

An Assessment of Risk Management Practices in the Logistics and Construction Industry

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Abstract: This paper focuses on the safety management practices particularly human safety in the logistics and construction sector. It takes in to account the associated risks in the construction and supply chain industry accompanied by changes during its evolution. It also addresses the causes resulting in the untoward events and injuries related to the workers on site. The research and data collection methodology adopted is based on questionnaire whose target audiences are construction and logistics staff that are working locally in public or private firms. The analysis of data is based on Likert scale giving equal weightage to each option and the questions are analyzed using Relative Importance Index (RII) technique to determine the foremost critical factors in the study. This study also provides solutions to minimize the risk especially for onsite workers and propose recommendations to effectively manage human safety risk during onsite construction of a facility including distribution and allocation of resources.

Keywords: Construction Industry, Logistic Industry, Risk Management, Safety

I. Introduction

The concept of safety originates from the broader term Risk. The term Risk can be defined as the possibility of arising any unexpected event or adverse phenomenon which is not desirable. The evaluation of risk is imperative to primarily save individuals, resources, time, public image and environment in case of any uncertainty.

Risk Management is very extensive which involves the process of identification of risk and its intensity, seeking for viable alternatives and proper monitoring of the work at execution. It also involves determining the possible solutions of risks in case of contingency and mitigates the losses. The industry has immensely evolved in the last few decades and it is valued as key sector in the progress and growth of the economy. It actually encompasses many other industries that originate from the warehousing and distribution sector. This is the reason it is substantially regarded among all the thriving countries of the world. Despite its significance, the logistics industry falls among the most dangerous and unsafe industries where accidents particularly human fatalities and injuries are very prominent and often most neglected in our part of the region. Safety in the logistics sector is dealing with accidents and accident prevention. Accident analysis provides insight in hazards and major accident scenarios, while prevention is related to interventions, ranging from the introduction of technical measures, design modifications, and organizational and behavioral interventions. Here the aim of the study is to assess and analyze the practices associated with safety management and provide solutions and recommendations to minimize the risk on construction sites. The study in actual emphases on the practices associated with the human safety and suggesting remedies to minimize the safety risk for the individuals because each worker is exposed to the risk related to his job which is necessary to be considered. There are numerous risk factors influencing the safety of workers that will be discussed further. In this regard, the research has set the following objectives:

- a) To investigate the causes of fatal accidents and injuries in logistics and construction industry while carrying out various activities.
- b) To explore the industry's concern regarding the safety of workers and up to what extent
- c) To put forward solutions, to mitigate the workplace hazards and ensure employee safety.

II. Purpose and Scope of the Research

This study will explain how logistics and construction industry can improve workers safety at workplace. This study focuses to determine factors causing fatal accidents and injuries during onsite working, transportation and material handling. More accurately, new safety methods and techniques will be studied using the factors that are important from the safety point of view. Therefore this research aims at identifying the causes behind occupational accidents or fatalities and answer if standard safety procedures are neglected. For over a decade, logistics and construction sector have significantly dominated others industry all over the world that actually stems from these two broad categories of industries.

Since construction and logistics are of paramount importance in business, therefore there are many safety concerns pertinent to it which predominantly includes harm to human life and injuries. The increased demand of residence and construction of other heavy-duty facilities in logistics business leads to many safety hazards in the industry that are needed to be addressed using sustainable and viable human safety initiatives.

III. Literature Review

The construction industry is marked by persistent changes, involving varying technologies, distinct working conditions and the need for co-ordination of different interdependent operations. Due to the vulnerability and complexity of work, safety is a serious problem within the construction industry. It is apparent that the construction industry has recorded the one third highest rate of accident among various major industries in most parts of the world (Choi, Chan et al. 2011)

Improving safety remains a priority in every country around the world because it is one main contributor which ranks high in the rates of severe and fatal occupational injuries compare to other industries (Bhattacharjee, S., Gosh, S. (2011)). The reasons for the poor safety record may relate with many factors such as complicated nature of work or system, risk of work, management style, safety knowledge and commitment, and personal behavior. In order to improve the current state of construction safety performance, different safety initiatives are now being implemented in both public and private sectors (Choi, Chan et al. 2011)

An effective safety measure can substantially improve site safety performance because it can help the management to come up with safer means of operations and create safer working environment for the worker. Furthermore, by incorporating effective safety measures, good safety culture can be fostered within organizations because it can encourage co-operation and communication between management and workers on different site safety operations (Anton, T.J., 1989). Since construction sector is very diverse, complex and labor intensive industry therefore there are numerous causes of fatalities and injuries. It is very frequent that contact with moving object and vehicle particularly in urban area contributes in the accidents that is among the substantial causes of fatalities as well (Swuste, Frijters et al. 2012). A homogeneous perception of safety is important for the achievement of a strong safety culture; however, employees may differ in their safety perceptions, depending on their position and/or hierarchical level within the organization (Arboleda, Morrow et al. 2003)

The reasons for the poor safety record may relate with many factors such as complicated nature of work or system, risk of work, management style, safety knowledge and commitment, and personal behavior (Choi, Chan et al. 2011). There is wide acknowledgment in the literature of risks in, and vulnerabilities of, complex supply chains. Surprisingly, however, there is a lack of conceptual frameworks and empirical findings to provide clear meaning and normative guidance on the phenomenon of global supply chain risk management (Manuj and Mentzer 2008). For decades, one of the major causes is falling from height that lies in the top of list for causing many unfortunate events. It includes improper installation of barriers on the boundary of site, falling from ladder or scaffolding and unintentional falling of labor to the ground due to inadequate installations.(Halperin and McCann 2004)

The environmental causes are also vital in terms of assessment of accidents like rainfall, snowfall and humidity as workers can be injured due to marginal negligence (Swuste, Frijters et al. 2012). It is also noticed that workplace conditions also affect the rate of injuries that the passage area is very messy and dirty causing trouble in the mobility of workers (Swuste, Frijters et al. 2012). The aspect of Management is also very significant from the company side, whether the company comply with the safety regulations that needs to be properly implemented on the site with consistent vigilance regarding its execution (Swuste, Frijters et al. 2012)

Duties on site sometimes take employees to relatively high places off the floor. Working with complicated and heavy materials at high points increases the possibility of employees falling down and suffering severe injuries. According to the U.S. Department of Labor, slipping, tripping, and falling are the most common industry accidents. They make up to 15 percent of all accidental deaths. Additionally, accidents cause warehouses to lose more than 95 million total work days each year. The warehouse is a place with lots of stuff. Its narrow aisles, tall stacks of goods, and poor lighting are the exact ingredients that can compromise visibility. Slipping and tripping over materials or spilled liquid are common accidents that can be avoided if the warehouse maintains adequate lighting and equips dark corners with special lights that can be easily switched on and off.

IV. Research Model

The theoretical framework of this study is based on independent and dependent variables which are illustrated as below (Refer Fig. 1.);

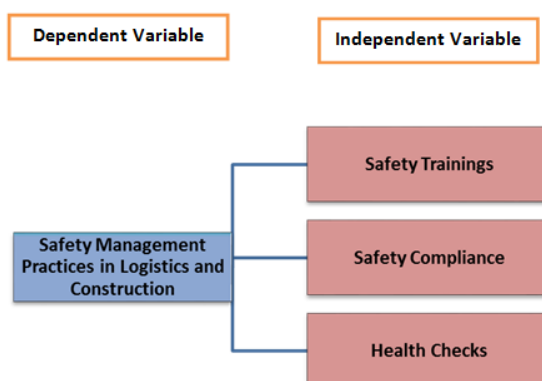


Fig.1. Research Model

The variables which have been selected are discussed below.

i. Workers Safety Trainings and Workshops

The tenacity is to study the relationship between the safety training workshops on minimizing human injuries and accidents in warehouses and material handling sites. Since it is confirmed by literature that the safety programs have ample influence on the worker safety at workplace, therefore the first variable for the research model is safety trainings (Independent variable)

ii. Safety Compliance at work

This study aims to determine the relation between the company's safety compliances on minimizing human accidents. The literature already put forwarded that abiding to Standard Operating Procedures (SOP) has some influence on the minimizing accidents and injuries. So the second variable for the research is company safety compliances (Independent variable)

iii. Periodic health checks of workers

This research also considers the relation between the workers regular health checks on minimizing human accidents as previous literature suggests that, the physical and mental wellness of employees has some influence on the minimizing accidents and injuries. So the third variable for the researcher is health checks as (Independent variable). The dependent variable comprises of "Safety management practices" in which the impact has to be determined. On the basis of these variables, the hypothesis is attained. In hypothesis:

H0: There is no relationship between workers safety initiatives and safety management practices in logistics industry.

H1: There is a significant relationship between workers safety initiatives and safety management practices in logistics industry.

V. Research Methodology

In the preliminary stage a comprehensive study has been conducted based on various publications highlighting the causes and various aspects of human safety. A questionnaire is devised consisting of respondent details and the technical details that are to be acquired during the research. The technical part consists of various questions plotted on Likert scale having equal weightage of every option. The questionnaire is subsequently analyzed based on the output of the respondents and a Relative Importance Index is calculated to determine the most critical and vital factors that are important in terms of human safety. Furthermore for qualitative question, a pie chart is drawn that is auguring the answers of respondents. The questionnaire consists of two sections, one refers to demographics of respondents and the other one comprising of questions based on the variables of the human safety to get the answers from the respondents having one to one interview method based on Likert scale ranging from strongly agree to strongly disagree.

The variables include workers safety training workshops, safety compliance at work and periodic health checks of workers including coordination among the workers and the insurance scheme of employees in case of any unfortunate event. The Relative Importance Index of each question based on answers from the respondents distributed on Likert scale is computed to determine the importance for each factor. The factor yielding maximum Relative Importance Index value based on respondent answers is considered to be foremost critical factor. The analysis is expanded further by examining and comparing the overall scores for each factor.

The Snowball Sampling Technique is used to fill the questionnaire considering that all the respondents should have witnessed at least one accident during their career to get more precise information. During the survey, the target audience and respondents are various onsite workers, truck drivers, fork lift drivers and dispatchers that are employed locally on numerous firms and working on various public and private projects.

VI. Results and Discussion

To Determine the Critical Factors in Safety Strategy

The analysis is performed after the collection of data, and subsequently Relative Importance Index is computed for each question to determine the foremost critical factors in terms of human safety that are significant in the light of data gathered. The analysis revealed that workers trainings is the most critical factor that contributes to the human safety during the entire construction process. Secondly, the results also unfolded that it is indispensable to have safety culture in an organization which includes compliance with the standards and using personal protective equipment leading to reduction in accidents. The third vital factor is that there should be adequate communication among the workers about the implementation of safety rules so that the knowledge and practices related to onsite safety can be mutually adopted.

Interpretation of Results Using Pie Chart

It is also very important factor to take in to consideration that what resources are available on site to cope with the safety related contingency and emergency situation to provide early help in order to prevent or minimize the loss to the human life. It is also a noted factor during the analysis of data that logistics firms should maintain a record of accidents and injuries based on the retrospective data to take protective measures in future. The results for maintenance of record by the companies according to the respondents are elaborated by the chart as follows (Refer Fig. 2.)

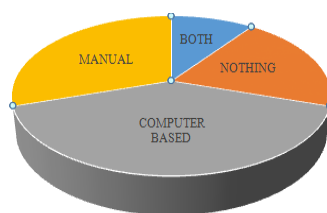


Fig. 2. Accidents Record.

From the Chart it is evident that 40% of the companies keep computerized record of injuries, 30% of the firms maintains manual record of accidents, there are 10% prospective organizations that keep both manual as well as computerized database record for the injuries and 20% of the firms does not at all keep record of the injuries or accidents that took place during the construction on their corresponding sites.

VII. Conclusion and Recommendations

It is clear from the Relative importance index (RII) analysis that there is a significant relationship between workers safety trainings and safety management practices in construction and logistics industry. Most of the companies do not accentuate on keeping their employees updated about the new and latest human safety practices that must be adopted to make their employees cognizant with the developments like seminars, workshops and Trainings in order to allow them to take measures about their safety during warehousing. There is a strong positive relationship of (RII = 0.75) between the workers trainings and safety management practices in Construction and Logistics industry by the respondents feedback against RII. It also indicates that the value of safety grows with increase in the demand of logistics activities.

When employees work on site with heavy equipment such as an excavator or forklift every day, they tend to get very comfortable and oblivious using the equipment. This can be very perilous if the operator begins to underestimate the danger of the machine. It is important that all employees should understand the potential hazards any equipment could possess and never get too comfortable. They should remain circumspect and careful when operating any machine. It is advised to always follow the specific instructions provided for the equipment in order to avoid situations where an accident is likely.

It has long been recognized that incentive schemes can improve company performance and motivate the workforce. Safety incentive scheme is one of the high-impact zero-accident techniques that can be considered as psychological approach in which employees can be rewarded for safe work habits. Therefore, the companies must introduce incentive schemes for those who comply according to the safety rules as it will slump the risk of injuries and accidents during the work. A safe site is always an efficient workplace. The dilemma is avoiding proper trainings of workers is the number one cause of workplace injury. Implementing systems with

Standard Operating Procedure (SOP) and frequent training exercises by updating the workers time by time is the best way to instill a safe environment for the employees. It is also advised that companies should provide compensation to their employees in case of any untoward event to keep their dedication intact during the work and create a working environment where all the workers are bound to follow safety regulations.

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