

ASSOCIATION BETWEEN SAFETY CLIMATE AND FALL HAZARDS ON CONSTRUCTION SITES

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The building construction process comprises a series of overlapping phases which bring together several hazards, exposing not only those performing particular tasks but all those sharing the work environment. Poor safety performance in the construction industry is very often attributed to the inevitably hazardous nature of the work, and/or to the poor behavioral choices of individual workers in that hazardous environment. The public health model of primary prevention reminds us that the presence of hazards in a work system is typically the root cause of “accidents”; therefore reduction of hazards at the source should be preferable to control of workers’ behaviors.

Safety climate is a construct to assess workers’ shared perceptions of the importance that management gives to safety, relative to other organizational priorities (Fogarty and Shaw, 2010; Zohar, 2010). Previous studies have suggested its association with both safe behavior and safety outcomes such as injury rates. Supervisor-worker daily interactions are suggested as the primary source from where employees gather insights into what is important in the organization in terms of safety (Zohar et al., 2010). However, company safety priorities may be tacitly, and better, communicated to workers through practices implemented to provide a safer workplace. The goal of this study was to examine the relationship between perceptions of safety climate and hazards at construction workplaces, in order to partially test the hypothesis that work environment conditions provide explicit messages to workers regarding management’s actual safety priorities.

The study was conducted in Bogotá, Colombia. Data were collected from October 2012 to April 2013 from 25 construction sites (1 per company). A walkthrough observation tool designed for this study assessed six types of fall hazards at each construction site. For each hazard, we also noted whether any protective measures (engineering controls or personal protective equipment) were implemented.

The Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) (Kines et al., 2011) was used to assess safety climate perceptions among construction workers at each construction site. Oral informed consent and anonymous responses were collected at the beginning of the survey.

Workers’ safety climate scores were averaged for each site. The percentages of fall hazards with engineering controls or personal protective equipment were calculated. Independence of observations among construction companies is assumed because of sampling and data collection procedures. However, the assumption of normality of residuals did not hold during statistical testing. Therefore, generalized linear modeling with robust regression was used to examine the relationships between construction site hazard profile and workers’ safety climate scores.

On average 10 workers per construction site (total 256 workers) responded to the NOSACQ-50 questionnaire. The workers’ safety climate score average and standard deviation were 2.8 ± 0.22 on a scale from 1 to 4. Implemented controls at the construction sites vary widely by type of hazard assessed. In general, a majority of hazards was not controlled by engineering or PPE measures. The implementation of engineering controls to reduce fall hazards varied widely by construction site with a median of 14% (interquartile range (IQR) = 29%); PPE implementation median was 11% (IQR=35%) while hazards without control had a median of 62% (IQR=63%). Workers’ overall safety climate scores were positively associated ($p < 0.05$) with the implementation of fall hazard controls at their company and were inversely related to the presence of non-controlled fall hazards at the workplace.

The results of this study indicate that there is an association between the presence of fall hazards and construction workers’ perceptions of safety. In terms of improving safety in the construction sites, hazard elimination and control, along with organizational interventions represent a central approach in which workers’ perceptions are not part of the path to injuries but, as injuries are, a consequence of the poor safety conditions in which they work.

Safety climate research has been mainly oriented to test its predictive ability for safety outcomes. Although co-workers’ social interactions and leader-worker communication have been suggested as the main mechanisms through which workers form perceptions of safety climate (Sparer et al., 2013; Zohar et al., 2014), results from this study show that workers’ perceptions of safety climate are also associated with the presence of hazards at the construction worksite. This may indicate, as Smith et al. (2006) stated, that worker’s direct interactions with hazards in their workplace is likely an important factor in the formulation of safety climate perceptions. Future studies might compare its relative importance to that of supervisor-worker verbal communication.

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