Safety Control And Safety Risk Perception

Safety Risk Perception

Workplace safety has been a major concern across all industries. Efforts have been made by occupational health researchers to find out the root reasons causes for the accidents taking place in the working environment. Among the factors that could lead to occupational safety accidents, human errors and unsafe behaviors were found to be the major causes for most of the accidents cases (Haslem et al. 2005, Rasmussen 1977). Further analysis by Fang et al. (2016) on construction workers, led to the introduction of a cognitive model in which inaccurate perception of safety and hazard recognition are linked to unsafe behaviors. This is conformable with the findings of the other studies such as conducted by Tixier et al. (2014), and Carter and Smith (2006) that risk-taking behaviors have a positive correlation with inaccurate safety perception.

According to Albert et al. (2014), underestimation of safety risks is very common among construction workers and part of this can be attributed to the fact that many hazards are still unidentifiable for frontline workers. However, even experienced workers who are able to identify safety risks may underestimate hazards (Perlman et al. 2014). In fact, when workers do not face negative consequences when they engage in risky activities on a regular basis, they become less sensitive to those risks, and over time their safety perception would gradually decrease (Geller 2001). In contrast, workers who had previous experience with injury showed a better perception of safety hazards (Shin et al. 2014). Not only poor safety perception can lead to unsafe behaviors, but it may also prevent workers to abide by safety policies and decisions which is troublesome in terms of implementing safety practices (Zhang et al. 2014).

As indicated in the literature, worker’s ability to recognize and accurately perceive safety risks relevant to their daily tasks are extremely important. According to Arezes and Miguel (2008), occupational accidents can be effectively avoided by recognizing safety hazards. On the other hand, accurate perception of safety risks plays an important role in effective safety programs (Hallowell 2010)…….

Safety Control

Safety control is known to be a perception-based variable that is distinct from other similar safety concepts such as safety performance or safety understanding [Snyder et al. 2011]. It reflects an individual’s perception of own capability to take measures to prevent or minimize safety risks or change an unsafe circumstance (Anderson et al. 2004). Researchers have tried to find out the relationship between safety control and other safety indicators. Huang (2006) conducted a survey on a large number of workers from various industry sectors including construction, manufacturing, service, and transportation to find out through which process safety climate can predict self-reported occupational injury. The results of the study showed that safety control mediates the correlation between safety climate and workplace injury (Huang 2006). Snyder (2011) proposed a model in which safety understanding would impact safety performance through safety control. These findings are aligned with the theory that safety control can be a predictor of safety outcomes such as self-reported injuries.

Safety Climate

Efforts to improve the safety of the workplace in various industries have been made since many years ago. There have been two approaches in dealing with occupational safety. The reactive approach relies on lagging indicators such as historical data of accidents to measure the safety of the workplace. Whereas in the proactive approach, a leading indicator is used to predict future incidents. Safety climate survey is a measurement tool to prevent accidents (Choudhry, Fang, & Lingard, 2009). It was first introduced by Zohar in 1980 to measure workers' perceptions of various aspects of work safety in manufacturing industries. Since then, this measurement tool has been used across many industries to forecast safety performance. Although there is not a unified definition of safety climate in the literature, it is commonly cited as an employee's perception of overall safety within the workplace (Schwatka et al. 2016). It is affected by safety policies and procedures as well as employees' perception of actual priorities (Gilkey, del Puetro, Keefe, Bigelow, Herron, Rosecrance, & Chen 2012). This is critical especially when company goals are in conflict. For example, employees decide whether they bypass safety procedures to meet deadlines or they choose to work safely and suffer penalties by missing project goals.

Another closely related term to safety climate is safety culture. These two terms are often used interchangeably in the literature but there are some differences. While safety climate pertains to the actual state of safety in an organization at any given point in time (Huang 2006, Cheyne et al.1998), safety culture is more focused on the organization's values and ideals with respect to safety (Guldenmund, 2000). Safety culture is formed by the managers and decision makers who design safety policies and procedures. Interactions between employers, managers , and employees influence on safety culture and climate with respect to the varying perception among different job levels (Zohar & Luria, 2005). Zohar conducted a literature review on more than 200 published studies about the assessment of safety climate in various work disciplines and the results showed that a correlation between safety climate and injury rates exists (2010). The higher the safety climate , the better safety outcomes and lower injury and illness rates are likely to be. Additionally, the Occupational Safety and Health Administration (OSHA) proposed that strengthening job site safety climate has the most influence on accident reduction.

In order to evaluate the safety climate in the construction industry, several instruments have been developed that mostly rely on self-reported survey questionnaires. A content analysis on 15 such surveys was conducted to show common key factors that affect safety climate (Ghosh, Young-Corbett, & Fiori, 2010). These criteria include but are not limited to role of management and safety rules/procedure and as main factors which have been repeatedly appeared in safety climate measures along with communication, worker involvement, and work environment (Ghosh et al., 2010). Another study introduced management commitment to safety and workers involvement as the two most important components in measuring safety climate (Dedobbeleer & Béland, 1991). They also identified elements that affected employees' risk perception. Prior experience with injury accounted for highest impact followed by control and risk. (Dedobbeleer & Béland, 1991)

Schwatka, Hecker, & Goldenhar (2016) conducted aA study reviewed of the existing construction industry literature with regards to safety climate in the construction industry and identified found 56 articles of which 80 percent were published after 2008 (Schwatka, Hecker, & Goldenhar, 2016). Results from this review showed that safety climate concept came towas

adopted in the construction industry later than other industries. Majority of these studies compared safety climate scores among different groups of employees with the results indicating the management group scored significantly higher compared with the others. The rest of the research studies identified by Schwatka et al. (2016) in their review focused on comparisons based on ethnicity, union status, and trades (Schwatka et al., 2016). Fang, Chen, & Wong (2006) conducted investigated a case study on a major commercial construction firm in Hong Kong to explore the relationship between safety climate and workers' personal characteristics and behavior (2006). They derived 15 elements to include in the safety climate questionnaire with emphasis on the job roles, influences of coworkers and safety resources. By analyzing the data and using logistic regression, an existing correlation between safety climate and employees' characteristics was confirmed. Such characteristics include but are not limited to gender, marital status, education level, drinking habits, and individual safety behavior. The results showed that the workers who stick to safe work practices and comply with rules demonstrated a higher safety climate score compared with those who do not. They also discussed that widely hiring of subcontractors may result in some issues regarding safety culture and climate (Fang et al., 2006).

Further efforts were made to evaluate safety climate by conducting comparison analysis among different job levels in the construction industry. An international study conducted by Chen, Lu, Liu, & Wang (2013) was done to evaluate and compare Taiwanese construction managers' perception of safety (2013). They developed an instrument by reviewing articles to identify the most important variables that influence safety perception. Their model was based on six aspects of human error (HE), safety resource and application (SRA), safety equipment and training (SET), site culture and external factors (SCF), safety inspection and audit (SIA), and accident medium and activities (AMA). The likert scale survey questionnaire was distributed among 360 construction management roles including safety managers, contractor managers, design and audit managers, public work managers, and others. Comparison analysis was done on the responses and results showed the highest perception level belonged to the safety managers (Chen et al., 2013).

Gilkey et al. (2012) investigated safety culture and risk perception of 67 residential worksites that participated in a safety pilot program in the Denver metro area(2012). All of the sample data s were was collected from those involved in single-family wood-frame residential construction projects. The comparison analysis based on the group responses of two job levels indicated that managers scored higher than frontline laborers in terms of safety culture. The findings of Gillen, Baltz, Gassel, Kirsch, & Vaccaro (2002)others may explain this result. Gillen at al. (2002) state that nonunion construction labors hold a poorer safety climate score compared to union workers (Gillen, Baltz, Gassel, Kirsch, & Vaccaro, 2002). Residential construction suffers from higher injury rates by operation of many small nonunion contractors whereas commercial and heavy civil sectors are mostly unionized throughout the US.

However, a comprehensive case study on the largest commercial development project in US history until the time of the study represented similar results (Gittleman et al., 2010). Following eight8 fatal accidents on the project and to address the related safety concerns, the investigators developed four4 different versions of the survey questionnaire to measure safety climate among four4 groups of different job levels including management executives, site superintendents, foremen, and craft workers. The survey consisted of standard Likert scale items as well as open-ended questions to create an opportunity for workers to express their opinions, concerns, and proposed solutions regarding safety issues on the job sites to the upper-

level management team. A large number of sample responses were collected from executives (n= 17), superintendents (n=61), foremen (n=134), and workers (n=5,268). The survey was available in both English and Spanish. However, only 11 % of workers completed the Spanish version whereas all other groups answered to the English version. Safety climate measures were based on management commitment to safety and safety practices responses as they were found to be the most frequently studied indicators of safety climate. The collected data were analyzed and the results showed that differences in safety climate scores between different group responses existed. This difference was significant, particularly between workers and executives. The executive managers' mean score was almost 20% higher than the mean score for the workers' group. The content analysis on the responses from the open-ended section was helpful to propose plans for improvement of safety condition in the job site by modifying the safety process that required minimal investment of resources and time (Gittleman et al., 2010). The authors concluded that "The most important lesson learned was that gauging differences in perception about site safety can provide critical feedback at all levels of a construction organization." Further investigation on construction workers reveals that they may lower their perception of hazards by engaging in risky environments on a daily basis in order to obtain short-time benefits. There are also some study efforts to discover the association between the ethnicity of workers and accident rates.

Conclusion

Based on the current body of knowledge that exists in safety literature, more investigation regarding multi-level organizational safety perception needs to be done especially in the commercial sector. A few in-depth case studies have been conducted with respect to the specific safety climate of worksites under investigation rather than the general safety perceptions of different professionals employed in the construction industry. This study will try to fill this gap by incorporating a breadth of samples to develop a better understanding of safety perception in the overall industry.