Implementing Innovative Ideas in Structural Engineering and Project Management
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TOWARDS ZERO CONSTRUCTION FATALITIES, INJURIES, AND DISEASES

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This study explores the 'holy grail' of health and safety (H&S) - zero fatalities, injuries, and disease! Although, the logic of pursuing such a goal is obvious there are many 'non-believers' in the sense that they do not believe it is achievable. However, the literature indicates that such a goal is an integral part of H&S culture and is complementary to the vision of fatality, injury, and disease free construction. Furthermore, it is the only 'transparent' goal. A study conducted among ‘better practice H&S’ general contractors (GCs) determined the following: subscription to such a goal is an integral part of H&S culture, and a pre-requisite for optimum H&S performance; such a goal is achievable, and there are a range of complementary interventions such as optimum resourcing of H&S, management commitment, participation, and involvement, and optimum H&S training. Conclusions and recommendations include: optimum H&S and the achievement of zero fatalities, injuries, and disease requires a goal of zero fatalities, injuries, and disease; industry H&S programs must focus on H&S culture; contractors must be enlightened in terms of the need to subscribe to such a goal, and the complementary interventions, and case studies that document the achievement of zero fatalities, injuries, and disease must be conducted.

Keywords: Health and safety, Performance, Zero target, Beliefs for practice.

1 BACKGROUND

At work, the definition of a 'safe' worksite is the one with zero injuries and fatalities. The literature however shows that zero targets are more or less goals that are difficult to attain. To back this argument, an empirical study in New Zealand documented the effects of such a target. The study observes that even though a firm adopted and focused on a 'zero target' for decades, attainment has been vague for various reasons (Young 2014). Although the firm has recorded an astonishing reduction in lost time injuries (LTIs) owning to the use of the target, minor incidents have deprived the firm of success. Similarly, construction firms have adopted such targets in order to protect their employees from work-related harm (Wilkins 2011). In a study on zero targets, Sherratt (2014) used a social constructionist methodology with discourse analysis to examine the practical realities of 'zero target' of construction H&S in the United Kingdom. The findings, which are based on the information collected from five large contractors operating 'zero target' H&S programs, show that 'zero' was viewed as a philosophy and a target with different interpretations in practice. Sherratt (2014) notes that although the incoherence and inconsistency concerning the understanding of what constitute 'zero' exist, the concept of 'zero' should be a necessity for H&S management so as to improve construction practice. The suggestion of Sherratt (2014) resonates with the status quo of construction H&S in South Africa in terms of fatalities and injuries. The status report on construction H&S in South Africa flag a range of deviations (Construction Industry Development Board (cidb), 2009), which are persistent in the sector in spite of an up-to-date regulatory environment (Republic of South Africa 2003). To amplify the need for zero tolerance in the sector, the recent statistics from the main compensation insurer in South Africa (Federated Employer's Mutual Assurance (FEM)) indicts the industry with a record 2 997 accidents in 2014. These accidents led to 54 fatalities and 377 permanent disabilities, which in turn, contributed 8 129 lost days in 2014 alone. Clearly, the goal of zero fatalities, injuries and disease is far from being a reality, and as such, intervention that looks beyond regulations is required in South Africa. This paper is premised on the need to realize improved construction H&S, which is evident through limited accidents in the industry. The objective of the paper is to report on a study that explored the perceptions of contractors on the zero acceptances for H&S deviations in South Africa. The exploratory study sought responses to two major questions, which include:

- On a scale of 1 (least important) to 5 (very important), how important are the following actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction [please note the 'Unsure' (U) response]?
- On a scale of 1 (strongly disagree) to (strongly agree), to what extent do you disagree / agree with the following statements relative to construction H&S [please note the 'Unsure' (U) response]?

2 RESEARCH METHOD

As mentioned earlier, an exploratory survey was conducted to determine what can be learned from contractors in terms of using zero targets to eliminate fatalities and injuries in South Africa construction. The goal of the exploratory survey is to develop pertinent hypotheses and propositions for additional inquiry (Yin 2014). A convenience sample was used for the survey in contractors who had achieved a place in the regional H&S competitions were requested to respond to two close-ended questions (mentioned above), and one open ended question. At the end of the survey period, 52 valid responses were received, which were included in the analysis of the data. By way of demographic information, over 90% of the respondents have tertiary education, 60.8% have been in the industry for over ten years, 92% are male, and 94% have site management operational positions in their firms.

3 RESEARCH FINDINGS AND DISCUSSION

In this exploratory survey, the self-administered questionnaire that was delivered per e-mail consisted of three questions (and 59 sub-questions), two of which were 5-point Likert scale type questions. Table 1 indicates the importance of actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction in terms of percentage responses to a scale of 1 (least important) and 5 (very important), and a mean score (MS) between 1.00 and 5.00. It is notable that all the variables (38) are deemed to be important given that their MSs > 3.00. The MSs show that the respondents perceive that people should be the most important resource in an enterprise, and zero harm, incidents, accidents, which anchor on respect for people and continuous improvement, should be viewed as very important for a worksite in construction. Also very important is the implementation of an H&S system, consciousness and mindfulness of the status quo at every given situation. In broad terms, the perceptions of the respondents point to the significance of the practices, and beliefs that were examined in the exploratory study.

Table 1. Rating of importance of actions / beliefs / interventions / practices / states in terms of achieving zero accidents, injuries, fatalities, and disease in construction.

Action / Belief / Intervention / Practice / State	**Mean Score**	**Rank**
People are our most important resource	4.83	1
A mission of ‘continuous improvement’	4.75	2
A goal of ‘Zero harm’	4.71	3
A goal of ‘Zero incidents’	4.65	4
A goal of ‘Zero accidents’	4.63	5
Respect for people	4.60	6
H&S management system	4.54	7
Consciousness and mindfulness	4.53	8
Construction hazard identification and risk assessments	4.51	9
Design hazard identification and risk assessments	4.50	10
A vision of a ‘Fatality, injury, and disease-free work place’	4.48	11
Core competencies e.g. values, aptitude, and integrity	4.47	12
Adequate financial provision for H&S	4.38	13
Designing for construction H&S	4.37	14
Conformance to requirements	4.37	15
Construction Management competencies (knowledge & skills)	4.35	16
H&S specifications	4.35	17
Client H&S requirements	4.33	18
‘Design and construction’ method statements	4.33	19

Table 1. (Continued).

A goal of 'Zero deviations'	4.27	20
Integration of design and construction	4.25	21
Quality management	4.25	22
Client focus on H&S	4.25	23
Pre-contract planning	4.24	24
The belief 'All accidents are preventable'	4.23	25
Environmental management system	4.22	26
Quality Management System	4.21	27
Environmental management	4.19	28
H&S training – Workshops and Seminars	4.12	29
H&S education – Short Learning Programmes	4.12	30
Appropriate conditions of contract	4.12	31
Pre-tender planning	4.08	32
Constructability / Visualisation	4.08	33
Appropriate procurement system	3.98	34
The practice 'H&S is a value, not a priority'	3.96	35
Tertiary education (all built environment) that includes construction H&S	3.90	36
Project duration	3.55	37
The belief 'Accidents are failures of management'	3.39	38

Table 2 further shows the extent of concurrence with statements relative to construction H&S in terms of percentage responses to a scale of 1 (strongly disagree) and 5 (strongly agree), and a mean score (MS) between 1.00 and 5.00. It is notable that 18 of the statements have MSs > 3.00, which indicates that in general, the respondents agreed with the statements. It is notable that most of the respondents either strongly disagree or disagree that accidents are project requirements. Similarly, majority of the respondents affirm that accidents cannot be part of the job to be done and accidents cannot be seen / accepted as a planned event. These perceptions reinforce the notion that H&S does not happen by chance as it must be planned to avert accidents; and culture does play an integral role for the pursuit (and possible attainment) of zero fatalities, injuries, and disease in construction. Most of the respondents equally opine that zero fatalities is achievable in the industry despite the 2014 statistics showing that 54 fatalities occurred in contractors in approximately 50% of South African construction recently. There is therefore a gap between thinking / perception and practice when accident statistics FEM is compared with the ratings in Table 1 and 2. However, the statements that achieve MSs ≥ 4.00 in Table 2 indicate that the zero target goals could be promoted and used in South Africa as these respondents appear to trust its efficacy. More so, the pursuit of the zero goals, which may appear to be difficult, could induce prolonged efforts for a steady reduction in lost time injuries / lost days of productive work (Young, 2014). When asked to comment regarding zero fatalities, injuries, and disease in South African construction, 22 comments were captured. A synthesis of the commentary shows the importance of optimum H&S culture that is exemplified by leadership and behavior in construction.

Table 2. Rating of extent of concurrence with statements relative to construction H&S.

Statement	**Mean Score**	**Mean Score**
H&S does not happen by chance, it must be planned	4.56	1
The goal of 'Zero fatalities, injuries, and disease' is an integral part of H&S culture	4.36	2
'Zero fatalities' is achievable	4.34	3
The goal of 'zero fatalities, injuries, and disease' complements the vision of 'A fatality, injury, and disease free workplace'	4.30	4
The vision should be 'A fatality, injury, and disease free workplace'	4.27	5
The goal of 'Zero fatalities, injuries, and disease' is a pre-requisite for optimum H&S performance	4.10	6
'Zero accidents' is achievable	4.08	7
Accidents are unplanned events	4.04	8
'Zero injuries' is achievable	4.00	9
'Zero incidents' is achievable	3.96	10
'Excusitis' (the proffering of excuses) marginalises H&S	3.91	11
Hazards and associated risk can be quantified	3.86	12
The focus on cost, quality, and time marginalises H&S	3.79	13
'Zero fatalities, injuries, and disease' is achievable	3.75	14
'Zero disease' is achievable	3.71	15
Construction is inherently dangerous	3.68	16
'Zero deviations' is achievable	3.63	17
H&S is a value not a priority	3.18	18
Accidents occur by default i.e. planned	2.22	19
Accidents are part of the job	1.98	20
Accidents are project requirements (especially on complex projects)	1.71	21

Some of the respondents even mentioned similar goals that are used by their firms to drive out accidents in the work place. Such slogans / goals include "home without harm, everyone, everyday." Some insightful verbatim comments noted include:

- "Zero fatalities, injuries and diseases are achievable, but only if you have the commitment from your organization and your labor force and that should also include your sub-contractors and their management."
- "The 'basic' H&H 'guideline' that is currently seen as acceptable on South African sites are not strict enough to guarantee zero fatalities, injuries, and disease even if planned correctly. This is because H&S will always be planned up to what is acceptable as per the companies' H&S file. Anything more will be seen as slowing down production and a waste of company money. Unfortunately H&S will always come at a cost, whether its money or statistics."
- "A Culture needs to be established in an organization to live out their values. It should be the starting point in any business. It must be felt and leadership needs to walk the talk and talk the walk. It is about discipline and order in the workplace."

4 CONCLUSIONS

This exploratory study has shown that in theory, contractors in South Africa recognize the importance of zero target goals in the form of 'zero harm', 'zero incident' and 'zero accident'. However, the contractors were not convinced that such goals are attainable in practice. Their perceptions in this regard are reinforced by the annual accident statistics, which document a range of causes of accidents in South Africa. It is herein argued that H&S programs should focus on H&S culture; contractors should be enlightened in terms of the need to subscribe to such a goal (no matter how difficult), and the complementary interventions. Case studies that document the achievement of zero fatalities, injuries, and disease would be conducted to determine the veracity of these targets on order to take the ideas forward in South Africa.

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