Effect of investments on safety performance of building projects

The construction industry is increasingly reliant on contractors’ voluntary initiatives to reduce construction accidents. A study led by Dr Yingbin Feng, a Senior Lecturer in Quantity Surveying at the University of Western Sydney, investigated the effect of investment on safety performance, and identified some key influencing factors. For the study, a regression/correlation research design was adopted. Multiple techniques were used to collect data from 47 completed building projects. Bivariate correlation and moderated regression techniques were used to analyse the data. The results show that basic safety investments do not produce a constant effect on safety performance, but varies according to site culture and project conditions.

Dr Yingbin Feng’s research tested the effect of safety investments on safety performance under different safety culture and project hazard levels. Safety investments refer to the costs that are incurred as a result of an emphasis being placed on safety control, whether it is in the form of safety training, safety incentives, staffing for safety, personal protective equipment, or other activities. Safety culture reflects the attitudes, beliefs, perceptions, and values that employees share in relation to safety. This has gained acceptance due to its critical role in accident prevention. Project hazard is a natural part of the initial construction site conditions owing to the scope and location of the project. Higher project hazard levels tend to be associated with higher risk levels on site.

Safety investments are further classified into basic safety investments and voluntary safety investments. Basic safety investments refer to the expenses of those accident prevention activities that are required by industry or government regulations and construction process on minimal safety standards. As a compulsory part of safety investments for any individual building projects in Singapore, where much of Dr Yingbin Feng’s research was concentrated, basic safety investments consist of those costs incurred by safety personnel, safety equipment and facilities, and compulsory safety training courses. Voluntary safety investments refer to the expenses of those accident prevention activities that are generally determined by individual companies or projects. This type of safety investment is incurred by the voluntary safety prevention activities such as in-house safety training and orientation, safety inspections and meetings, safety incentives and promotions, and innovative technologies, methods and tools designed for safety.

A popular assumption holds that higher safety investments result in better safety performance. However, the empirical evidence from this research suggests that a higher level of basic safety investments does not always produce a positive impact on accident prevention. The research findings indicate that the effect of basic safety investments on accident frequency rate does not hold constant under different project conditions. Basic safety investments have a stronger positive effect on accident prevention under a higher safety culture level and a higher project hazard level; while the effect of basic safety investments on accident prevention might not be positive if the project hazard level and safety culture level of the project were low. The Risk Compensation Theory (Peltzman, 1975) and Risk Homeostasis Theory (Wilde, 1982) may help to explain why the effect of basic safety investments is moderated by the safety culture and project hazard level.

With investments in basic safety having a stronger positive effect on accident prevention if the project already has a robust safety culture and project hazard level, this research highlights the importance of addressing the cultural factors impacting upon workers’ perceptions of safety and behaviours. Increasing protection and creating a safer environment will not necessarily raise safety performance if site culture has also not improved. The study therefore suggests that contractors’ interventions should combine physical protection with other cultural safety measures.

Dr Yingbin Feng’s research was awarded the Premier Award at CIOB International Innovation & Research Awards 2014. The judging panel regarded the research as original, well written with clearly articulated objectives, and has the benefit of being highly accessible to a wide readership. The paper provides a holistic re-evaluation of safety management within construction. It was originally published in Safety Science, Vol.59, pp.28-45, 2013.

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