



## Scaffold : A Review of Safety Conditions on Sites

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### ABSTRACT

From the beginning, safety has been an essential point that has to be taken under consideration on any construction site. It may not be possible to completely eliminate the misfortunes in the construction industry because of the perilous nature of construction operations involved in it. However, if safety measures are properly imposed, it will help in curtailing accidental injuries in the various operations involved in different types of civil engineering works. Improper scaffolding and ignorance of the safety instructions may lead to fatal accidents on site. People on construction scaffoldings work in dynamically varying, often adverse climate which may increase risk of accidents. It is therefore necessary that obligatory safety should be taken care on while working in a risky environment to prevent misfortunes and troublesome situations. As scaffolding is a temporary structure used to carry out different works at heights the higher components affecting the scaffolding related works that leads to accidents at the construction sites are caused by the human factors. Scaffolding hazards are accident hazard, physical hazard, chemical hazard, psychological hazard, ergonomic hazard and organizational factors. Control measures are needed to be taken and the labors working on site must be provided with proper training regarding the safety and acknowledgement of scaffolding hazard and prerequisites of measures as improper use of scaffolding is considered fearsome. This paper presents a review of all such authors who studied about the safety measures that are to be focused on while laying a scaffolding on site.

**Keywords :** Safety, Scaffolding, Misfortunes, Perilous, Accidental Injuries, Prerequisites.

### I. INTRODUCTION

Scaffolding is a temporary structure which is used on construction sites for repair of building, to support people and materials and on other high rise buildings.

As we all know safety is are top most priority in any constructional site. There are many such cases happen

in India and all over world due to improper scaffolding.

Accidents take place due to scaffolding which cause of a technical (T), Organisational (O), and human (H) nature.

24.6% off all causes were technical, 48% were organisational causes and 27.4% were human causes.

Accidents came from a lack of or inadequate equipment that secures working on scaffolding, and also improper collective protection measures e.g. Roofing or protective nets, poor stability of scaffoldings or its components and also an inadequate spatial structure of scaffolding.

Nevertheless, 100% safety can never be guaranteed even though the scaffolder have worn all safety measures. By hazard analysis, the rest of accidents in metal scaffolding is found to be 0.32 and that in bamboo scaffolding is found to be 0.68. By AHP, the risk of accidents in metal scaffolding is found to be 0.61.

The safety assessment by the two methods results in even conclusions. The results indicates that the labours in bamboo scaffolding easily get nervous, drained, exasperated and act inconsistently, all of which are easy to make accidents happen.

When synthetically analysing the safety performance, economic effectiveness, as well as quality, company's images Metal scaffolding is much better as compared to bamboo scaffolding.

## II. LITERATURE REVIEW

### 1. Robert Bucon<sup>1</sup>, Agata Czarnigowska<sup>2</sup>, Piotr Kmicik<sup>3</sup>, Aleksander Robak<sup>4</sup> (2019)

In this paper authors have collected data and compared scaffoldings observed in two big cities Warsaw & Pozan. The authors conducted regular observations of scaffolding erected in selected polish urban areas [1]. It gives a good idea of the qualities of scaffolding that are there in use and enables estimating changes in the number of scaffoldings in a year in polish construction frame scaffoldings are most commonly used type. Users commonly opt for the narrowest option (less than 70 cm of usable width

of the platform) and apply them to a variety of works, be it placing concrete, cladding walls with ETICS or even heavy stone elements, or providing access to roofs[1]. Secondly most commonly used type is modulus scaffolding and tube and fitting type is rarely used.

### 2. Marek Jablonski/.\*, Iwona Szer, Jacek Szer (2018 )

In this paper the probability of occurrence of health and safety risk on scaffolding caused due to noise exposure has been studied/ carried out. The result is based on measurement of one hundred and ten scaffoldings located in five cities in different parts of Poland. Environmental test performed on scaffolding were focused mainly on the level of sound. Sound level is the main point of attraction in environmental test performed on scaffolding.

The study enable is to modify the working environment so that it becomes employee friendly and helps in reduction of problems occurring in a noisy work environment. The study was based on the noise level that the construction workers are exposed to. The second group where building machines are used occasionally generates the average sound exposure level. The group related to building sites comes under group 3.

### 3. Hitesh D. Bambhava<sup>1</sup>, Prof. Jayeshkumar Pitroda<sup>2</sup>, Prof. Jaydev J. Bhavsar<sup>3</sup> (2013)

In this research paper, authors reveal the importance of safety and cost as well as relationship in construction. It is also found that metal scaffolding is much safer than bamboo scaffolding, but from their cost the metal scaffolding is expensive than bamboo scaffolding.

In any construction site scaffolding is very important so the study of scaffolding is also important.

The whole study of safety, cost & comparison between metal & bamboo is done by statistical method.

#### **4. Rachel Collins<sup>1</sup>, Sijie Zhang<sup>2</sup>, Kyungki Kim<sup>3</sup> and Dr. Jochen Teizer<sup>4</sup> (2014)**

In this paper the author has discussed about the integration of safety risk factor in BIM for scaffolding construction. This paper shows the results of safety risk that occurs at each stage of scaffolding project life cycle for building a masonry wall & how these risk & related mitigation suggestion can be applied to BIM.

As per the paper safety is integrated with 4 dimensional (4D) BIM by linking the scaffolding safety risk & mitigation with the project schedule. To investigate & develop on approach to integrate safety risk factor with BIM which helps in construction safety monitoring & management.

#### **5. Jaydeep N Desai<sup>1</sup>, Dr. Jayeshkumar Pitroda<sup>2</sup>, Jaydev Jagmohandas Bhavsar<sup>3</sup> (2014)**

In this research paper; author studied about scaffolding, types of scaffolding, and safety measures of scaffolding and economical aspect of scaffolding on any constructional sites. Scaffolding plays a significant role in safety of labors, Repairs in building, Materials in construction & also it can be erected with less energy and less efforts. In durability & safety metal scaffolding is better than bamboo scaffolding. The various type of scaffolds can be used in different type of construction works or in constructional sites and also we can select scaffolding by considering financial level of project.

#### **6. Michal Pienko<sup>1</sup>, Aleksander Robak<sup>2</sup>, Evan Blazik-Borowa<sup>3</sup>, J. Szer<sup>4</sup> (2018)**

The paper gives the results of 100 scaffolding structures in terms of safety of use. The authors studies scaffolds in Poland which were at construction & renovation stage in 2016 & 17. The basic elements affecting the safety of scaffolding use such as anchors, supports, platforms, guardrails and

toe-boards have been taken into account [7] and checked.

The errors found in the assembly process & use of scaffolding were assembled together, As the legal acts are not clear, they can cause many issues, Incomplete scaffolds can be do very dangerous & accidents may occurs.

### **III. CONCLUSION**

Scaffoldings has no specific pattern it is erected as per the requirement at site. In large constructions frame scaffoldings are the most popular type used. Steel scaffoldings are much preferable safe and economic and efficient in use as compared to bamboo scaffoldings. It is important to modify the working environment so that it becomes employee friendly and helps in reduction of problems occurring in a noisy work environment.

The safety can also be analysed using (4D) BIM software to investigate & to integrate safety risk factor with BIM which helps in construction safety monitoring & management. On site safety should be taken into account and the workers should be properly trained to work under extreme conditions and in risky environments.

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