Review On "Study And Analysis Of Safety Management At Construction Projects"

Miss. Vijaya D. Gayki[1], Prof. Dr. Pankaj P.Bhangale[2]
[1]Dept of Civil Engineering
[2]Associate Professor, HOD, Dept of Civil Engineering
[1, 2] M.E. (CT & M) SSGBCOET, Bhusawal - 425201, India

Abstract- *Cases of construction site accidents always happen. In line with the efforts to reduce accidents at construction sites, the objectives of this research are to determine the current safety practices at construction sites, to identify the safety practices related problems, and to identify the strategies to reduce the safety practices related problems. The practices to be followed are safety policy, education and training, site safety inspection, safety auditing, safety meeting, site safety organization, personal protective equipments, emergency support and safety measuring devices, fall protective systems, and safety promotions. The findings of this research would reduce the gap of understanding on the aspect of safety practices at construction site and can be used as a source of reference in the site safety management.*

Keywords- High-rise Building, Safety Management, Safety analysis in High-rise Building

I. INTRODUCTION

Construction sites are dangerous places where injury death or illness can cause to workers. These can happen due to electrocution, falling from height, injuries from tools, equipment and machines; being hit by moving construction vehicles, injuries from manual handling operations, illness due to hazardous substance such as dust, chemicals, etc. Even nail standing up from a discarded piece of wood can cause serious injury if trodden on in unsuitable shoes. Statistics of accidents in the construction industry in India are scarce. The rate of accidents on construction industry is very high not only in India but also in many other countries including the developed. Construction industry has accomplished extensive growth worldwide particularly in past few decades. For a construction project to be successful, safety of the structures as well as that of the personnel is of utmost importance. The safety issues are to be considered right from the design stage till the completion and handing over of the structure. Construction industry employs skilled and unskilled labourers subject to construction site accidents and health risks. A proper coordination between contractors, clients, and workforce is needed for safe work conditions which are very much lacking in Indian construction companies. Though labour safety laws are available, the numerous accidents taking place at construction sites are continuing. Management commitment towards health and safety of the workers is also lagging. A detailed literature study was carried out to understand the causes of accidents, preventive measures, and development of safe work environment.

Investigation in 'Safety Management' is a vast topic having a huge research going on several aspects of this topic. Various authors have different contribution in their own respective method or technique. It becomes intense need to learn and understand the views of various authors from various parts to give our own contribution on this topic. Purpose of this chapter in this report is to highlight the work done on study of Safety Management in construction and give some terms which will be useful further in this report.

II. LITERATURE SURVEY

Dr. Chandra Pinnagoda *et al.* (1995) has discussed about safety, health and welfare on construction site in this manual. It includes information about safety practices, policies and provisions for accidents. It also has information about handling of equipments and machineries. It helps to consider safety, health and welfare conditions on construction sites in our country and to learn about possible solutions to the problems encounter. [1]

S. Mohamed *et al.* (1999) conducted an empirical investigation of construction safety management activities and performance in Australia. He investigated the effectiveness of safety management activities currently adopted by Australian contracting organizations. A safety management survey has been conducted in the contracting organizations operating in the State of Queensland, Australia. Based on a research model depicting statistical analysis techniques, a safety management index reflecting the intensity of level of safety management activities has been developed to provide a means whereby individual organizations can be assessed and graded on their safety management commitment and attitudes. The author reported a detailed empirical analysis carried out to examine the relationship between the intensity of safety management

commitment and the overall safety performance, pro-activeness and record. [2]

In this paper S. A. Usmani *et al.* (1999) worked on activities and different stages involved during construction project. This paper also deals with safety standards and IS codes essential for the execution of design, construction work, etc. also it have a brief idea about safety as conceptual term to engineering definition. And this paper also include some noticed incidents occurred at construction project during execution. [3]

Sophie Hide, Sarah Atkinson, *et al.* (2003) had studied casual factors in construction safety. This project was instigated, previous research on accidents and injuries in the industry had largely been confined to the collection. This research is limited by problems with data collection and broad classification. There is collection of rich, detailed, data on the full range of factors involved in a large sample of construction accidents. Using this information, the processes of accident causation is discussed, including the contribution of management, project, site and individual factors in construction industry accidents. [4]

In this paper Luxembourg *et al.* (2004) discussed about the action to achieve better safety and health in the construction industry. It deals with achieving better safety and health in construction. This report describes 16 cases of good practice in the construction sector. The purpose of this report is to obtain examples of good practice from across Europe and make them available to interested parties. This report, by gathering together a collection of very different individual case studies from throughout Europe, aims to stimulate the development of discussion and action to make the industry a safer and healthier one to work in. [5]

This paper by Robin Turney, Lee Allford *et al.* (2004) provides an overview of PRISM in order to highlight those areas where human factors techniques are being applied in the process industries and the safety benefits which they provide. It includes study about improving human factors & safety in the process industries. The paper also includes an assessment of those areas where further research or development work is necessary. It deals with the improvement of safety in the European process industries through raising awareness of, and sharing experience in, the application of human factors approaches. [6]

Fang, Huang and Hinze *et al.* (2004) conducted a Benchmarking Study on Construction Safety Management in China. This paper presents information to measure safety management performance on construction sites. In China, the conventional construction safety benchmarking approach was to assess safety performance by evaluating the physical safety conditions on site as well as the accident records, while no attention has been paid to the management factors that influence site safety. The authors identified key factors that influence safety management and developed a method for measuring safety management performance on construction sites. Based on the survey and interview, data collected on safety management factors in 82 construction projects in China, the safety management index as a means to evaluate real-time safety management performance by measuring key management factors was developed. The author concluded that this method can be an effective tool to evaluate safety management on construction projects. [7]

In this paper Nongiba A. Kheni, Andrew R.J. Dainty and Alistair G.F. Gibb *et al.* (2005) discussed about health and safety management practices of small subcontractors. This paper is a report on research, which seeks to develop a model of health and safety management by small subcontractors and a tool that will facilitate effective health and safety management in small subcontractor organizations. The paper reviews health and safety management practices within small firms and describes the research methodology. [8]

Professor Albert P.C. Chan, *et al.* (2006) researched to improve construction safety involving working at height for residential building repair and maintenance in Hong Kong. It sets out to identify conditions where such works are necessary and to investigate the causes of associated accidents and problems. The objectives of the project are achieved by the findings from interview surveys, focus group meetings, literature review, questionnaire surveys, analysis of accident statistics and the analysis of case studies. [9]

Hassanein and Hanna *et al.* (2008) studied Safety Performance in the Egyptian Construction Industry. This study presents the results of a questionnaire survey that was conducted among a selected sample of large-size contractors operating in Egypt, as well as a comparison of the safety approaches in both the United States and Egypt. The results revealed that safety programs applied by large-size contractors in Egypt were less formal than those applied by their American counterparts. Only a few companies out of the surveyed sample had accident records broken down by projects and provided workers with formal safety orientation. The author recommended that reforms in the way of the employer's contribution to social insurance were necessary; thereby linking accident insurance costs to the contractor's safety performance. This is meant to serve as a strong incentive for safety management. [10]

Choudhry and Fang *et al.* (2008) suggested recommendations for improving site safety by listening to the viewpoints of the subcontractor's workers. The reason behind this was that the subcontractors deal with different situations that judge their action on how best to work safely on a construction project. The objective was broken down into three parts: workers viewpoint, unsafe behaviors and safety behavior. The author's goal was to understand the workers viewpoint as to why accidents happen and this was accomplished by performing in-depth interviews with workers. Gaining understanding of why construction workers engage in unsafe work behavior and identifying factors that influence their safety behavior was part of their study. [11]
Lopez, Ritzel, Fontaneda and Alcantara *et al.* (2008) conducted a study on construction industry accidents in Spain. They analyzed industrial accidents that take place on construction sites and their severity. Eighteen variables were studied. They analyzed the influence of each of these with respect to severity and fatality of the accident. [12]

According to John p. Spillane *et al.* (2011) a qualitative investigation of critical issues affecting management of health and Safety should be carried. This research investigates and identifies the various issues affecting successful management of health and safety in confined construction sites. The value of this research is to aid management and operation of brown field sites by identifying issues impacting on health and safety management in project process. [13]

Zubair, Kanya Lal and Allah Bux *et al.* (2013) carried out a study to identify the critical factors affecting the safety program performance in Pakistan construction industry. A questionnaire survey was conducted to highlight the influence of the Construction Safety Factors. The questionnaire survey was analyzed using AIM (Average Index Method) and rank correlation test was conducted between different groups of respondents to measure the association between different groups of respondent. The author finding that management support is the critical factor for implementing the safety program on projects. From statistical test, the author further concluded that all respondent groups were strongly in favor of management support factor as CSF (Critical Success Factor). [14]

Carcano and Franco-Poot *et al.* (2014) studied the Construction Workers' Perceptions of Safety Practices: A Case Study in Mexico. Organizational characteristics and worker perceptions were among the main factors affecting the safety climate in construction sites. Although some perceptions of workers may seem absurd to others, these components were part of their reality. Worker behavior was an extremely important factor in workplace safety as many accidents were often caused by insecure actions, in which combinations of human behavior were the consequence of such perceptions. The aim of this study was to explore workers' perceptions of safety practices in their habitual work environment, a building site in Mexico. [15]

III. METHODOLOGY OF WORK

- Literature surveys have been carried out by referring books, technical research papers, research journals, magazines etc. to understand the basic concepts about the topic.
- Now work is to be done in next step to know the research gap and necessity of safety management in actual.
- Data collection required for efficient safety management system for the construction projects based on check list survey and interviews with a variety of industry stakeholders and safety engineers.
- After study, analysis of data collected above is carried out i.e. details obtained from the above work are formulated, tabulated and then comparative study of safety management for the various construction project with reference to ideal safety management system.
- Analyze whether organizational health and safety association rules are useful or not for the construction industry. Finally interpretation of results is to be done and to make the conclusions.

IV. CONCLUSION

From the above review it is concluded that research have been carried out on the study and analysis of Safety Management for construction projects. For the analysis purpose, the basic information and data is to be collected by using check list survey and interviews with the various industry stakeholders and safety engineers. The main objective is to provide a system and resources to deal with precaution and prevention regarding safety to protect people, property and the environment and to minimize adverse impacts on people, property and the environment. Various types of misbehavior toward equipment hand list is the most basic reason for accident and prevent such case safety practices should be adopts. Several major problems are encountered in the safety practices. The problems are ignorance of workers on work procedures, lack of financial allocation for safety management, lack of awareness among workers, and language barrier between supervisors and workers. Several strategies have been suggested to overcome the problems, such as to provide effective safety training, allocation of budget for safety management, full commitment from the top management, and to provide safety booklets in various

languages as the strategies to reduce problems in safety practices.

V. ACKNOWLEDGMENT

I am highly grateful to thank my guide come Head, Prof. Dr. Pankaj P. Bhangale, Department of Civil Engineering, SSGBCOET, and Bhusawal for his constant intellectual support in the form of his innovative ideas and valuable guidance. His expert suggestions and scholarly feedback had greatly enhanced the effectiveness of this work.

REFERENCES

[1] Dr. Chandra Pinnagoda *et al. 'Safety, Health And Welfare On Construction Sites: A Training Manual'*, International Labour Organization, 1995.

[2] S. Mohamed *et al. 'Empirical Investigation Of Construction Safety Management Activities And Performance In Australia'*, Safety Science 33,129-142, 1999.

[3] S. A. Usmani *et al. 'Safety In Construction'*, First International Seminar Safe'99 On Safety & Fire Engineering, Cohin, In India, November 24-26, 1999.

[4] Sophie Hide, Sarah Atkinson, Trevor Pavitt, Roger Haslam, Alistair Gibb, Diane Gyi, Roy Duff, Akhmad Suraji *et al. 'Casual Factors In Construction Accidents'*, Loughborough University And Umist For The Health And Safety Executive 2003.

[5] Luxembourg *et al. 'Achieving Better Safety And Health In Construction'*, European Agency For Safety And Health At Work, 2004

[6] Robin Turney, Lee Allford *et al. 'Improving Human Factors & Safety In The Process Industries: 'The Prism Project''* Symposium Series No. 150, 2004.

[7] Fang, Huang And Hinze *et al. 'Benchmarking Study on Construction Safety Management in China'*, 2004.

[8] Nongiba A. Kheni, Andrew R.J. Dainty And Alistair G.F. Gibb *et al. 'Health And Safety Management Practices Of Small Subcontractors'*, 21st Annual Arcom Conference, 7-9, Soas, University Of London. Association of Researchers In Construction Management, Vol. 1, 105-14, September 2005.

[9] Professor Albert P.C. Chan, Professor Francis K.W. Wong, Dr. Michael C.H. Yam, Dr. Daniel W.M. Chan, Ir. Albert W.K. Kwok, Professor Edwin H.W. Chan, Dr. Edward C.Y. Yiu, Dr. Edmond W.M. Lam, Miss Esther Cheung *et al. 'Construction Safety Involving Working At Height For Residential Building Repair And Maintenance'*, Construction Industry Institute, Hong Kong And The Hong Kong Polytechnic University

[10] Hassanein and Hanna *et al. 'Safety Performance in the Egyptian Construction Industry'*,2008.

[11] Choudhry and Fang *et al. 'The behavior focuses and found that workers are involved in unsafe behavior because of lack of safety awareness'*, 2008.

[12] Lopez, Ritzel, Fontaneda and Alcantara *et al. 'Construction Industry Accidents in Spain'*, 2008.

[13] John P. Spillane, Lukumon O. Oyedele, Jason Von Meding, Ashwini Konanahalli, Babatunde E. Jaiyeoba And Iyabo K. Tijani *et al. 'Confined Site Construction: A Qualitative Investigation Of Critical Issues Affecting Management Of Health And Safety'*, Journal Of Civil Engineering And Construction Technology Vol. 2(7), Pp. 138-146, July 2011.

[14] Zubair, Kanya Lal And Allah Bux *et al. 'The critical factors affecting the safety program performance in Pakistan construction industry'*, 2013.

[15] Carcano and Franco-Poot *et al. 'Construction Workers' Perceptions of Safety Practices: A Case Study in Mexico'*, 2014.