0	68.0	4.0	16.0
Documented work procedures	32.0	56.0	0.0	12.0
Average	19.3	62.7	2.6	15.0

According to literature, the implementation of H&S entails putting into effect the minimum standards for the wellness of the employee. It includes, inter alia, implementing the legislative requirements, having an H&S management system, procedures and protocol, and a coordinated effort from all stakeholders. The survey results shown in Table 3 revealed that clients never conducted H&S audits and inspections on 56% of projects. 28% of respondents said that their clients rarely conducted H&S audits and inspections – there was no response relative to always. Similarly, 52% of respondents stated that their supervising consultants, i.e. designers, never conducted audits and inspections, 20% rarely 16% sometimes. There was no response relative to always. This means that to the designers or supervising consultants, H&S is not important enough to warrant monitoring. With respect to the Factories Inspector, 56% of respondents said that no such inspections and audits have ever been conducted, and 32% rarely. Given the aforementioned, it can be concluded that the contribution by non-contractor stakeholders such as clients, designers, and the Factories Inspectorate is virtually non-existent. Such stakeholder input and commitment is cardinal and essential to the implementation of H&S. The respondents' ratings of the perceived importance of H&S to clients reveal the extent to which clients are committed to the implementation of H&S. Relative to cost, time, quality, and avoiding litigation, clients view H&S to be the least important aspect on a construction project (Table 7).

Table 7: Perceived importance of H&S according to clients.

Aspect	Score
Remaining within budget	590
Contract period	565

Quality	555
Avoiding litigation	515
H&S	270

Responses relative to whether H&S was a major agenda item on the agenda of client progress meetings (Table 5) validates the perception rating - almost 72% of the respondents said that H&S was not a major agenda item. Client progress meetings are an important event during a project for this is the forum where progress is evaluated and problems on site are discussed. If clients were committed to the implementation of H&S, it would most certainly have been an agenda item. Standard contract documentation also does not reflect commitment by designers and clients to H&S. Although 70% of the respondents said that H&S was addressed in contracts, only 8% indicated that it was extensively addressed. On average, 26% said it was not, slightly, or fairly addressed.

1.8 CONCLUSIONS

Relative to the level of H&S awareness and implementation of H&S in Botswana's construction industry, it can be concluded that:

- The level of H&S awareness is low;
- The implementation of H&S is inadequate;
- The implementation of legislation is inadequate;
- Non-contractor stakeholders in the form of clients and designers, are not committed to the implementation H&S;
- Accidents have occurred and risk-taking behaviour is prevalent;
- Contractors' management commitment is inadequate;
- H&S management systems do not exist in many organisations, and
- Procedures and protocol are inadequate for the implementation of H&S.

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1.9 RECOMMENDATIONS

In addition to the amendment of legislation to include multi-stakeholder responsibility for H&S to promote awareness and implementation of H&S, the socio-economic aspect should also be considered. In this study, respondents indicated that financial provision for H&S would greatly contribute to the improvement of H&S implementation. Many contractors currently face diminished incentives to allow for H&S in their tenders.

It is also recommended that contracts should address H&S just as they do quality and cost. This will help many contractors, as both contractors and designers will be required to address H&S during the execution of projects. Botswana's construction industry is highly populated with small and medium size contractors, which, in most cases, have no or limited capacity to address H&S. Management systems and procedures may be too much to expect from them. It is recommended that clients appoint H&S consultants to ensure the implementation of H&S by integrating the activities of contractors, designers, and clients. It is further recommended that collaboration between the Department of Labour, clients, designers, and contractors be enhanced as the institutions are already in place. This would obtain good results even from small and especially emerging and empowered contractors who may not have capacity at the moment.

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