

## **Assessment and Development of Model for Planning Safety at Building Construction Site: A Review**

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**Abstract**— This report tells the procedure to study building site safety planning; the report gives a healthy theoretical model which has its origins decisively fixed in appropriate intellectual and practical writing. It provides a serious analysis of the word “site safety planning during construction” and relative terms like safety, planning and its importance. The main objective of the research work is to analyze the site safety measures through descriptive statistics tools which are used at different building construction sites and then comparing that data with relevant safety codal provisions which are laid in BIS codes for a variety of aspects of safety measures at construction sites. The data is collected with the help of questionnaire by physically visiting the building construction sites. After the analysis of the data a site safety plan (model) is made which will be used for planning safety at building construction sites.

**Keywords**— *safety measures, site safety planning, construction sites, safety environment, safety management*

### **1. Introduction**

Construction safety and its planning are very much important in construction industry however, it is in demand all over the world due to its perceptional, emotional, behavioral, and administrative factors. To study the site safety one should practice safety culture as human life is irreplaceable. Site safety is a main concern for building construction companies all over the world. For a constructive and advanced safety traditions is fitting important as main fatalities in world are occurred at building construction sites. In such major accidents are occurred due to the poor site safety management. Site safety planning shapes and effects safety actions and safety program efficiency. To better understand the concept of site safety planning relative terms are also discussed like safety culture, safety climate, and behavior based safety which is important workings of the planned theoretical model of site safety planning. The planned model is the comparison with further site safety models reported in the writing to check its application.

### **2. Literature review**

**Alexander Laufer et al. [1] in 1986** examined many methods for classifying of medium and large construction sites. Measures which were studied included effectiveness, consistency, and strength and analytical capacity and then the reason for accomplishment or breakdown of safety plan at construction location was identified. The conclusion was drawn that for the successful safety performance at construction sites, process methods were more effective to their strength and analytical capacity but its effectiveness and consistency were low.

**Fabian C. Hadiprionoet al. [2] in 1992** the paper deals with the models which eventually tell us about the major cause of falls. The research binds that the fault-tree models are helpful as a tool to analyze building construction falls.

**Edward J. Jaselskis et al. [3] in 1996** this paper provides techniques for improving safety performance by analyzing numerical profiles of companies and sites with different levels of safety performance. This paper provided with strategies for better safety performance which could help the contractors.

**Keith.R.Molenaar et al. [4] in 2009** outcomes of a structural equation model SEM was identified, in addition to the relationship among group culture and safety performance. The SEM and the other measures gave a strong framework for measuring and civilizing group safety culture. Based upon the findings a list of measures was proposed by the author for improving group safety culture and safety performance.

**Matthew R. Hallowell et al. [5] in 2013** the paper concluded that safety at construction site is important at all construction phases. Measures for safety at construction sites should be taken before any hazard takes place. A mixed method research method was used during construction phase like measurements, monitoring and response and managements actions required. The author concluded that a very strong safety outcome is expected by using these project safety controls methods.

**Ophir Rozenfeld et al. [6] in 2010** the paper concluded that Hazard Analysis, was a well organized measure for safety threat evaluation which are used in manufacturing settings. A technique in support of analyzing hazard called “construction job safety analysis” (CJSA) was made. The work at construction sites are constantly changing and workers are more addressed to the hazard for the safety management in construction the technique was developed within the framework of study.

**P.S.Sathish.Kumar et al. [7] in 2012** A questionnaire survey and formal interview was conducted for checking safety measures at different construction sites and it was found that many sites were completely lacking in most of the safety measures which were safety programs and rule, safety program execution, use of individual defensive equipment, hazards and their safety, maintenance, urgent situation fulfillment. It was all negligence of the safety management’s team.

**Qian. Chen et al. [8] in 2012** presented case study on location for safety plan with a general service provider. The research was based on accident rate and safety violation by comparing before and after incident rates at construction site. It was useful in reducing and preventing accidents, which resulted in both reactive and proactive measurements for job site safety performance, are useful.

**Rafiq.M.Choudhry et al. [9] in 2007** concluded a conceptual model for site safety culture which should be used at construction sites. The model included 3 theoretical categories i.e. safety environment, behavior-based safety, and safety structure are useful at construction sites for the employee safety.

**Sjie Zhang et al. [10] in 2014** concluded by giving a automatic safety checkup rule BIM (building information models), this model automatically checks the hazards and gives a preventive measures which should be used during these hazards. It also gives the place and the problem why it has been detected.

**T. Subramani1 et al. [11] in 2014** the data was collected from general contractors of major projects going in India. The data included the site safety measures to be used at construction sites. The study revealed the poor site safety performance at construction sites. The paper provided sets of measures and strategy headed for contractors for civilizing site safety performance.

**S. Thomas Ng et al. [12] in 2002** examined a opinion poll survey was organised in Hong Kong for safety performance evaluation (SPE).The most common SPE at organization and execution of safety management system in collaboration by the legal authority. A safe working environment was provided for the employees of the project under a framework for safety performance.

**T. Michael Toole et al. [13] in 2002** results in survey of plan engineers, local contractors, and subcontractors which indicated that there was not regular agreement on site safety that should be used by any of these groups. Explanation regarding negligence at site is discussed and then specific site safety measures are recommended on future projects according to the factors needed to prevent accidents at site.

**Data Xinyu Huang et al. [14] in 2006** this thesis concluded the Study on the role of owner in the safety during construction .owner plays a very important role in site safety planning during construction. Owner gives a active participation in project execution and in developing a site safety performance. Survey was conducted and guidelines were given on how owner can play a important role in site safety performance.

**V.K. Bansal [15] in 2011** the study concluded that a 2D drawings and 3D models are used to identify the hazard at construction sites.2D drawings are converted in 3D models and a planner links its components with particular actions and execution order is defined. The report also suggested the use of 4D modeling which helps in executing what type of safety measures and when they should used.

**Mohd. Aqleem et al. [16] in 2015** concluded that most of the fatal injuries are seen the construction industries in developing countries. The workers are more affected by these hazards. Low concern is seen in developing countries towards the safety of workers therefore a strict legal enforcement for safety should be implemented so that there are fewer accidents at work place

### **3. Scope of research**

Safety plan can also be designed for more buildings where safety is at most important like the construction under the water or the construction which are done at very extreme areas where safety is needed.

### **4. Discussion**

According to the different researchers, it is seen that the safety system, safety policies, safety procedures and safety committees have the strong relation with the change and to inspire the intellect of site safety performance and the worth of the work surroundings at construction sites. Safety committees should give a site safety model which is not just a piece of paper but actual implementation of site safety measures which should be strictly followed by the contractors and owners.

### **5. Conclusion**

Based on review of the literature it can be accomplished that lack of systematic approach and lack of life concern is seen at construction sites. Safety culture can be followed at the construction site, this report proposed a model for planning safety during construction of a building at construction sites. That can be used as successful measure for improving site safety for projects under construction. Proper planning of the project, implementation, controlling and reviewing safety performance, the proper safety structure which is not just a rule file, but actual execution of the plan.

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