

Exploring the Construction Safety Risk Drivers and Risk Prevention

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Abstract: Construction has long reputation as the riskiest workplace with frequent numbers of incidents and fatal accidents. Previously, hazard identification has drawn sufficient attention from various scholars. However, evident on identification of safety risk drivers that stimulate hazardous conditions in the construction site are still deficient. Therefore, this research aimed at exploring construction safety risk drivers and highlighting risk prevention particularly at the high-rise building construction. A total of 105 samples were gathered from the construction stakeholders in the Malaysian construction industry. Two methods were employed in this research included questionnaire survey and site observation. Data were analyzed using Exploratory Factor Analysis (EFA) with SPSS23 Software and complemented with site photograph interpretation. Twenty one risks drivers were analyzed and results from the EFA managed to rotate five principal factors namely “external drivers”, “managerial drivers”, “safety performance drivers”, “worksites drivers” and “workforce drivers”. The highest factor loading was “inadequate safety measures” which was denoted under safety performance drivers while the lowest factor loading was “economic factors” under the external drivers. A total of six factors were identified as critical risk drivers with factor loading more than (Sig. = 0.80) and were further analyzed using site observation approach based on three site profiles to complement the results of EFA. Meanwhile, sixteen factors were analyzed using EFA for risk prevention and managed to rotate two principal factors; “managerial concerns” and “safety and health requirements”. These risk prevention were suggested to mitigate the occurrence and consequence of the construction safety risks. The highest factor loading for risk prevention was accounted for “safety and health induction and training” and the lowest factor loading was for “subcontractor selection and management”. This research provides novelty in which the focus is on safety risk drivers and risk prevention with unique features using observation analysis to support EFA results. The finding from this research should be able to facilitate the construction practitioners to improve safety risk management in the Malaysian construction industry.

Key words: Construction safety, high-rise building, risk drivers, risk prevention, practitioners

INTRODUCTION

In developed countries, construction industry accounts as a strategic tool in achieving sustainable development. Construction contributes significantly to economy growth, income and employment generation in a country. The challenge of the construction industry at present is to play an integral part in sustainable development without jeopardize environmental, social and wellbeing aspects. Despite numerous benefits offer by the construction industry, it is also recognized as the riskiest workplace (Cheng *et al.*, 2004).

The complexity and uncertainty characteristic of the construction site turns it into a host of abundant occupational injuries, diseases and fatalities. Construction workers are likely more vulnerable to injuries and fatalities compared to other industries (Yemul and Darade,

2014). Human errors and poor managerial aspects are always highlighted as the main causes of fatal and non-fatal accidents or near misses.

Hazards scenario arisen from a single or multi risk drivers. For instance, the hazards scenario of hot weather and strenuous work shows the highest factor loading of safety risks in the high-rise building construction in Malaysia (Sofwan *et al.*, 2016). The source of the risk is from natural weather which is beyond human control. Proper training which described as risk prevention will drive down the risk of injuries cause by dizziness or sweaty palms and heat-induced illnesses such as heat stroke and heat exhaustion.

Safety risk drivers: Safety risk drivers are an initiating factor in hazards scenario. They are either can decrease or increase the chances for the risk to happen or worsening