

RELATIVE IMPORTANCE OF HEALTH & SAFETY PERFORMANCE EVALUATION FACTORS IN ORGANISATION LEVEL WITHIN GAUTENG CONSTRUCTION INDUSTRY

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Improvement of construction health and safety (H&S) is supported by continual performance monitoring and review. To achieve this, the relative importance of H&S performance factors (HSPF) was examined through a questionnaire survey conducted in Gauteng, South Africa. The survey research was expedited among purposively selected construction professionals who are conversant with H&S matters in construction firms. The results reveals that the relative important index include ensuring that H&S is a line-management responsibility, which is known and accepted at all levels of organization management, beyond a clear definition of responsibilities at various organizational levels, the study support the perception that communication, and accountability constitute significant H&S enabler in a construction organization. These factors are crucial to promote cooperation and improved performance regarding H&S. The results of the questionnaire survey could be used to develop a framework suitable for evaluating the H&S performance.

Keywords: Construction, Health & safety, Performance, Gauteng

1. INTRODUCTION

In a market-driven society, it is common for construction stakeholders, especially those at the lower end of the supply chain, to concentrate exclusively on completing projects to the required quality standard with the minimum time and cost with limited priority place upon H&S outcomes (Ng, Cheng and Skitmore, 2005). The lack of motivation in fostering an H&S culture at both organisational and project levels has resulted in a poor record (Harper and Koehn, 2007; Sawacha, Naoum and Fong, 2009). In view of the importance of Occupational Health and Safety (OHS), countries such as the United Kingdom (UK), Singapore and Hong Kong (HK) have adopted a self-regulatory approach to safety, whereby proprietors (including contractors) are required to develop, implement and maintain safety management systems (Rowlinson, 2007; Harper and Koehn, 2007). In addition to setting out safety objectives and targets in their safety management systems, construction firms need a rational framework for safety performance evaluation (SPE) in order to objectively gauge their effectiveness

in accident prevention over time (Ng, et al 2005). Therefore this study is set out to develop a HSPE framework suitable for use in the construction industry and protocols for evaluating the health and safety performance.

2. LITERATURE REVIEW

Considering the adverse impacts of accidents, construction safety management is of genuine concern to all stakeholders in the construction industry. Government, unions and insurers have spent a great deal of time and effort attempting to evolve legislation, rules and regulations to help reduce the large loss of life and limbs, and the high number of "lost-work days" (Goldsmith, 2007). In USA, the practice of safety in construction is regulated by governmental agencies such as the Occupational Safety and Health Administration (OSHA), which provides strict rules and regulations to enforce safety and health standards on job sites. However, legislation alone cannot reduce accident rates unless craftsmen and management take positive actions to integrate these rules into their everyday activities by implementing a safety management programme. Safety management is an approach aimed at removing or minimizing the forces, which cause losses through injured workers, or damaged equipment and facilities (Kin Dorji and Bonaventura, 2006). In South Africa, the construction industry contributes greatly to the statistics of employee injuries and deaths and this can be linked to negligence in the workplace, lack of education to employers, not taking the industry health and safety legislation serious (ignorance) non-compliance, failure to implement health and safety measures, and other factors, resulting in accidents (Construction Industry Development Board (CIDB), 2009). These accidents cost the industry a lot of money because these injuries must be treated, productivity slows down due to shortage of personnel, the injured

2.1 SAFETY MANAGEMENT SYSTEM

Construction site H&S problems are preventable and should be prevented (Hinze, 2006). The international labor organisation ILO (2010) notes that improving H&S of construction workers could be achieved through well-coordinated efforts of society. Hughes and Ferrett (2010) also maintain that effective management of worker's H&S depend on promoting healthy workplace culture that demands worker and employer participation. Thus, any successful H&S programme requires strong management commitment and visible leadership. Flin (2003), Gambatese (2008) and Lutchman, Maharaj and Ghanem (2012) contend that management commitment, involvement and participation are pre-requisite for promoting and sustaining a positive construction site H&S performance. Lutchman et al.(2012) argue that management commitment to and involvement in workers' health correlate with the degree to which construction firm identifies H&S as a core business value or guiding principle. According to the ILO (2008), effective management of workers' health requires budgeting adequate resources for occupational health and services and incorporating workers' health in the training of primary health care practitioners and professionals.

A successful health programme on any job starts from the owner, who must hire safer contractors (Behm, 2005; Gambatese, 2008). They can do this by pre-qualifying contractors on H&S performance competencies. Oloke (2010) argues that construction H&S governance and H&S culture begins with client's organisation. The client who controls resources and project team should require that the contractors must adhere to H&S regulations and job site H&S programmes. Gambatese (2008) points out that the safety-conscious client must aggressively oversee the implementation of these

programmes on site. Contractors H&S management and leadership are very crucial in promoting and sustaining workers' health (Howarth and Watson, 2009). Management commitment to workers' health is reflected through the leaders that inspire, stimulate, involve and participate in H&S matters. Similarly, many H&S scholars have acknowledged the importance of management commitment to and active involvement in the improvement of construction workers' health (Flin, 2003; Lutchman et al, 2012). For these reasons, a proven H&S management systems and culture is imperative in contracting organisations. Howarth and Watson (2009) point out that it is important that contractors systematically plan and organise construction sites activities that could not place workers at risk from the source. Spangenberg (2009) opines that involvement and participation of workers in site H&S management have also been found beneficial to both management and workers.

2.2 SAFETY POLICY

A health and safety policy is a written statement of principles and goals embodying the company's commitment to workplace health and safety. (Kin Dorji and Bonaventura, 2006). It demonstrates top management's commitment to ensure safe working methods and environment at the construction sites. Koehn et al. (1995) states that in order to reduce financial risk, management support for safety programmes in both developed and developing countries should be considered as an economic necessity since accidents had proved quite costly to the contractor. This is in addition to the ethical and professional responsibility of the management for providing a safe work site for all employees. Sawacha et al. (2009) also stresses the importance of management's viability and participation in achieving successful safety performance.

2.3 ORGANIZING

One of the essential elements of the safety management is the designation of individual with responsibilities and accountabilities in the implementation of the construction safety programme and plan. The organization should demonstrate how accountabilities are fixed, how policy implementation is to be monitored, how safety committees and safety representatives are to function, and how individual job descriptions should reflect health and safety responsibilities and associated accountabilities (Stranks, 2010). As such, in order for the safety policy to be effective, both management and employees have to be actively involved and committed (Holt, 2001). In the research finding of Sawacha et al. (2009), it indicates that having a well-trained safety representative on site can improve safety performance by undertaking fault spotting and insisting on corrective action being taken. Also having full-time safety personnel will somewhat relieve the pressure on the on-site construction project team (Koehn et al. 1995). Sawacha et al. (2009) further indicates that companies with effective safety committees are more likely to take steps that improve safety performance than those without. This means that safety committees can play a positive role in the improvement of safety performance. In UK, the Safety Representatives and Safety Committees Regulations 1977 which was implemented by the HSC, describes the appointment and functions of safety representatives and the establishment of safety committees (Davies and Tomasin, 2006). Similarly, in USA the OSHA standards for the construction industry had listed the necessary requirements for a minimum standard of safety and health (Koehn et al. 1995). The committee is empowered to research, discuss, coordinate and make suggestions related to labour safety affairs at the job site.

2.4 PLANNING AND IMPLEMENTATION

Planning is a critical area in the control and enforcement of a safety program (Goldsmith, 2007). It is a process that prepares, creates, implements and monitors the safety programme, thereby addressing the workplace health and safety through an organized, step-by-step strategy (Kin Dorji and Bonaventura, 2006). Planning starts with the company's written health and safety policy. It ensures that health and safety efforts of all job-site personnel really work by designing a programme that translates policy into practice. Planning, as such, entails identifying the objectives and targets which are attainable and relevant, setting performance standards for management, considering and controlling risks to all employees and to other people who may be affected by the organization's activities, and ensuring documentation of all performance standards (Holt, 2001). The safety and health programme covers a range of general safety procedures and practices. Some of them are safety training, safety meeting, safety inspection, accident investigation and reporting, job hazard analysis and control, safety promotion, and personal protective equipment (PPE), etc.

2.5 MEASURING HEALTH & SAFETY PERFORMANCES

Safety performance measures are used primarily for comparisons among companies and supervisors. In addition, they are also used as a means for pinpointing problem areas (Levitt and Samelson, 2007). Also according to Laufer and Ledbetter (2006), a key factor in the control and improvement of any performance aspect on site is the ability to measure the performances. Measuring health & safety performances is important to check the effectiveness of various training methods and it also serves as an instrument in choosing a contractor. There are various methods of measuring the safety performances. Some of the common methods are experience modification rating (EMR), accident costs, frequency rate, behaviour-based safety and OSHA-recordable incidence rates (Kin Dorji and Bonaventura, 2006).

3. RESEARCH METHODOLOGY

To devise a rational framework for HSPE necessitates the establishment of the importance of Health & Safety factors in an objective manner as possible. A questionnaire survey was chosen as an appropriate means for soliciting views of various project participants within a relatively short period of time. A questionnaire is defined as a formalized set of questions for obtaining information from respondents. The overriding objective is to translate the researcher's information needs into a set of specific questions that respondents are willing and able to answer (Okorafor, Talukhaba and Okumbe, 2015). A questionnaire is the main means of collecting quantitative primary data (Malhotra, 2011). A questionnaire enables quantitative data to be collected in a standardized way so that the data are internally consistent and coherent for analysis. In all cases the role of the questionnaire is to provide a standardized interview across all subjects. This is so that when the questions are asked or presented, it is always in exactly the same way (Brace, 2013). To avoid a plethora of different responses that could be saying the same thing put in hundred different ways, questionnaires were thought to be the best tool to provide standard responses that could easily be analysed (Okorafor, et al., 2015). The questionnaire consists of two sections: the first section was designed to get information about personal data of the respondents to depict their profile that may let them have experience on issues relating to occupational health and safety in construction process the second section

focuses on prioritising (by rank ordering) the main factors pertinent to health & safety performance at the organisational and project levels. The questionnaire was piloted by experts in construction safety to test the suitability of the main and sub-factors for HSPE and the format of the questionnaire which makes the research a mixed method approach. When selecting the sample for the main study, a mix of construction participants with different background was randomly sampled to minimise the possibility of bias. As a result, five main categories of construction stakeholders were involved: (i) Clients; (ii) Architects; (iii) Engineers; (iv) Quantity surveyors; (v) Contractors including main contractors and sub-contractors; One hundred (100) structured questionnaires were administered to the practitioners in the industry that are involved in construction process. The views of the respondents were assess by using likert scale to measure the relative importance index of health & safety performance evaluation in the construction processes and a total of forty nine (49) questionnaire were returned and found useful which amounts to a return rate of 49% which is considered adequate against the norms within the industry. The response rate achieved for this research is similar to that achieved in other surveys (Sutrisna, 2009; Okorie, Emuze and Smallwood, 2015). It could be inferred from Sutrisna (2009) and Danity (2008) that performing a statistical analysis in survey within the response rate equal to or above the threshold of thirty (30) is acceptable. Thus 49% response rate achieved in this survey provides reasonable data for analysis. The data collected were analysed with the use of mean percentage and Mean item score (MIS).

4 Findings and Discussions

The professional categories of respondents were made up of 6% of client, 6% of architects, 18% of engineers, 18% of quantity surveyors, 39% of construction manager and 13% were contractor as depicted in Table 1.

Table 1: Distribution of the professionals who responded to the questionnaire

PROFFESIONAL	NUMBERS	PERCENTAGE
Client	3	6%
Architect	3	6%
Engineers	9	18%
Quantity Surveyor	9	18%
Construction Manager	19	39%
Contractor	6	13%

An important feature in understanding the health and safety performance evaluation is the experience within the construction industry. Table 2 suggests that majority of the respondents had reasonable working experience within the industry to contribute effectively to the study. Over 78% of respondents had over 5years in construction industry, 32% of whom had over 15 years of experience working in the industry.

Table 2: Years of working experience the respondents have in construction.

YEARS OF EXPERIENCE	FREQUENCY	PERCENTAGE
0<5	11	22%
6<10	9	18%
11<15	13	28%

16<20	12	24%
>21	4	8%

IDENTIFYING AND RATING OF RELATIVE IMPORTANCE OF HEALTH & SAFETY FACTORS AT ORGANISATIONAL LEVEL IN GAUTENG CONSTRUCTION INDUSTRY

The results of the study (table 3) indicate what the respondents perceive to be rating of relative importance index of health and safety factors at organisational level within the Gauteng construction industry.

A five point Likert scale was used to determine the causes of construction accident and so on with regards to the identified factors from the reviewed literature. The adopted scale is as follows; 1= Most not important, 2= Not important, 3= Neutral, 4= Important and 5= Most important. The five-point scale was transformed to mean item score (MIS) for each of the factors of causes as assessed by the respondents. The indices were then used to determine the rank of each item. The ranking made it possible to cross compare the relative importance of the items as perceived by the respondents. The MIS was based on the previous studies conducted by Aibinu and Jagboro, (2002) and Ayodele and Alabi(2011). This method was also used to analyze the data collection from the questionnaires survey. The computation of the relative mean item score (MIS) was calculated from the total of all weighted responses and then relating it to the total responses on a particular aspect. This was based on the principle that respondents’ scores on all the selected criteria, considered together, are the empirically determined indices of relative importance.

The index of MIS of a particular factor is the sum of the respondents’ actual scores (on the 5-point scale) given by all the respondents’ as a proportion of the sum of all maximum possible scores on the 5-point scale that all the respondents could give to that criterion. Weighting were assigned to each responses ranging from one to five for the responses of ‘Most not important’to ‘Most important’. This is expressed mathematically below. The mean item score (MIS) was calculated for each item as follows, after Lim & Alum (2015)

$$MIS = \frac{1a + 2a + 3a + 4a + 5a}{\sum(N)} \text{-----equation 1}$$

Where;

- n1 = number of respondents foremost not important;
- n2 = number of respondents for not important;
- n3 = number of respondents for neutral;
- n4 = number of respondents for important;
- n5 = number of respondents foremost important;
- N = Total number of respondents

Following the mathematical computations, the criteria are then ranked in descending order of their mean item score (from the highest to the lowest).

Table3: Findings: The table below ranks the relative important index of health & safety performance evaluation factors in Gauteng Construction industry.

HSPE FACTORS	MEAN ITEM SCORE	RANKING
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Ensure that OSH is a line-management responsibility which is known and accepted at all levels;	4.77	1
Define and communicate to the members of the organization the responsibility, accountability and authority of persons who identify, evaluate or control OSH hazards and risks.	4.32	2
Lists qualifying requirements for eligible contractors with a view to ensuring that bidders are restricted to those whose past performance demonstrates care, competence and safety.	4.08	3
promote cooperation and communication among members of the organization, including workers and their representatives, to implement the elements of the organization's OSH management system;	3.86	4
Establish effective arrangements to identify and eliminate or control work-related hazards and risks, and promote health at work;	3.78	5
Potential contractors must be required to prepare and submit an acceptable project hazard identification plan.	3.66	6
Potential contractors must be required to prepare and submit an acceptable project hazard prevention plan.	3.54	7
Ensure effective arrangements for the full participation of workers and their representatives in the fulfillment of the OSH policy	3.49	8
Establish and implement a clear OSH policy and measurable objectives;	3.33	9
Employers must identify all hazards including new hazard at work and find out if they are significant hazards	3.31	10
If any injury happens, however slight, it must be investigated to see if it was caused by a significant hazard	3.29	11
Definition of health & safety responsibility and development of in – house health & safety rules	3.27	12
Incorporation of safety requirement in subcontractor 'selection	3.19	13
Establish prevention and health promotion programmes;	3.16	14

Provision of safety induction and performance monitoring	3.11	15
provide effective supervision, as necessary, to ensure the protection of workers 'safety and health;	3.02	16
Defines supervisory and employee safety training,	2.90	17
identifies specific published safety standards and hazard prevention requirements,	2.77	18
Fulfill the principles of OSH management systems contained in relevant national guidelines, tailored guidelines or voluntary programmes, as appropriate, to which the organization subscribes;	2.58	19
Implementation of safety management system in accordance with legislation	2.46	20

5 Discussion of findings

Respondents were asked to rate the relative importance index of health & safety performance evaluation factors in the gauteng construction industry. Based on the ranking of the weighted average from the mean item score (MIS) for the listed factors (Table 3), it was observed that the dominant HSPE factors in Gauteng construction industry is Ensuring that OSH is a line-management responsibility which is known and accepted at all levels; with MIS of 4.77 ranking 1st, Define and communicate to the members of the organization the responsibility, accountability and authority of persons who identify, evaluate or control OSH hazards and risks. with MIS of 4.32 ranking 2nd, Lists qualifying requirements for eligible contractors with a view to ensuring that bidders are restricted to those whose past performance demonstrates care, competence and safety. with of MIS of 4.08 ranked 3rd, promote cooperation and communication among members of the organization, including workers and their representatives, to implement the elements of the organization's OSH management system; with MIS of 3.86 ranking 4th. Establish effective arrangements to identify and eliminate or control work-related hazards and risks, and promote health at work; with MIS of 3.78 ranked 5th. There is evidence that construction stakeholders have pivotal roles to play in protecting and preventing workplace hazards. The law empowered clients and their project consultants to pre-qualify contractors on H&S performance competencies and oversee the implementation of H&S plan on site. Client poor leadership and a lack of commitment to industry stakeholders H&S manifest through: contractors are not pre-qualified on HSPE factors, inadequate provision of financial resources for H&S, and poor supervision of project H&S plan on site. The consequences of these poor leadership and lack of commitment by clients and their project consultants result in high accident rate. The poor leadership and lack of commitment to workers' H&S by construction industry stakeholders are confirmed in the literature; Gambatese (2008) ; Lutchman, Maharaj and Ghanem (2012) ; Hughes and Ferrett (2010) and ILO (2010).

6 CONCLUSIONS

Based on the study reported there is a need for the construction professional to put in concerted effort in checkmating accident in the industry, factors such as ensuring that OSH is a line-management responsibility which is known and accepted at all levels; define and communicate to the members of the organization the responsibility, accountability and authority of persons who identify, evaluate or control OSH hazards and risks; lists qualifying requirements for eligible contractors with a view to ensuring that bidders are restricted to those whose past performance demonstrates care, competence and safety; promote cooperation and communication among members of the organization, including workers and their representatives, to implement the elements of the organization's OSH management system; establish effective arrangements to identify and eliminate or control work-related hazards and risks, and promote health at work; top the list. As such adequate attention should be given in that regards, so as to minimize the rate of accident in the industry. This would probably lead to the development of a mechanism for the management of such factors, thereby reducing the fatality rate within the industry. It is expected that this study would provide the much needed framework which would contribute in no small measure in engendering the enthronement of best practices across board and also leads to the establishment of robust OHS culture to deal with the challenging issues.

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