

Exploring the Impact of Team Members' Behaviours on Accident Causation within Construction Projects

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Abstract

The South Africa Construction Regulations recognise the contributions of each member of a project team to health and safety (H&S) improvement. Notably, the regulations mandate the propagation of certain behavioural traits from clients, designers, project managers, quantity surveyors and contractors involved in project execution so as to improve construction H&S performance in the industry. This paper therefore reports on a study that explored the impact of H&S leadership styles and behaviours of these key project participants in terms of accidents and injury causation. A structured questionnaire, which was designed to obtain information on H&S contributions of these key project participants, was used for data collection. The resultant descriptive and inferential statistics shows that clients' and their consultants' and contractors' H&S leadership styles and behaviours have a significant influence on construction H&S performance in South Africa. However, it was also noted that unethical behaviour found in clients organisation in terms of procurement process and contract award to contractors without adequate H&S records and competencies have a serious challenge to the improvement of H&S performance in the industry. It was also observed that H&S is often not designed into project, project H&S plans are not integrated, while no or little financial provision is made for site H&S management. Overall these suggest trend towards poor leadership styles and behaviour in construction. The study therefore recommends that clients, consultants and contractors should demonstrate visible leadership and commitment towards projects H&S particularly during the early planning stages for improvement and sustainability of workplace H&S culture.

Keywords:

Behaviour, Construction, Health and Safety, Leadership, South Africa

1 Introduction

Accident and fatality statistics in the construction sector all over the world have remained roughly the same since the early 1990s (Brauer, 2006; Sherratt and Farrel, 2012). It has also been observed that H&S related legislation, regulations, and management systems are not enough to further improve construction H&S performance. According to Lees and Austin (2011), the typical top-down control approaches to H&S management and rules enforcement no longer achieves the desired results. Nevertheless, H&S legislation, regulations and management systems have brought success to accident and injury prevention in the workplaces (cidb, 2009). Lees and Austin (2011) further argue that such successes are limited as workplace accidents are on-going.

Lutchman, Maharaji and Ghanem (2012) maintain that inadequacies in rule enforcement and management oversights have led to the search for better ways of managing construction H&S. Sherratt and Farrel (2012) and Lutchman *et al.* (2012) argue that understanding human dynamics or behaviours in relation to industrial H&S is better than focussing on legislation,

regulations and H&S management systems. In addition, the behavioural science approach to H&S management according to Krause (1997) postulated that behaviour change will lead to the expected change in attitude. Lutchman *et al.* (2012) point out that the behaviour-based H&S management concept was developed on the premise that workplace H&S can be better managed by understanding human behaviour. Sherratt and Farrel (2012) elucidate that behaviour-based H&S is proactive, objective, and fosters problem-solving perspectives by identifying human behaviours as it relates to the root causes of workplace accidents, and then analyses the problems before they occur.

Krause (2003) maintains that to achieve long-term change in H&S related performance, it is necessary to examine the behaviours and leadership styles exhibited by the key project participants. In support of the relationship between project teams' behaviours and positive workplace H&S outcomes, Wu and Fang (2012) state that behaviour-based H&S management systems are likely to have their greatest impact if directed upwards (key project teams). On this note, Lutchman *et al.* (2012) maintain that it is participants' behaviours and their leadership styles that are critical in creating and sustaining a positive H&S culture in an organisation

Globally, industry leaders are calling for prudent approaches to reduce the levels of workplace fatalities and injuries. Economic and social impacts of construction site accidents and incidents around the world have added more voice to this call. Flin and Yule (2003) affirm that the ultimate success of H&S performance in any organisation is largely dependent upon the quality of leadership. Therefore, the underlying theme to improving H&S performance in the South African construction industry is the leadership quality and commitment, which must cascade or permeate across all the key project leaders in the construction project delivery chain. Therefore, examining the key project participants' leadership styles and behaviours relative to project H&S will help in understanding the root causes of site accidents and incidents. This study therefore seeks to examine how leadership styles and behaviours of the key project participants contribute to accidents and injuries causation in the South African construction industry.

2. Literature Review

2.1 Leadership styles and H&S behaviour of key projects leaders/participants

Concern about poor construction site H&S performance has tended to focus attention exclusively on unsafe behaviours and unsafe acts of workers in the form of mistakes, omissions, and violation of rules (Krause, 1997). At-risk work practices or unsafe behaviours may be connected as site workers are always in the front line of physical on-site activities. According to Krause (2003), workers' activities at operational levels exposed them to the proximal cause of adverse events. Behaviours related to distant causal factors such as clients poor H&S leadership styles and behaviour (Lutchman *et al.*, 2012) and project related H&S behaviours of consultants such as designers, project managers, quantity surveyors (cidb, 2009) and contractors' poor H&S management and leadership styles at all levels (Hopkins, 2007) precipitate the at-risk behaviours of workers on site.

Flin and Yule (2003) noted that much emphasis on workers' unsafe behaviours were at the expense of good designs and related critical H&S leadership styles of the key project participants' and contractors' H&S management systems at all levels. Stressing the importance of leadership and behaviour of the key project participant for effective H&S management, Geller (2008) asserts that the key project participants have important roles to play in improving construction sites H&S performance.

2.1.1 Clients' H&S leadership roles and behaviour

The clients as the owner of projects have a substantial influence on the way in which a project is runs (cidb, 2009). Oloke (2010) asserts that the governance of any project begins and ends with the clients. Clients' H&S leadership roles and behaviour at the early projects stage are critical factors for effective H&S management. According to Behm (2005), clients have pivotal leadership roles in improving construction H&S particularly decisions made at the early project planning phase through the appointment of the design team, contractors' selection and provision of financial resources for H&S matters.

The strong link between effective leadership and positive H&S outcome, found outside construction, underpins the assertion that improvement and sustainability of workplace H&S culture rest squarely on clients' visible leadership and behaviour. Ironically, in the developing countries, clients lack of visible leadership; unethical behaviours and non-adherence to the procurement process have been found to be contributing to poor H&S performance in the industry (cidb, 2011).

2.1.2 Designers' H&S leadership roles and Behaviour

Haupt (2011) argues that the thrust of designing for H&S into projects lead to a reduction of site accidents and incidents. Behm (2006) states that designers (architects/engineers) have a duty and responsibility to design-in safety into construction during the design process. He further states that designers can use their knowledge and influence to design-in safety features that will improve the actual construction of the projects, as well as its maintenance after completion. However, it has been found that designers lack in integrity and commitment in their designs decisions and the consequences have been site accidents and incidents

Oloke (2010) emphasises that those involved with the designing and planning of construction projects should demonstrate visible leadership and commitment from the inception stage to construction and maintenance. Designers should recognise their important roles concerning human lives as demanded by their professional codes of conduct by exercising due diligent and care when designing.

2.1.3 Project managers' roles leadership and behaviour

Project managers, in terms of their contractual relationship with clients have important leadership roles to play in ensuring that construction projects achieve the desired quality including workers' H&S from inception stage to completion (cidb, 2009). Research conducted by Smallwood and Venter (2002) among member practices of the Association of Construction Project Managers (ACPM) in South Africa indicated that project managers can contribute to optimal H&S performance in the industry.

Project managers as project leaders can influence construction H&S performance during the project design stage. The Project Management Body of Knowledge (PMBOK) identifies project managers' roles that can influence projects H&S performance: facilitation of financial provision for H&S; pre-qualification of contractors on H&S, and integrating H&S into projects. The above identified scopes of work placed important leadership roles on the shoulders of project managers relative to projects H&S management. In addition, the cidb (2009) reports noted that project managers' leadership roles is more visible on project sites when they monitor contractors' H&S plans, conduct site H&S meetings and visit sites regularly to ensure that contractors conform to projects H&S plans.

2.1.4 Quantity surveyors' leadership roles

Paucity of funds is one of the major factors contributing to contractors' poor site H&S intervention. Inadequate allocation of financial resources for H&S during the early project planning or at the tendering stage by quantity surveyors is one of the major factors contributing to contractors' poor site H&S intervention (Brauer, 2006). However, adequate financial provision for H&S can be realised in the contract documents by quantity surveyors (Olatunji, Sher and Gu, 2011). Arguably, when a contractor compromises workers' H&S due to lack of funds, the resultant effect will be injuries and fatalities on sites.

Prudent management of financial resources on site has been linked to better quality of work and worker's H&S. Lack of commitment in preparation of interim valuations certificates on monthly bases by quantity surveyor could impact negatively on contractors' cash flow which will result in lack of funds for site H&S management.

2.1.5 Contracting organisations' leadership roles and behaviour

Contractors have duties and responsibilities under the law to carry out construction activities without causing harm to workers and the general public. It is the leadership styles at all levels of management in the contracting organisations that determines how construction process will be plan, organise, control, and monitor to ensure that workers' H&S are optimised. Leadership have been noted as the critical factors that drives organisational H&S policy. Hopkins (2007) maintains that achieving and sustaining organisational H&S culture required leadership skills not only management skills. Similarly, Lutchman *et al.* (2012) argue that the implementation of an organisation's H&S policy is largely dependent upon leadership commitment at all levels of management in an organisation.

Leadership according to Flin and Yule (2003), entails transparency, honesty, and trustworthy. However, these leadership qualities found in the Western world are lacking among top management and site managers in the Sub-Sahara Africa countries (Lutchman *et al.*, 2012). Sunindijo and Zou (2012) point out that lack of intelligence and interpersonal skills has been found to negatively impact on site H&S.

Managers are the conduit between management and workers and they shape workers understanding by communicating to them the company's work ethics (Geller, 2008). Studies comparing low and high accident rates on construction sites indicated that on sites where managers demonstrate good quality leaders, a planner, an organiser, and good role model to others such sites have excellent performance in both workers' safety and quality of work (Hinze, 2006). These leadership qualities are lacking among site managers in South Africa, and they impose serious challenge to the improvement of projects H&S performance.

3 Research Methodology

To achieve the objectives of this study, a literature survey was conducted in the areas of construction H&S management and leadership, which resulted in the formulation of structured questionnaires. Questionnaires were distributed to clients, project managers, architects, consulting engineers, quantity surveyors, and site managers. The main purpose of the questionnaire was to explore the influence of H&S leadership and behaviours of the projects team in terms of accidents and injuries causation. One hundred and seventy (170) questionnaires were distributed, seventy-five were returned, and this resulted in a response rate of 44.1%. The response rate achieved for this research is similar to that achieved in other

surveys (Collins, 2008; Sutrisna, 2009). It could be inferred from Sutrisna (2009) and Dainty (2008) that performing statistical analysis of survey data based upon a response rate equal to or above the threshold of thirty (30) is acceptable. Thus, a 44% response rate which was achieved in this survey provides reasonable data for analysis.

3.1 Data analysis and interpretation of findings

The majority of the responses (70%) were received from clients, architects, project managers, quantity surveyors, and site managers. Over 67% of the respondents have been involved in construction for the past 10 years; 70% have tertiary qualifications; 59% hold management positions, and 40% are managing members or principals. A 5-point Likert-scale measurement was used to obtain the opinions of the respondents and to analysis the results. Leedy and Ormrod (2010) maintain that Likert scales are effective to elicit participants’ opinions on various statements. The statistical (version 10.0) was used to generate the descriptive and inferential statistics. When using Likert scales, it is imperative to calculate and report Cronbach’s *alpha* coefficients as well as the internal consistency and reliability (Gliem and Gliem, 2003). Maree and Pietersen (2007) suggest the following guidelines for the interpretation of Cronbach’s *alpha* coefficient: 0.90 – high reliability; 0.80 – moderate reliability, and 0.70 low reliability. The questionnaire survey shows a high reliability Cronbach’s alpha of 0.90.

4 Findings and Discussion

The questionnaire seeks to investigate respondents’ perceptions of the influence of H&S leadership styles and behaviour of the key project participants in terms of accidents and injury causation. Tables 1, 2 and 3 indicate the respondents’ perceptions of the extent to which identified statements relative to key project participants contribute to poor H&S performance. The tables are presented in terms of percentage responses to a scale of 1 (minor) to 5 (major), and an MS ranging between 1.00 and 5.00.

4.1 Clients’ H&S leadership styles and behaviour contributing to poor H&S performance

Table 1 indicates the respondents’ perceptions of the extent to which identified statements of client’s leadership styles and behaviour contribute to poor H&S performance. It is notable that 7 MSs were above the midpoint of 3.00, with an average MS of 3.37. The respondents perceive that all the identified statements relative to clients’ H&S leadership styles and behaviour in Table 1 contribute significantly to poor H&S performance in the South African construction industry. Findings of this study corroborated literature survey; Behm (2005) and Oloke (2011) pointed out the importance of clients’ H&S leadership styles and behaviour in terms of adequate provision of financial resources for H&S and awarding of contract to contractors with good H&S records.

Table 1 Client’s H&S leadership styles and behaviour contributing to poor H&S performance

Statement	Unsure	Response (%)					MS	Rank
		Minor.....Major						
		1	2	3	4	5		
Failure to ensure that contractor has made adequate financial provision for H&S	2.1	7.0	11.2	23.8	32.9	23.1	3.54	1
Awarding of contract to incompetent contractors	1.4	6.3	16.9	22.5	30.3	22.5	3.46	2
Inadequate addressing of H&S matters during contract negotiation or tendering process	2.5	3.5	18.9	31.5	23.1	19.6	3.36	3

Lack of prequalification of contractors on H&S	2.8	4.9	18.2	28.7	28.0	11.2	3.35	4
Inadequate provision of financial resources for H&S	0.7	8.4	16.8	26.6	30.1	17.5	3.31	5
Non adherence to procurement process	6.3	8.4	19.6	34.3	18.9	12.6	3.28	6
Inadequate monitoring to ensure that contractors comply with the H&S plan	4.2	12.0	21.1	32.4	19.0	11.3	3.26	7

Source: Researcher

4.3 Consultants' H&S leadership styles and behaviour contributing to poor H&S performance

Table 2 indicates the respondents' perceptions of the extent identified statements related to project consultants' H&S leadership styles and behaviour contribute to poor H&S performance. It is notable that 8 MSs were above the midpoint of 3.00, with an average MS of 3.43. It also indicates that the respondents perceived that project consultants' leadership styles and behaviour contribute to poor H&S performance. The respondents perceive that the identified statements in Table 1 contribute significantly to poor H&S performance in the industry. The findings supported literature survey in that designer (architects/engineers) has duty and responsibility to design-in safety into construction during the design process (Behm, 2005; Haupt, 2011). The findings also supported research conducted by Smallwood and Venter (2002) among member practices of the ACPM that poor monitoring of project H&S plans implementation among project managers in South Africa marginalise H&S performance. In addition, the work of Olatunji *et al.* (2011) corroborated the findings that inadequate financial provision for H&S in the contract documents by quantity surveyors contribute to poor H&S performance.

Table 2 Consultants' H&S leadership styles and behaviour contributing to poor H&S performance

Statement	Unsure	Response (%)					MS	Rank
		Minor.....Major						
		1	2	3	4	5		
H&S information not incorporated into design	9.1	8.4	13.3	30.8	23.1	15.4	3.64	1
Lack of prequalification of contractors on H&S	3.5	9.8	15.4	33.6	26.6	11.2	3.51	2
Faulty and complex design	6.3	5.6	11.9	40.6	12.7	13.9	3.47	3
H&S not included in the contract documents	5.6	12.6	18.2	25.2	23.1	15.4	3.40	4
H&S information not recorded on drawings, schedules and specifications	7.7	6.9	20.3	32.2	22.4	10.5	3.39	5
Poor monitoring of project H&S plans implementation on site	5.6	11.9	16.2	29.4	25.9	10.49	3.36	6
Project H&S plans not integrated into project	5.6	9.8	18.2	33.6	21.7	11.2	3.33	7
Poor choice of procurement system	11.9	10.5	16.5	33.6	18.9	11.2	3.30	8

Source: Researcher

4.4 Contractors' H&S management systems contributing to poor H&S performance

Table 3 below indicates the respondents' perceptions of the extent that contractor related H&S management practices and leadership contribute to poor H&S performance. It is notable that 8 MSs were above the midpoint of 3.00, with an average MS of 3.44.

Table 3 Contractors' H&S management systems contributing to H&S performance

Statement	Unsure	Response (%)					MS	Rank
		Minor.....Major						
		1	2	3	4	5		
Inadequate site management commitment to H&S	3.5	2.8	9.1	25.2	32.9	26.6	3.71	1
Non-conformance to H&S plans	2.8	4.2	5.6	27.9	36.4	23.1	3.69	2
Inadequate provision of financial resources for H&S	3.5	2.1	9.7	30.8	20.9	20.9	3.62	3
Inadequate H&S training	2.1	2.1	10.5	28.7	36.4	20.3	3.61	4
Poor H&S culture	2.1	6.3	6.9	27.9	34.3	22.9	3.59	5
Inadequate top management commitment to H&S	3.5	3.5	8.4	30.1	34.9	19.6	3.57	6
Lack of worker participation and involvement in H&S	1.4	4.2	7.7	32.9	34.3	19.6	3.51	7
Infrequent H&S meetings	2.1	6.9	15.4	34.3	33.6	7.7	3.20	8

Source: Researcher

It also indicates that the respondents perceived that contracting organisations' leadership styles and behaviour contribute to site accidents and incidents. The respondents perceive that the identified statements in Table 3 contribute significantly to poor H&S performance in the South African construction industry.

The findings supported literature survey that most proven H&S management systems in the developed countries are lacking in the Sub-Sahara African countries (Lutchman et al (2012). The cidb (2009) reports identified the following areas that South African construction contractors are lacking: management commitment at all levels, lack of worker participation and involvement in H&S, poor H&S training of workers and inadequate provision of financial resources for H&S.

5 Conclusions and Recommendations

Based on the reported research, it can be concluded that key project participants' leadership styles and behaviours could lead to improvement of H&S performance. Behaviour change and commitment towards projects H&S by the key project participants, particularly during the early projects planning is imperative for improvement and sustainability of workplace H&S culture. The study recommends that:

- Clients as the owner and financier of developmental projects should appoint consultants with proven H&S competencies and provide all necessary financial resources for projects H&S;
- Designers must behaviour in most ethical manner by designing in H&S into the projects;
- Project managers as the coordinator and facilitator must demonstrate visible leadership and commitment towards project H&S by ensuring that H&S competent contractors are appointed and diligently monitor contractors on projects H&S plans implementation on site;
- The quantity surveyors as the financial experts should ensure that adequate funds are allocated for H&S in the contract documents and see to the prequalification of contractors during the tender process/negotiation, and
- The leadership styles and behaviour of contractors at all levels of management are critical for improving site H&S performance and sustainability of workplace H&S culture.

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