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Health and Safety Elements of Premature Construction Project Closure

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Abstract. Construction projects are usually bounded by a predefined start and end date within which project objectives must be met. Negligence by one or more project stakeholders often results in project failure; however, other internal factors can also cause a project to fail. Thus, this study explores the health and safety components that can lead to premature construction project closure. Data for the study was gathered through a survey of construction professionals within the Gauteng Province of South Africa. The data gathered was analysed using a quantitative model to rank the measured factors in terms of their mean item scores. The results revealed that accidents, air quality considerations, and not providing various safety gears pose the most risk to successful completion of construction projects. It was therefore concluded that proper plans and strategies should be put in place to reduce the risk of occurrence of hazardous events. Lastly, necessary emergency actions must be stipulated for any kind of unexpected occurrence that could jeopardize the wellbeing of workers.

Keywords: Construction Health and safety factors; Project failure; Project success; Construction projects; Premature project closure.

1 Background

Projects are supposed to end when the predefined project goals have been met. Then again, when project objectives cannot be met or there is no longer need for the project, the project will be terminated prematurely. According to Doraisamy [1], a project may face difficulties and challenges that lead to it being abandoned and closed. In delivering construction projects successfully, clients and construction professionals face several obstacles as a result of the complex nature of construction projects [2]. Havila [3] submitted that project stakeholders must remain proactive in order to ensure construction projects are completed successfully and within its success parameters.

Belassi [4] submitted that numerous factors are responsible for the successful completion of construction projects. A number of studies like that of [5–7] also attributed successful completion of construction projects to efficient project leadership. Similarly, Meredith [8] noted that usually, projects might need to close for internal reasons within the project. This kind of project closure essentially terminates all

activities associated with the project irrespective of what stage they are, or amount of funds, energy and time have been invested in the project. In another light, construction projects are considered as high-risk series of activities, detrimental to human health [9]. In view of this, the current study was guided to explore the health and safety considerations that lead to premature closure in construction projects.

Health and safety concerns remain a delicate matter in construction projects. This can be attributed to the fact that the construction industry is characterized by a very high number of accidents [9]. Bird [10] submitted that the days of attributing accidents as a random phenomenon are over. Accidents are caused by a series of actions that could be avoided if recognized, comprehended and efficiently managed. It is worthy to note that these accidents do not only alter the wellbeing of workers but could ultimately lead to fatalities and demoralize the families involved [11]. Waehrer [12] also pointed out that accidents are also sources of damages to clients and construction firms which might instigate a shutdown of current projects. Studies carried out by [13, 14] pointed out that the most frequent 'accident types' in construction projects include; being hit by falling objects; contact with moving parts of a machine, electrocution, falls from height such as roof, upper floor, platform, ladder, and scaffold.

In the study conducted by Wu [15], it was observed that safety in construction projects can be jeopardized by four main issues which are; safety climate - the common perceptions on safety among employees. Safety culture - the beliefs of a company on safety issues. Safety attitude – the mental state of workers during a project. Safety behaviour – the actions of workers as regards to safety. Furthermore, Studies carried out by Winge [16] pointed out seven causal factors of occupational accidents. The first is 'workers action' which includes mistakes, dangerous acts, defiance of standard procedures, and cutting corners. Next is 'workers capabilities' which involves workers not knowing how to handle equipment, perform a task, or identify a hazardous situation. Third on the list is 'immediate supervision' which involves supervisors not properly planning activities in such a way to control dangerous situations and reduce the risk of accidents. The fourth is 'local hazards' which are perils peculiar to construction sites and they could be properly managed when identified. The fifth is 'usability of resources' which refers to the lack of specific material or equipment needed for a task. Sixth on the list is 'project management' and it refers to omission or misunderstanding of details of the project or activities within the project. Last on the list is 'Risk management' which involves inaccurate assessment of risks. Alarcón [17] suggested that occupational safety within construction projects can be enhanced if construction companies adopt the best combination of safety practices that suit the size and nature of its organizational structure.

2 Research Setup

The background of this study has discussed how health and safety considerations can jeopardize the successful completion of construction projects. It further outlined different actions that could lead to health and safety hazards on project sites. In view of this, the research was streamlined into a descriptive study and thus, the survey method

was deemed appropriate for collecting the primary data. The research adopted a quantitative model and thus a five-point Likert scale structured questionnaire was designed and used as the medium of collecting primary data with the sole purpose of achieving the aim of the study. Primary data was sourced from built environment professionals in Gauteng Province of South Africa. A total of 120 questionnaires were sent out to prospective respondents. 82 questionnaires were retrieved back and serve as the basis for this research after they were checked for completeness. The retrieved questionnaires were analysed using descriptive statistics and presented in terms of their ranked mean item scores in the succeeding section of this paper.

3 Findings

Background data collected revealed that 47.56% of the respondents are Civil Engineers, 21.95% are Construction Project Managers, 12.20% are Quantity Surveyors, 9.76% are Architects, 6.10% are Contracts Managers and 2.44% are Project Managers. Distribution of the respondents based on the length of work experience in the construction industry shows that 64.63% has 1-5 years of experience, 30.49% has 6-10 years of experience while 4.88% has above 10 years of experience in the construction industry. 61.11% of the respondents worked in the private sector, 32.94% of the respondents worked for both private and public sectors while 6.15% of the respondents worked in the public sector. The background information collected in this study reveals that the respondents extensively span across various construction-related fields and are engaged in both public and private sectors. In line with this, it can be assumed that the data retrieved from the respondents is reliable.

Table 1. Health and safety elements that contribute to premature project closure.

Health and safety elements	Mean Item Score	Standard deviation	Rank
Vehicle related accidents	3.89	0.994	1st
Air quality and respiratory concerns	3.88	0.921	2nd
Lack of personal protective equipment	3.84	0.675	3rd
Lack of first aid and fire safety training drills	3.84	0.909	3rd
Materials and equipment handling	3.82	0.904	5th
Psychological state of workers (stress)	3.82	0.904	5th
Unavailability of warning signs	3.79	0.871	7th
Violence on site	3.78	0.952	8th
Fall of workers from heights	3.70	0.898	9th
Noise handling	3.56	1.020	10th

Table 1 ranks the health and safety elements that contribute to premature project closure. From the table, it can be deduced that vehicle-related accidents; respiratory concerns; lack of personal protective equipment; lack of first aid and fire safety training

drills; materials and equipment handling, and Psychological state of workers are at the top of health and safety components responsible for premature project closure with mean item scores of 3.89; 3.88; 3.84; 3.84; 3.82; and 3.82 respectively. Since all components measured are above the average value of 3, it could be purported that all the elements are significant health and safety factors that could easily lead to premature project closure.

4 Discussion

Khodeir [18] emphasized the importance of practicing health and safety strategies in the workplace as a way of minimizing injuries which may lead to premature project closure. Abbasi [19] agree with the findings of the current study as it ranked vehicle-related accidents first. Furthermore, Doraisamy [1] also agree with these findings as it emphasized that unavailability of personal protective equipment can have an influence on safety on site which in turn can contribute to the closure of project prematurely. However, Alcumus [20] believes that fall protection for workers working on heights, noise handling and availability of warning signs to prevent workers from slipping and falling are the most important factors.

The empirical findings and theoretical review of this study revealed that all the component measured are significant health and safety factors that could cause construction projects to close prematurely. However, vehicular accidents, respiratory safety, and availability of personal protective equipment are the major causal factors of premature project closure under health and safety considerations. Also, deficiency in first aid and fire safety training drills and mishandling equipment and materials were also identified as important elements of premature project closure, in terms of health and safety. It is worthy to note that all the element identified as health and safety components of premature project closure can be mitigated with proper risk assessment, plan, and strategy as it is important for construction firms to ensure safety for all its workers. This can be achieved by adopting the best combination of safety practices that suit individual firm's organisational structure as well as the size and nature of projects executed within the organisation.

It is important that constructions sites be kept as safe as possible and necessary emergency equipment be provided. Personal protective equipment must also be provided for all workers involved in a project as well as people visiting the project site. The health of personnel on construction sites must also be specially considered in terms of air quality and how it can affect the respiratory systems of workers. Furthermore, construction site workers and team members should be taken through a mandatory induction stage at the commencement of individual projects. During the induction, all staff members involved in the project should be sensitized on the modalities and uniqueness of such new projects.

5 Conclusion

Construction projects are supposed to sequentially cover all stages of a project life cycle, from the conception stage all through to the project termination stage. However, numerous difficulties and challenges may be encountered during the course of project execution that can lead the project to close prematurely without achieving the predetermined goals. This study thus explored the health and safety elements that can cause construction project to prematurely close and found out that accidents, air quality considerations, and not providing different safety gears pose the most risk to successful completion of construction projects. Although construction projects cannot be completely void of accidents and hazardous risks, proper planning and management could reduce their occurrences and mitigate their impacts on projects.

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