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Efficient Use of Safety and Emergency Management on a Construction Site

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Abstract: ***Construction Industry in India has changed drastically during the last few decades. It is the second largest employing sector next to agricultural sector, but first in terms of accidents close to the road accidents. From the construction of building simple structures, roads, and minor civil work projects, the construction industry has changed significantly over the last few decades. Safety on construction job site has been ignored by construction companies worldwide and particularly in countries where the labour force is required. Due to increasing numbers of reported accidents and injuries on construction projects, safety is becoming an important issue in construction environment today; also safety is usually discarded by its operator.***

Keywords: Construction Industry, Labor Force, Accidents, Injuries, Safety, Safe Environment.

I INTRODUCTION

Construction Industry in India has changed drastically during the last few decades. It is the second largest employing sector next to agricultural sector, but first in terms of accidents close to the road accidents. From the construction of building simple structures, roads, and minor civil work projects, the construction industry has changed significantly over the last few decades. Safety on construction job site has been ignored by construction companies worldwide and particularly in countries where labour force is required. Due to increasing numbers of reported accidents and injuries on construction projects, safety is becoming an important issue in construction environment today; also safety is usually discarded by its operator. Hence, safety management plays a very important role in the construction industry. Research has shown that false practices by workers and inadequate supervision are the basic causes of an accident. Also, failures of management towards safety practices (safety training, safety education, awareness program, etc) are other consequences of accidents.

II OBJECTIVES

The objectives of this study are:

- To Study the present scenario of safety and emergency management in Indian construction industry.
- To study, determine and collect data required for SEM in a residential project with respect to following points:
  a) Safety Activity
  b) Emergency activity
  c) Risk assessment

To develop a Safety and Emergency Management (SEM) model for all minor as well as large construction organizations to elude risk of accidental injuries and deaths by using the data and parameter studies

SCOPE OF THE STUDY

To study the safety management through case studies and introduce safety and emergency management (SEM) model on those or similar projects with respect to following points:

- To understand the current Scenario of safety management at sites and the growing need for same in Indian construction industry.
- To understand different types or categories of hazards.
- Identify and understand these hazards in different stages of the projects.
- To study the safety and emergency management model and it's Impacts on the project.
- To prepare and recommend a checklist for identification of hazards in the projects under consideration.

III METHODOLOGY

For carrying out the proposed work, following methodology will be adopted for data collecting and analysis. As per the methodology, a survey will be carried out in Pune district. The survey will find out how many construction companies actually look after safety management on sites and to analyse the present practices of safety management. So the study will be carried out by Safety and Emergency Management (SEM) model. In this study, data will be collected in details from a few sites with the permission of company authorities. Data will be collected regarding safety practices adopted at their respective sites and conclusion will be computed.

A. CHECKLIST PREPARATION

The factors and causes for the accidents are found in many of the research papers and also the actual condition of sites may lead to making the perfect Preparation of Checklist. The actual data is to prioritise these factors according to their impact to minimize the accident rate on site.

Likert Scale

A Likert item is simply a statement that the respondent is asked to evaluate by giving it a quantitative value on any kind of subjective or objective dimension, with the level of agreement/disagreement being the dimension most commonly used. The Likert scaling method is each to adopt and gives brief or actual causes of any projects with good accuracy level. It is easy to use the Likert scale. All the score of surveyed delays is ranked from lower value to higher value as per significance level. The Questions are categorized as per Significant Level as 1-not significant to 5-Extremely Significant so according to this scale higher value represents the agreement to higher or extremely significant value and lower value to not significant value.
These are categorized as follows:-

1. Unimportant factor - 1
2. Somewhat important factor - 2
3. Quite important factor - 3
4. Very important factor - 4
5. Extremely important factor - 5

2 Relative Importance Index

The Relative Importance Index (RII) ranking method had been applied to determine the ranks of the different important parameters which are related to the safety and emergency management. From the ranking assigned to each point, it is able to identify the most important safety parameters which are useful in the construction industry for the easy working with less number of accidents and with more reliability. The RII has been used in many domains to evaluate the comparative importance of a single item to others. The following equation is used to compute the relative importance index for all the reasons.
The five-point scale ranging from l (Unimportant) to 5 (Extremely important) is adopted and transformed to relative importance indices (RII) for each factor as follows:

$$RII = \frac{\sum W}{A * N}$$

Where:
W = Weightage given to each factor (ranging from 1 to 5)
A is 5 (the highest weight) and
N is the Total number of Respondents
The RII value had a range from 0 to 1 (0 not inclusive), the higher the value of RII indicates that the more important parameter regarding safety management in the Construction industry.

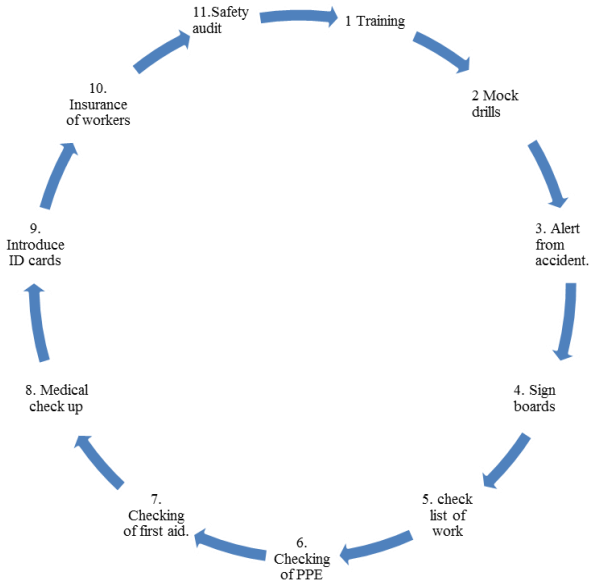
B. ANALYSIS OF SURVEY

For the study of the current status of the safety and emergency model in Indian construction sector, I visited near about 20 sites in and around Pune. After visiting all the sites I found that a lot of construction companies are just using the safety management on paper (only for the show purpose) and due to this reason they have to face accidents on sites.
To find out the actual reasons for the accidents and also the rate of accidents I prepared the checklist which carries the rating system to find out the most important parameters related to the safety and emergency management. And for finding the other important parameters of safety management the data is collected from the books, net and review papers etc.
After finding the important parameters all these are arranged in a checklist format and is linked to the Likert scale to find out the exact importance of these factor on the actual site.

IV SAFETY AND EMERGENCY MANAGEMENT MODEL (SEM)

To reduce the causes of accidents and number of accidents a Safety and Emergency Management model is suggested which

describes the organization chart along with duties and responsibilities of various safety personal. It also describes the working of the safety committee, the frequency of training and safety meetings as well as the use of personal protective equipment.
Safety and Emergency Management model is a guideline model which is developed based on a survey, data collection, interviewing safety engineers from all the sites selected for the study. It contains the organization chart, general safety rules and gives activity wise precaution on the site. The main purpose of SEM is to reduce the accidents on site and enhance safety management on sites.



GENERAL SAFETY RULES OF SEM

1. Wear personal protective equipment like safety helmet, safety shoes, safety goggles, hand gloves etc. as required and without exception.
2. Good housekeeping must be maintained to the maximum possible extent. A clean area of working is always a safe place to work. All roads, passage, walkways must be always kept clear off materials.
3. Any hazards unsafe condition noticed then it should be reported to the supervisor for immediate action taken.
4. Watch your footing to avoid slips, falls.
5. Report all incidents even if minor in nature.
6. Do not go the site of fire or accident unless you are instructed.
7. Keep yourself alert especially around operating equipment and machinery.
8. Conduct tool box talks daily for workmen.
9. Never use drums, concrete blocks as parts of scaffolding.
10. Never carry sharp or pointed tools in your pockets.
11. Drinking of alcohol must be prohibited.
12. Keep working area free of loose materials.
13. Never leave tools of equipment or materials in such a position that they can fall on some on working below.
14. For the performance of work, it is necessary to provide having expert people, proper plan, and experienced supervisor.
15. It is necessary to keep and maintain all safety devices and safety guards sound and operative. In the case of any damage, these should be respired, restored, and returned immediately.

EMERGENCY MANAGEMENT

Modern industry, characterized by complex process and technology is open to an ever increasing danger from disasters, which can seriously affect the safety, security, and stability of the organization. Some of these disasters are natural such as earthquakes, floods, tsunamis, cyclones, lightning, while others are man-made. The man-made disasters included dangerous spills & leak of chemicals, fires & explosions, hit by external objects, contamination & poisoning of food, terrorist attacks, etc. All of these have occurred several times in industries, when unprepared for such disasters creating panic, disorder, and confusion. The result has been extensive damage to men and material. Major accidents/disasters in a factory are one which has the potential to cause serious injury or loss of life. It may cause extensive damage to property, loss of life and serious disruption both within and outside the works.
An emergency plan is an informative document, which acquaints the occupants of a factory or occupancy with procedures to be implemented, during an emergency. It details standard operational guidelines to emergency controllers and their personnel, who may be required to fulfill a key functional role, during the various stages of an emergency. In other words, it contains critical information, which can assist emergency services personnel to formulate appropriate incident management strategies and tactics, when attending on an emergency at a plant. Since it is a critical document in implementing appropriate management strategies, it is important that the plan is comprehensive and easy to read and use. Each work shall formulate an emergency/disaster management plan, detailing explicitly what action will be taken in the event of a major accident occurring on site, to prevent further escalation and to ensure rapid control. The emergency planning within the factory premises is known as On-Site Emergency Plan.

DISCUSSION

This study demonstrates the importance of safety and health in construction and highlights the factors affecting safety on construction projects. The benefits of safety and health improvement include: reduced accident costs, increased productivity, improved human relations and enhanced firms image. Age and experience have an impact on the level of safety on construction sites. Safety and health should be included as a project parameter, which means it should be considered during all phases of a project

CONCLUSION

- It is observed that many of the Construction projects are not working with respect to safety and emergency management which is the primary cause of a major number of accidents.
- By using SEM model these accidents may be reduced up to a large extent. SEM model is helpful for motivating towards the safety and it increases the company's profit due to fewer accidents. It can be implemented from ground to top level of management.
- General safety rules are helpful for workers and Working of safety committee will manage the safety on sites.
- Suggested model of each activity gives precaution of safety on construction sites under risks and hazards. The checklist of each activity avoids the occurrence of the accidents.

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