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Safety Management Analysis In Construction Industry

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ABSTRACT
The Indian society and economy have suffered human and financial losses as a result of the poor safety record in the construction industry. The purpose of this study is to examine safety management in the construction industry. The study will collects data from general contractors, who are involved in major types of construction. Collected data include information regarding organizational safety policy, safety training, safety meetings, safety equipment, safety inspections, safety incentives and penalties, workers' attitude towards safety, labor turnover rates and compliance with safety legislation. The study will also reveal several factors of poor safety management. Thus the paper will conclude by providing a set of recommendations and strategies to contractors for improving their safety performance.
KEYWORDS: Safety, Management, Analysis, Construction, Industry.

I. INTRODUCTION

The significance of the construction industry to the economic and social life of the country is noteworthy. The industry needs much investment and involves various types of stakeholders and participants. From the point of view of safety the conditions normally encountered in the construction industry does not lend themselves to the degree of control, Possible in other industries where more stable conditions are generally obtained. The construction industry is usually very large, complex, and different from other industries. Hence it is prone to numerous health hazards.

II. SAFETY

For many years safety professional have been aware that the majority of workplace accidents are triggered by unsafe behaviors, and that their control is one of the keys to successful accident prevention. However, many organizations, even those companies with low accident rate have been frustrated by their inability to control unsafe acts.

2.1 Importance of Safety in Construction

The construction industry has traditionally been considered as a hazardous occupation due to the high incidence of occupational injuries and fatal accidents. The number of fatal occupational accidents in construction all users the world is not easy to quantify, as information on this issue is not available for most countries. The outlay on construction in successive live year plans of India has been in the range of 36% to 50%.

2.2 Need for Safety Management

The construction industry has some special features which have a direct bearing on the accident potential. In this trade the pattern of work is ever changing. The operations and physical circumstances change constantly unlike in the factories where the process, the method and the operations are generally respective. Timings and schedules vary considerably from place to place. The most important changing factor the change of men themselves. The inherent nature of construction jobs combined with the above factors make this industry as one with accident risks.

2.3 Safety Clauses In Contract Documents

All Contract documents signed by the Owner and contractor contains various safety clauses wherein the contractor is obligated to make Provisions for the safety of men and structure and the consequences for failure to do so. The contractor is already mandated by law to comply with state and national regulations. The owner has to demand that the contractor document and implement the proper safety programs that will protect employees working on the job site. Owners sometimes hesitate and feel that they are interfering with the contractor's say of doing business if they express concern over safety at a jobsite. In reality owners have the absolute right to mandate that a quality safety program be an important part of the selected contractor's culture.

2.4 Safety Programme

The safety program of a Construction organization is a compact package which comprises a safety policy, safety department to implement the policy, and specially trained personnel to man it. The general safety inspection program that has to be followed in Construction site is shown in figure 2.1

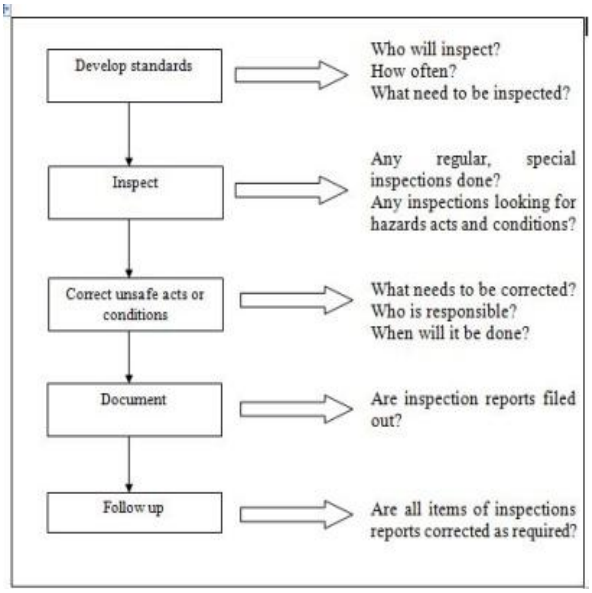

Fig 2.1 General Safety Inspection Program

III. METHODOLOGY

The present study was conducted to establish to measure real time safety management performance on construction sites. The methodology adopted in this work is the collection of data by the method of survey. Surveying with a help of questionnaire was found to be most efficient based on the literature review conducted by the author and shown in figure.3.1

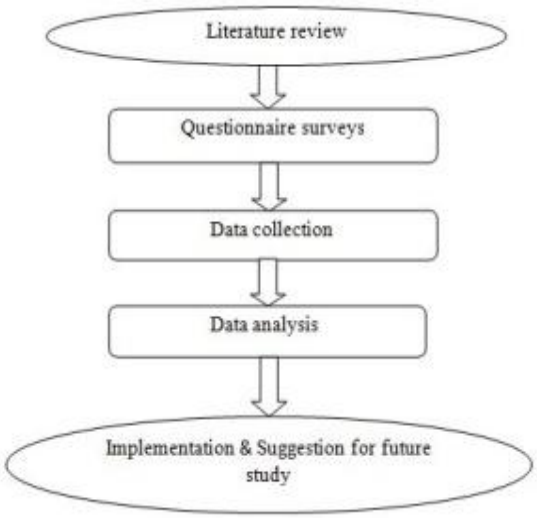

Fig.3.1.The methodology adopted in this work

3.1 Method of Analysis

SPSS Statistics is a software package used for statistical analysis. It is now officially named "IBM SPSS Statistics". SPSS Statistics (originally, Statistical Package for the Social Sciences, later modified to read Statistical Product and Service Solutions) was released in its first version in 1968 after being developed by Norman H. Nie, Dale H. Bent, and C. Hadlai Hull. SPSS is among the most widely used programs for statistical analysis in social science. It is used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and others.

IV. RESULT AND DISCUSSION

The questionnaire was distributed among twenty five companies mostly around Chennai. Totally Fifteen questionnaires returned us on date. The response rate was (60%).The percentage of companies that had participated in the survey are shown in the table 4.1

Table 4.1 Distribution of questionnaire

Sl.no	Type of Organization	Percentage of response received
1	Developers & Promoters	40
2	Contractors	33
3	Sub contractors	20
4	Consultants	7

Totally for twenty five companies the questionnaires were given, out of which fifteen had an effective reply. Thus the response rate is 72% which is considered a good response in this type of survey. All the questionnaire survey was done from project manager or project engineer, site engineer of the project at the construction site. In the Fifteen questionnaires, there are 7 project managers, 6 site engineers and 2 design engineers are answered the questionnaire. In some cases, consultant gave the answers on behalf of their clients, both from the owner and the contractor side. Even email reply was accepted since it was difficult to get the direct one to one meeting with the Project managers. The percentage of safety investment that was made by the companies is less and not defined clearly. The general types of accident that commonly occur in construction site as observed by the respondents are stated below:

1. Falling from height.
2. Failure of temporary structures.
3. Fall of objects.
4. Hit by object.
5. Electrocution
6. Slippage.
7. Caught in between
8. Collapse.

The cause for accidents as stated by the respondents is shown in figure 4.1. Out of the ninety companies surveyed accident has occurred in twelve construction sites. There is no fatality in the surveyed companies. The damages that are reported after an accident are worker injury, loss of man days, wastage of material, breakage of form materials, financial claims, etc. the financial loss in terms of claim for medical treatment to injured worker, insurance claims and material costs vary from rupees ten thousand for minor injuries to one lakhs fourty

thousand rupees. Out of the fifteen companies surveyed four companies face legal suits for the cause of accident. Bar chart for surveying results as shown figure 4.1

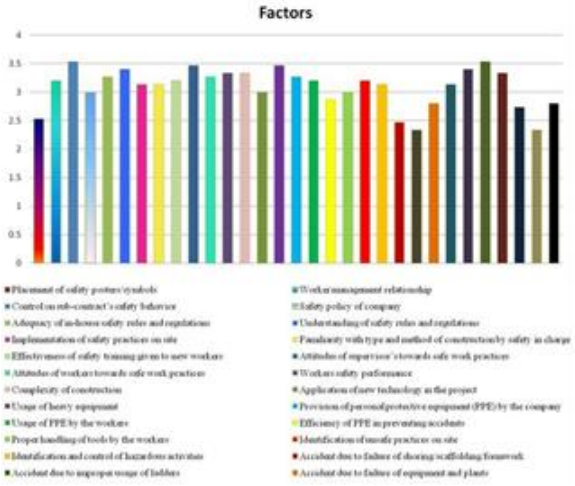

Figure 4.1 Bar chart for survey results

Most of the companies that take part in the survey have a separate environment health and safety (EHS) document. But the safety provisions that are recommended in the EHS document are not implemented in construction sites.

The results of the Likert scaled questions are shown in Table 4.2 the mean value of all the factors that affect construction site safety vary between 2.33 to 3.53, which emphasis that in the whole of the companies that was surveyed the safety features are between low and high level. Out of the thirty one factors considered three factors were ranked as very high, ten factors as high, fourteen factors as medium and four factors as low effect with respect to safety. The coordination and control of sub contactor, control on sub contractor's safety behavior and the provision of personal protective equipment by the company were ranked as top three factors that affect construction safety with an average mean of 3.53, 3.47 and 3.40 respectively. Results of Likerts scaled questions in given below the table 4.2.

Table 4.2 Results of Likert scaled questions

FACTORS	Mean	Standard Deviation
Placement of safety posters/symbols	2.53	0.92
Worker management relationship	3.20	0.77
Control on sub-contract's safety behavior	3.53	0.64
Safety policy of company	3.00	1.13
Adequacy of in-house safety rules and regulations	3.27	0.80
Understanding of safety rules and regulations	3.40	0.99
Implementation of safety practices on site	3.13	0.92
Familiarity with type and method of construction by safety in charge	3.13	0.64
Effectiveness of safety training given to new workers	3.20	1.26
Attitudes of supervisor's towards safe work practices	3.47	1.25
Attitudes of workers towards safe work practices	3.27	0.80
Workers safety performance	3.33	0.72
Complexity of construction	3.33	0.72
Application of new technology in the project	3.00	1.13
Usage of heavy equipment	3.47	1.13
Provision of personal protective equipment (PPE) by the company	3.27	1.10
Usage of PPE by the workers	3.20	0.94
Efficiency of PPE in preventing accidents	2.87	0.92
Proper handling of tools by the workers	3.00	0.65
Identification of unsafe practices on site	3.20	0.77
Identification and control of hazardous activities	3.13	1.06
Accident due to failure of shoring/scaffolding/formwork	2.47	1.30
Accident due to improper usage of ladders	2.33	1.05
Accident due to failure of equipment and plants	2.80	1.15
Frequency of safety inspection carried out	3.13	0.92
Co-ordination, control and management of sub-contractors	3.40	0.91
Workers language and communication barriers	3.53	0.92
Workers adaptation to working environment	3.33	0.90
Degree and level of punishments in terms of fines	2.73	1.10
Degree and level of punishments in terms of suspension from work	2.33	0.90
Introduction of incentives for safe workers	2.80	1.01

This booklet has been prepared based on the provisions of "BUILDING AND OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) RULES, 1996" The booklet has been prepared for possible implementation of required safety measures in construction sites.

The Act has been made applicable to even small establishments employing 10 workers in any building and other construction work.

V. SAFETY COMMITTEES

Every establishment wherein 500 or more building workers are ordinarily employed, there shall be a safety committee constituted by the employer which shall be represented by equal number of representatives of employer and the building workers employed in such establishment

The main functions of the safety committee, shall be,

1. To identify probable cases of accident and safe practice in building or other construction work and to suggest remedial measures.
2. To stimulate interest of employees and building workers in safety by organizing safety weeks, safety competitions, talks and film shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
3. To go round the construction site with a view to check unsafe practices and defect unsafe conditions and to recommend remedial measures for their rectification

including first aid, medical and welfare facilities.

4. To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including use of proper personal protective equipment.

VI. CONCLUSION

The work environments in construction activities are generally more hazardous, than other industries due to the use of heavy equipment, dangerous tools, and hazardous materials, all of which increase the potential for serious accidents and injuries. Therefore, it is evident that a focused dedication inwards safety is needed from construction at all levels. It can be inferred from the survey data that safety managers have the opportunity to influence and enhance the sense of safety and the quality of the work environment. Owners of large projects can more actively participate in construction safety management in each stage of project execution including project design contract selection, contract development, the construction phase, selecting safe contractors, and developing the safety culture on the projects through safety training and safely recognition programs.

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