

Sustainable Civil Engineering Structures and Construction Materials, SCESCM 2016

Role of organizational factors affecting worker safety behavior: a Bayesian Belief Network Approach

Bonaventura H.W. Hadikusumo^a, Bhanupong Jitwasinkul^a, Abdul Qayoom Memon^{a,*}

^a*School of Engineering and Technology, Asian Institute of Technology, P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand*

Abstract

Several investigations on major occupational accidents are demonstrating interest in role of organizational factors. Investigations and evidences manifest that “the root causes involved more than technical or human failures” [1]. Thus, focusing on organizational factors is an important issue in safety as a means of mitigating accident in the workplace. First step for assessing the influence of organizational factors is to identify the relevant organization factors. Out of 22 factors identified from literature review, seven important factors were finalized for Thailand construction industry: communication, culture, management commitment, leadership, organization learning, empowerment, and reward system. At final phase, Bayesian Belief Network was used for handling the complex causality and providing the strategies to enhance the safety work behaviors. According to first alternative, 73.3% of safety work behavior was reached by manipulating management commitment, participation, learning and leadership nodes simultaneously. The second alternative accomplished about 74.6% of safety work behavior when the leadership, management commitment, participation and intention node were assigned to favorable state. For the third alternative, 77.7% of safe work behavior could be obtained by controlling leadership, management commitment, participation and perceived behavioral control node.

© 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of SCESCM 2016.

Keywords: Organizational factors, Worker behavior, Bayesian belief network

1. Introduction

Occupational accidents not only generate losses in property damage but also provoke a decrease in employee's morale, productivity, quality of products and services, public image, customer relations, and organization's reputation.

*Corresponding author. Tel.: +66944046058.

E-mail address: abdul.qayoom@ait.asia

In light of these economic and social costs, it is important that safety professionals and researchers require better understanding on the events preceding occupational injuries, as well as the relevant contributory factors that may influence in any individual's safety work behaviors. In Thailand, governmental and non-governmental agencies are active in development and promoting occupational safety in construction industry. Therefore, every project in Thailand has to be intergraded with safety program in day-to-day operations in order to increase safety performance. Besides that, there is still a need to reach the targeted outcomes, even though accidents in downward trend [2]. This indicates that these efforts are not adequate to handle at-risk work behaviors on the construction sites. It is important here to note that not only people are considered as contributing factors but also organizational factors shape the context that contributes to at-risk work behavior [3]. Thus, organizational factors have been recognized as the means of mitigating accidents in the workplace and improve the worker safety behavior.

2. Problem statement

Findings from several studies revealed and underpinned the idea that the majority of occupational accidents are caused by people rather than unsafe working environments [4,5]. Accordingly, findings indicate that approximately 80 percent of occupational injuries caused by at-risk behaviors while 15 percent caused by risk working conditions and the last five percent is inevitable [6,7,8]. This particularly brings attention to safety professional to recognize the importance of employee's behaviors as major root cause. The prominence of organizational factors in human error has been particularly acknowledged. Evidences from previous researches have supported the contribution of organizational factors on organizational safety performance. However, the effect of organizational factors in the field of work behavior in construction industry has hardly been examined. It is not easy to determine the implication on the improvement of the safety work behaviors in conjunction with the influence of organizational factors because of their complexities from the multiple causal relations between organizational factors, psychological precursors and safety work behaviors, especially in the complex construction safety scenarios. Thus, appropriate analytical approach should be capable of handling the complex causality from their interactions among organizational factors, psychological precursors and individual safety work behaviors within a built environment. Hence, inconsistency in the influences of causal relationships could be determined by various quantitative methods such as traditional inferential statistic or probabilistic model (Bayesian belief network). The achieved results and explanations should further enable the safety experts provide policy and procedures to increase safe work behaviors by considering the certain inferences of causative factors.

3. Methodology

Fig. 1. illustrates the research paradigm. Both qualitative and quantitative approaches have been used. After thorough literature review, a set of organizational factors have been identified. Through triangulation, key important organizational factors were finalized by expert opinion. After that causality analysis has been carried out using Bayesian belief network to develop strategies to improve the worker safety behavior.

4. Identification of organizational factors

The success or failure of the organization is reliant on the collaboration of all departments, identification of organizational factors, therefore, is based on perspective regarding on how an organization and its people cooperate within their environment. Therefore, the first step of systematic approach for evaluating the influence of organizational factors must sufficiently identify the key organization factors. Thus, a system theory has been adopted as a blueprint for a framework to identify and investigate the organizational factors. This theory provided the concept that attempt to integrate classical and human relation approaches. This phase utilizes the realism paradigm and the case study approach to decide how an organization and its people interrelate within their environment and to provide an illustrative framework because realism research is capable of "searching towards an understanding of the common reality of any system in which many people operate inter-dependently"[9]. Therefore, this study proposes 22 organizational factors including organizational culture, ownership, safety culture, leadership, personnel selection, reward system, resource allocation, communication, and management commitment, coordination of work,

Download English Version:

<https://daneshyari.com/en/article/5028543>

Download Persian Version:

<https://daneshyari.com/article/5028543>

[Daneshyari.com](https://daneshyari.com)