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An explicative model of unsafe work behavior

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Abstract

This study attempted to construct and test an explicative model of unsafe work behavior to reveal the mechanisms by which the following contributory factors to unsafe work behavior influence safety behaviors of individuals at workplaces: (a) perceived safety climate, (b) perceived hazard level, (c) perceived work pressure, (d) perceived risk, and (e) perceived barriers. Perceived safety climate was operationalized as management commitment, supervisor support, co-worker support, employee participation, and competence level. Data were collected from 722 US grain industry workers in 102 different locations of a multi-national grain company using a 98-item survey questionnaire. The second-order factor model to explain unsafe work behavior was tested using structural equation modeling (SEM). The results indicated that perceived safety climate was the best predictor of unsafe work behavior among the contributing factors of safety behavior. Perceived safety climate affected unsafe work behavior in three paths simultaneously: (a) indirectly through the sequential influence of other mediating factors of perceived work pressure, perceived risk, and perceived barriers, (b) through direct influence on perceived barriers which, in turn, affects unsafe work behavior, and (c) direct influence on unsafe work behavior (standardized path coefficient = .73).

Keywords: Unsafe work behavior; Structural equation modeling; Confirmatory factor analysis; Safety climate; Grain industry

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1. Introduction

Every year millions of Americans suffer disabling injuries and thousands are killed at workplaces. According to recent accident statistics (NSC, 2002), 5300 deaths and 3.9 million disabling injuries occurred in American workplaces in 2001 which are actually underestimates of job-related injuries and deaths because NSC counts only unintentional injuries, excluding work injuries and deaths caused by violence (Leigh et al., 2000). The NSC estimates that the total cost of work-related unintentional injuries in the US amounted to $132.1 billion and that organizations lost 130 million work days because of injuries in 2001 (NSC, 2002). The cost is equivalent to about $490 per capita, or about $1280 per household (NSC, 2002). If non-economic damages such as pain and suffering experienced by workers and their families, diminished ability to perform family and social roles, impact on family relationships, and shrunken morale of co-workers are quantified and added (Seo and Blair, 2003), the cost of work injuries and deaths will be much higher than the NSC estimate.

To reduce this enormous cost to society as well as to minimize human sufferings, earlier efforts had been focused primarily on technical actions and scientific safety management up to the 1980s (Hale et al., 1998; Hale and Hovden, 1998; Heinrich et al., 1980; Petersen, 1988). Those injury prevention activities were basically based upon a credo of dichotomous etiology of accidents—unsafe acts and unsafe conditions.

1.1. Causes of occupational accidents

One of the first accident causation models historically was accident proneness model dated back as early as 1910s that assumes that there are some persons who are more prone to accidents than others (Hale and Glendon, 1987). A number of studies have attempted to find individual differences that are predictive of accidents in various aspects including visual acuity, reaction time, and personality but failed to identify any set of individual traits of accident proneness (Hale and Glendon, 1987; Heinrich et al., 1980). On the contrary, Schulzinger's survey of 35,000 accidents (as cited in Petersen, 1988) revealed that "the accident repeater contributed only 0.5% of them, whereas 75% were due to relatively infrequent experiences of a large number of persons" (p. 194). A conspicuous limitation of this model was extremely limited focus on one factor, the characteristics of accident victims, paying little attention to other contributing factors, especially common to many individual accident victims, to the occurrences of accidents.

Heinrich's (1931) domino theory is the most widely quoted accident causation model so far. Heinrich asserted that any injury (5th domino) is necessarily caused by an accident (4th domino) and that the accident in turn is caused by unsafe acts of a person and/or unsafe conditions (3rd domino) that are preceded by fault of person (2nd domino) and ancestry and social environment (1st domino). Heinrich suggested that removal of the 3rd domino is the easiest and most effective way to stop the sequence leading to an injury, reporting his discovery from case studies of 75,000