

# Application of Safety and Health Management in Construction

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**Abstract:** *Safety and Health management is one of the important fields in the construction. Safety and health during the construction of a project is also influenced in large part by decisions made during the planning and design process. Workplace safety is a priority. It is necessary to encourage the employees in various ways in an organization. The main objective of the project is to find the major factors affecting safety and health to use various mathematical methods of analysis to give recommendations for the factors so as to minimize the risk and hazards in the construction industry. Data collected from the questionnaire survey was analyzed with relative importance index, frequency, severity, importance indexes and the significance of major factors along with their indexes were confirmed with ANOVA test.*

**Keywords:** Safety, Health, Causes, Construction

## 1. Introduction

Modernization and industrialization have helped the construction industry to grow in leaps and bounds. Small towns and cities have become more urbanized and, the construction sector too has got a boost. Irrespective of occasional slumps in the economy or in construction works, the sector is going through a faster growth. Apart from old / traditional urban / industrial centers, new industrial or urban centers have appeared on the map where construction works are going on. Expanding and fast growing construction sector, in general, has drawn large number of workers due to lack of greater employment opportunity elsewhere. There are more than 20 million of construction workers in India at present. Cities, like Delhi alone have around more than 600 thousand of them. Apart from metros other cities, like Jamnagar in Gujarat, Guwahati & Shillong in the Northeast are also expanding at fast rate.

Construction industry is an index of growth of a nation. Today, the construction industry is the second largest employing skilled and semiskilled labour after agriculture and plays an important role in our nation's economy. Due employer, after agriculture, employing over 32 million people. The construction sector in India accounts for 5% of the gross domestic product and 38% of the to increase in business opportunity and migration of labor, the demand for commercial and housing spaces has also increased. According to the tenth five Year plan (July, 2003), the estimate of shortage in urban housing is assessed to be 8.89 million units. As of now, the housing and construction industry employs 30 million people and about 250 industries are associated with construction industry directly or indirectly.

Laborers methods important for safety for personal safety and risk control reasons. The way I see it, if you have a particular person who has a competency in working as a tradesman, say, for example a carpenter, one who has gone through an

apprenticeship, he is qualified. He obviously knows how to use a hammer and install a skirting. So where its something where its trained in a competency as being a tradesmen then I think it only needs to be covered in company induction or expectations of induction or something like that because to tell a carpenter how to swing a hammer is probably not something that I think needs to be included in it. But to tell a carpenter how to swing a hammer when he is hanging of the edge off a building, that is something that needs to be included in it. Supervisors saw themselves as playing a vital role in the planning process for high-risk work, including the preparation and communication to labors, as they are in a position to know what work is coming up.

## 2. Objectives

The studies were concentrated on the matters of safety on construction industries have occupational health and safety management system.

To promote and ensure optimum standards of health, safety and environment including statutory requirements. Maintain safe and healthy work places, plant and equipment methods of work etc. devise ways to protect persons from foreseeable work hazards. To strive for continual improvement in safety at all work sites. Assigning responsibilities or accountability for maintaining safety at different levels. Provide through investigation into safety incidents or near miss incident and establish safeguards to prevent recurrence. To create awareness that what we require is safe production. Provide for response to emergency situations.

Companies that like to be better eco-friendly agents invest in strong environmental, health and safety management, otherwise known as EHS. From an environmental standpoint, it involves creating an efficient approach to managing waste complying with environmental to the regulations or reducing the effect of pollutions and also manage to safeguard his labors

Volume 6 Issue 3, March 2017

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from major and minor accident. EHS is nothing but a well-planned management system which is used to make the construction safety and eco-friendly.

### 3. Literature Review

Literature revealed multiple sources of inform in construction industry. Engineering, education, and enforcement were found categories of counter measures used for improving safety in construction industry were found useful for safety prediction and associated factor identifications. Published studies on the effectiveness of educational activities in improving job safety. Most of the reviewed studies evaluated the effects of educational activities along with (e.g., enforcement or access prevention); therefore, the effects of educational activities separated from those of the other activities.

The literature shows that there is a need to evaluate the safety of construction users by using appropriate and sufficient amounts of data alongside relevant statistical methods modeling techniques. Further there is a need to evaluate the effects of an educational activity alone on the safety of employees at construction industry.

### 4. Research Methodology

In this paper tried to work out ranking of causes of safety and health in construction industry along with ranking of impacts of these safeties. Further this work includes the ranking of various methods used by construction industry for dispute resolution. The survey questionnaire was designed to get the ranking of above three issues by suitable technique. The survey questionnaire is made of four groups. Respondents has to tick mark any one option for each raw under the category of Strongly disagree (1), Disagree (2), Neutral (3), Agree (4) and Strongly agree (5).

It was planned to collect the feedbacks from various stakeholders of construction industry from Thiruvananthapuram city of Kerala state of India. The survey has included Contractors, Labors and Developers. This research work includes use of Ranking Techniques and ANOVA method.

### 5. Data Analysis

This research work has used following two methods for carrying out ranking work

#### 5.1 RII Method

$$R.I.I = \sum W/A \times N$$

Where,

$\sum W$  = weighting given to each factor by the responder

(Range 1 to 5)

A = Highest weight

N = Number of respondent

#### 5.2 Statistical analysis

##### 5.2.1. Severity Index

$$\text{Severity index (S.I)\%} = \sum((ais*nis)/(5*N))*100$$

Where,

ais = Number of respondents

nis = Degree of frequency

N = Total number of respondents

##### 5.2.2. Frequency Index

$$\text{Frequency index (F.I)\%} = \sum((aif*nif)/(4*N))*100$$

Where,

aif = Number of respondents

nif = Degree of frequency

N = Total number of respondents

##### 5.2.3. Importance Index

$$\text{Importance index (I.I)\%} = \text{severity index} \times \text{frequency index}$$

**Table 1: Ranking result**

Safety factors	Relative importance index Value	Ranking
Electrical device have current inspection	0.875	1
No smoking signals posted	0.85	2
materials properly stored	0.85	3
All operators are qualified	0.848	4
Gas line and power cables	0.845	5
First aid kit available	0.825	6
Sanitary facilities	0.825	7
Cylinder stored in upright position	0.802	8
Head protection	0.8	9
Equipment secured	0.8	10
Lights, brakes, warning signals	0.77	11
Are fire extinguisher provided	0.76	12
limited access zones	0.75	13
Explosive properly stored	0.755	14
Substance abuse policy in place	0.725	15
Control and disposal measures	0.723	16
Fuel supply protected	0.71	17
Injury record being kept	0.7	18
Proper extinguisher provided	0.695	19

**Table 2: Top Ten Relative importance index factors**

Factors	Safety factors	Relative importance index	Rank
Electrical	Electrical device have current inspection	0.875	1
Fire prevention	No smoking signals posted	0.854	2
Hazard communication	materials property stored	0.85	3
power tool	All operators are qualified	0.848	4
Welding and cutting	Gas line and power cables	0.845	5
Jobsite	First aid kit available	0.825	6
Site keeping	Sanitary facilities	0.825	7
Flammable liquids	Cylinder stored in upright position	0.802	8

Personal protection equipment	Head protection	0.8	9
Construction area	equipment secured	0.8	10

## 6. Results and Discussion

The major factors selected from the relative importance analysis were further subjected to severity and frequency index analysis. From the severity and frequency indices, the importance indexes of the factors were obtained. The indices along with the ten major factors were analyzed with the help of ANOVA table. The purpose of task was to analyze the significance of the indices along with the major factors identified from the analysis.

## 7. Conclusion

In this project various factors causing constructions accidents is considered, than the factors will be analyzed by using ANOVA method manually. By the results the greater factors will be find out. Then proper recommendations will be provided to overcome accident.

The rectification method was easy to implement in site and follow up was also simple for all category peoples who are included in construction work the procedure was helpful for reduce the risk factor and accident which will helpful for a safe and speedy construction economically. Therefore it can be concluded that construction project intending to prevent indirect losses should primarily focus their attention on the improvement of safety measure at site.

Necessary awareness on construction safety should be made among employees through safety journal's periodic, safety meetings, training and availing the revision of updated safety guide lines as per the standards imposed by the concerned authorities. The management should assure the usage of personal protective equipment with the appointment of safety officers. Also necessary secureness of equipment should be assured with the installation of barricades, warning signs and with the recruitment of skilled and trained operators for performing the task.

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