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Safety Management in Construction Industry

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ABSTRACT: Over the past few years construction work has been increasing in undeveloped as well as developed countries. In developing countries, safety rules usually do not exist; if they do, the regulatory authority is usually very weak in implementing such rules effectively. India is mainly agricultural based country but now a day construction industry stands next to agriculture. Construction job is very risky jobs as compared to other in safety point of view. The disturbing thing in construction work is mainly number of fatalities occurring. This is mainly due to lack of knowledge regarding work even the training or safety during the work. So it is important to standardize safe management system. In this paper, identify cause of accidents, assessed, and satisfactorily rectified. Also several construction safety techniques were used for the safety of major construction organizations across India involved in construction industry.

KEYWORDS: Safety Management; Accidents; construction safety management (CSM); Health and Safety Executive (HSE)

I. INTRODUCTION

Construction industry life is now a day very fastest growing in India. In construction industry during working safety of human life is important issue. In construction sector the lot of crowd is comes or connected from rural area, so there is a lack of knowledge regarding the safety and regarding the training and these are two main factors which are cause for the accidents. Safety means free from danger or risk and also safety is the state of being safe. Safety management is an organizational function, which ensures that all safety risks have been identified, assessed and satisfactorily mitigated. As per the survey in India the most of construction industries especially in rural areas are do not have safety and emergency department in there firm. In some construction industries safety and emergency responsibilities is just given to individuals who do not possess proper knowledge and experience in this field also there are safety and emergency provision made but implementation of these provisions are not found which can prevent accidents. 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. NEED OF WORK

The need of this research is to determine the importance of integrating and improving safety management standards within construction project management in India. To improve health and safety standards at construction sites by covering general emergency and safety provisions as well as duties and responsibilities of the employers, engineers, contractors, and sub-contractors regarding safety measures and the minimum necessary requirements.

III. ADVANTAGES AND DISADVANTAGES

Accidents in construction sites are unplanned incidences involving movement of persons, objects or materials which are result in injuries, damages and losses to properties or people and to reduce these proper safety and emergency management is needed in construction industry. On sites accidents occur due to unsafe conditions, unsafe act and

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beyond human control. In construction industry lot of companies are having the safety management but every company is not using the modern techniques But just they are carry a basic safety management. Small projects are not working with respect to safety and emergency management which causes the major number of accidents but the large projects are working by using safety and emergency techniques which results the less amount of accidents.

Apart from lack of knowledge; lacks of motivation, lack of knowledge about safety in workers, no use of personal protective equipment, communication problems are some main safety management problems occurred in small scale even in large scale construction industries. So training should be given according to their requirements on site to workers. If some techniques of safety managements are use it can prevent major loss that is loss of human life, health loss and economical loss.

IV. RELATED WORKS

Construction safety in the literature review mainly falls into 4 categories.

- Accident statistics and causes of construction injuries or fatalities.
- On site accident prevention methods.
- The role of stakeholders, apart from contractors, in preventing accidents.
- Safety management and hazardous control measures in construction.

There is very little literature relating directly to the construction safety sites in developing countries. Present works provide information on how accidents may be prevented but assume that a strong regulatory body exists to enforce legislation. This literature review therefore presents information which is either specific to developing countries or has been prepared in a developed country context but would also be applicable to developing countries. The construction industry is a labor intensive industry both in developed and developing countries, with a large number of tasks being undertaken in similar ways in both regions. But the number of accidents in foreign countries is very less compared to India.

4.1 Accident statistics

In the economic point of view, the construction industry plays a vital role as it typically contributes 10% of a developing country. Accidents as an unplanned and unexpected occurrence, which upsets a planned sequence of work; are resulting to loss of production, injury to personnel, damage to plant and equipment and eventually interrupting production flow. Control measures as an act of limiting or making something to happen in a particular way, stop something from spreading, going out of hand or getting worse. Identify safety in construction as the process or way of protecting the health and life of those who build, operate, maintain and demolish engineering works; and others affected by those works. In Helander^[2] analyses 739 construction fatalities that occurred in the UK. He found that fifty two per cent occurred due to falls from roofs, scaffolds and ladders. Falling objects and material were involved in 19.4% of the deaths, and transportation equipment, (e.g. excavators and dumpers) were involved in 18.5%. Helander also found that 5 per cent of construction accidents occur during excavation work. The categories used for classifying fatal accidents were:

- Falls
- Falling material and objects
- Electrical hazards
- Transport and mobile plants
- Other

Most of the accidents that involved falls occur during work on roofs, scaffolds and ladders. Moreover, collapses of structures and falling materials also contribute for a large proportion of victims^[3] Many of the safety hazards are particular to the different trades, and usually construction workers underestimate the hazards in their own work which affects the motivation for adopting safe work procedures. The establishment and use of procedures and regulations to enhance safety can avoid a large proportion of these accidents. There are also forceful monetary incentives in construction safety as it is estimated that construction accidents amount to about 6% of total building costs; this should encourage the industry as well as the regulatory agencies to invest in construction safety. In Dedobbeleer and German

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^[4] estimated the relationships between a worker's safety performance index and attitudinal issues related to safety. The authors considered three factors; reinforcing factors, enabling factors, and predisposing factors. Reinforcing factors compute the attitudes of other towards safety; enabling factors measure the availability of safety factors at the work place; predisposing factors measure the knowledge and attitudes towards safety of the individual worker. Some other factors like demographic were also used for interaction. The inclined factor alone explained most of the variation in safety performance. Majority of the workers under the age of 26 had relatively low safety performance scores & relatively little knowledge about safety and an unfavorable attitude towards safety performance. The study concluded that:

- Falls are the most serious hazard.
- Research on safety motivation shows that hazard recognition is an essential element.
- Many accidents involve hand tools. Ergonomics can improve safety through better design.
- Protective equipment needs to be comfortable.
- The paper also dealt with the psychological aspects of safety, such as motivation and attitudes.

Hinze and Pannulu^[5] explored the impact of new workers and turnover rate on safety. In this paper they identified the following key factors:

- Superintendents with the same crew from the earlier jobs had fewer injuries.
- Employer Safety enhances when the employer retains the worker for one year, and the advantage increase with longer continuous service.

4.2 Accident prevention and safety management

Jannadi^[6] conducted a model survey of 86 safety officers and 173 workers from the top 200 construction companies in the UK to discover the key factors in accident prevention. Unlike many other studies the opinion of workers as well as safety officials was also considered more conventionally, the focus remained on large construction companies. The six most important factors were:

1. Maintaining safe work conditions
2. Establishing safety training
3. Safety education to support good safety habits amongst workers and supervisors
4. Effective control of the main contractors on site
5. Maintaining close supervision of all work
6. Assigning safety responsibility to all levels of management and workers.

Hinze and Pannulu^[5] found that the safety performance is improved by the increased job control. Damages or injuries are found to be lower for projects in close proximity to the home office which was primarily due to more frequent visits by top management^[8]. A longer duration of employment also improves a worker's safety performance. Hinze and Figone^[9, 10] investigated the effects of the general contractor on specialist contractors for small, medium and large-scale projects. In addition to the safety factors discussed above, they found the following additional factors improved safety with subcontractors: Companies that negotiated a majority of prime contracts were safer.

- Smaller projects, projects with fewer specialty contractors and negotiated contracts resulted in fewer accidents.
- Less schedule pressure.
- Involvement of specialist contractors in meetings with owners/clients.
- Project schedules produced with onsite departments.

Hinze and Harrison^[11] identified safety program practices in large companies which resulted in a reduced injury rate. They identified the following key factors in safety:

- Field safety representatives hired by the corporate safety director.
- Field safety directors trained their subordinates.
- The safety director reports to the vice-president or the president of the company.
- New workers received formal safety orientation. Safety awards were given to the workers and the foreman.

This was followed by another study by Hinze and Rabound^[12] which founded the suitable means of achieving or maintaining an acceptable safety performance

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4.3 Role of stakeholder apart from contractor

Young^[14] described the role of site engineers to improve safety at sites. In order to obtain fully common project goals of greater value, lower costs and reduced risk, engineers on the front line must take the lead in implementing innovative, yet pragmatic approaches that strategically integrate safety concerns into the project management process. While significant improvements in safety performance have been made in the past few decades, one party within the project team, the designer, has not been directly involved in the safety effort. Sweeney^[17] pointed out that the future of health and safety in the construction industry depends on a collaboration of many parties, including labor, industry, academia, private organizations and government. The National Institute for Occupational Safety and Health (NIOSH) is the single federal organization mandated by US Congress to conduct research to protect the health and safety of workers. Its successes through its partnerships over the past five years demonstrate that H&S is an important element of the construction job.

4.4 Safety management and hazardous control measures in construction

Selvan A. & Krithikapriyadarshini^[18] Accidents as an unplanned and unexpected occurrence, which upsets a planned sequence of work; are resulting to loss of production, injury to personnel, damage to plant and equipment and eventually interrupting production flow. Thus, control measures of accidents to ensure safety of workers and minimize accident related waste on sites are essential. For this essential field survey is important which involves a designed questionnaire that was administered through convenience sampling technique within Lagos State and descriptive analysis tools were used for the analysis. The field survey reveals different control measures in place and their rate of usage on building projects.

To avoid the hazardous effects some important precautions should be taken but the usage of accident control measures are different from site to site i.e. helmet, first aid services, protective clothes and traction boots etc. Also safety officer, different from the site engineer or manager, should be employed on site to specifically plan, monitor and ensure adherence to control measures on site to minimize accidents occurrence and waste.

V. PROCEDURE FOR SAFETY MEASURES

5.1 Safety plans

Management of any construction firm has the responsibility of developing a comprehensive and written safety program that is performance oriented. The information should include the basics of personal protective equipment, the proper use of tools and power equipment, safe work practice, company policy on safety, safety responsibilities, emergency procedure, etc. This document must be made available to every worker on site and adherent to it must not be compromised. The responsibility of the safety personnel shall be to draw up a safety plan, setting out the rules applicable to the construction or building site, and shall make any adjustment to the plan, ensure effective distribution and use of safety equipment.

5.2 Safety training

Safety training is an essential part of any safety and health program. Safety personnel and site workers should be trained in hazard identification, control and method of encouraging safe practices. The safety training and meetings must emphasize the project's safety requirements, review past activities, plan ahead for new operations; discuss the causes of accidents on site and ways of preventing future occurrence. This training should be provided in the language well understood by the workers.

5.3 First aid arrangements

First aid facilities must be provided on site regardless of the size of the project and the number of workers on site. In case of any injury such as cuts, strips or trips; prompt treatment with first aid facility can help prevent further aggravation of such injury. The employer should be responsible for the provision of first aid facility and personnel at all time on site.

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5.4 Management policy at work place

The type of management policy or commitment to safety at workplace is very essential to the prevention of accidents Health and Safety Executive (HSE) and Occupational Safety and Health Administration outline preventive measures as:

1. Wearing clothes that are appropriate to the work and weather condition on site. Wearing of hand gloves.
2. Wearing of work traction boots at all times on site. Wearing of hardhats or helmet at anywhere on site. Provision of eyewear or goggle for welding purposes etc.
3. Constant inspection and assessment of equipment, plants, tools and other site materials before use.
4. Organizing effective safety training for all site workers and personnel whether on site or off site. And Provision of effective first aid facility and personnel on site.
5. Provision of barriers, signs or reflector around dangerous areas on site.

VI. CONSTRUCTION SAFETY MANAGEMENT

This consists of three phases;

- (1) Planning and Preparation
- (2) Identification and Assessment
- (3) Execution and Improvement

Phase1. Planning and Preparation: In this, construction organizations must first initiate the safety program through an effective preplanning and resource development process.

Phase2. Identification and Assessment Phase: This phase consists of developing safety goals and objectives, management training and strategic decision making on safety management techniques.

Phase3. Execution and Improvement Phase: The final phase of the CSM implementation is the execution and improvement phase. At this stage, the new culture must be incorporated in the mix, employee-training programs must be launched, and all safety performance closely monitored to promote continuous improvement.

VII. CONCLUDING REMARKS

Owing to increase in complexity of operations, the construction industry has become more dangerous than ever before. Construction organizations are faced with the challenge of having to closely monitor their safety management systems to minimize occupational hazards. In India effective safety construction management is not available. Moreover, the key to proper safety execution is not necessarily through strict guidelines and standards, but through an effective total safety management initiative, first supported by an organizations senior management, then integrated via specific safety management implementation tools/ systems, and finally by continuous follow up and monitoring to ensure quality and continuous improvement. The authors would like to conclude that the single most important determinant of the success of an organization in implementing CSM is its ability to translate, integrate, and ultimately institutionalize CSM behaviors into everyday practice on the job.

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