Towards a better reliability of risk assessment: Development of a qualitative & quantitative risk evaluation model ($Q^2$REM) for different trades of construction works in Hong Kong

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Since the safety professionals are the key decision makers dealing with project safety and risk assessment in the construction industry, their perceptions of safety risk would directly affect the reliability of risk assessment. The safety professionals generally tend to heavily rely on their own past experiences to make subjective decisions on risk assessment without systematic decision making. Indeed, understanding of the underlying principles of risk assessment is significant. In this study, the qualitative analysis on the safety professionals’ beliefs of risk assessment and their perceptions towards risk assessment, including their recognitions of possible accident causes, the degree of differentiations on their perceptions of risk levels of different trades of works, recognitions of the occurrence of different types of accidents, and their inter-relationships with safety performance in terms of accident rates will be explored in the Stage 1.

At the second stage, the deficiencies of the current general practice for risk assessment can be sorted out firstly. Based on the findings from Stage 1 and the historical accident data from 15 large-scaled construction projects in 3-year average, a risk evaluation model prioritizing the risk levels of different trades of works and which cause different types of site accident due to various accident causes will be developed quantitatively. With the suggested systematic accident recording techniques, this model can be implemented in the construction industry at both project level and organizational level. The model ($Q^2$REM) not only act as a useful supplementary guideline of risk assessment for the construction safety professionals, but also assists them to pinpoint the potential risks on site for the construction workers under respective trades of works through safety trainings and education. It, in turn, arouses their awareness on safety risk. As the $Q^2$REM can clearly show the potential accident causes leading to different types of accident by trade of works, it helps the concerned safety professionals and parties to plan effective accident prevention measures with reference to the priority of the risk levels.

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1. Introduction

It is encouraging that the safety performance in Hong Kong construction industry is improving which can be reflected in the construction accident statistics as published by the Labour Department (2009a,b). The year 2009 recorded a notable drop in the number of site accidents, from 11925 in 2000 to 2755 in 2009, representing a decrease of 76%. The accident rate per 1000 workers in 2009 also dropped by 63% (54.6) when compared with the figure of 2000 (149.8).

However, construction site accidents rates in Hong Kong are still relatively high when compared with most of the neighboring countries, such as Japan and Singapore, despite of the fact that much effort has been made by the HKSAR government, employers, contractors and safety practitioners (Fung, 2010). To some extent, such undesirable situation is attributed by the inert awareness to risk due to the tradition and culture of the workforce.

Assessment of risk level associated with the hazards on site is an essential component in the process of risk management (Trethewy et al., 2003) which is a process of estimating the magnitude of risk and deciding whether the risk is tolerable or not (Occupational Safety and Health Council, 2003). An effective risk assessment can offer a proactive approach to help organizations to avoid incurring losses by preventing the accidents happening in the first place (McGuinness, 1995). According to the Occupational Safety and Health Branch, Labour Department (2008), the following aspects should be taken into account for risk assessment:

- Materials, equipment/plants used for the task/activities.
- Authority for delegation, training and ability to cope in an emergency.