

# Improving Construction Safety Practices in India

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## Abstract:

Nearly 6.5 million people work at 2, 52,000 construction sites in a day. There are lots of construction works going in India and there are lots of people who are working in construction sites for money and the families also depended on these works. Some of the factors which are affecting safety on construction sites are lack of training, no awareness about personal safety equipment and reckless operations are the main reasons for injuries and accidents in construction sites. The main attentions of this paper are to improve the safety practices in India. The safety performance is less in India compared to other countries. Other countries like china and US are implementing safety practices and the accidents and death ratios in developed countries like Australia and US is less compared to India. The findings in this chapters are improvisation of safety practices in India by finding the problems in construction sites and weak zones in implementing the safety practices. The improvisation is done at three levels that is organizational level, project level and government level which includes all the necessary precautions to improvise the safety practices

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## I. INTRODUCTION

One of the most dangerous occupations is working in a construction project especially in India, where there are many construction projects going on in very less time due to rapid growing economy.[15]. Construction safety is most important thing in any project. Some literature reviews are done to find the major factors affecting safety performance in India. India is a country where 70% of the people from agricultural background and working in construction sites without any training and education. Construction Safety performance in India is not considered seriously and the workers in construction met with many accidents and injuries which affects their lives and delaying the project. The construction safety performance in India is poor compared to other countries which is gathered from literatures, books and survey. [14]. Government is the key responsible for accidents and injuries as they are not much concerned about safety practices like personal protective equipment which is a key responsible thing for safety during work and this personal

protective equipment consists of safety things for workers which include helmets, gloves, shoes, jackets and other protective equipment. In countries like UAE, China and US if the companies do not provide personal protective equipment for workers they are severely punished.[14] [15].

This paper mainly focusses on improving safety performance by using safety practices like special training, management control, personal protective equipment as the country like India is not more specific in using these safety practices as they have some errors in it. Instead they are concentrating on money and fast completion of project. Nearly 6.5 million people work at 2, 52,000 construction sites in a day from previous survey. [18]. The main factors which are responsible for poor safety practices include improper training, uneducated people from rural background, low quality equipment, unsafe methods and poor attitude towards safety. Qualitative research is used to find the previous information and present results. Improvising training techniques and awareness

programs for safety performance from referencing with developed countries would be the main light of this paper. In developed countries the advancement of technology gives high productivity, but when that comes to India it provides an unsafe work environment.[16].

#### *A. Back Ground:*

Nearly 6.5 million people work at 2, 52,000 construction sites in a day. There are lots of construction works going in India and there are lots of people who are working in constructionsites for money and the families also depended on these works. But, the safety assurance cannot be given to these families due to regular accidents and injuries. The safety performance in India is poor comparing to other countries. The workers in construction sites suffering with many injuries and accidents. The countries like US and Australia are using all types of protective equipment's for safety and laws are also implemented strictly if the laws are violated the punishments are so strict and companies are also focusing on workers and their safety but in India lots of construction projects are going on regularly and there are lots of project delays happening due to constant injuries and accidents in construction sites. The safety laws are also not strictly enforced and awareness about importance of safety and equipment should be clearly explained. There are many acts in India like Minimum Wages Act, contract labour Act of 1970 and Workmen's compensation Act of 1923 which are not strictly followed by construction companies. The role of safety inspectors in small sites is showing impact on safety but in area like 50,000m<sup>2</sup> they are only 2 to 3 safety inspectors where there is no proper supervision in India.

There are many languages spoken in India. There are people who cannot understand the languages spoken by contractors and which is majorly spoke by other people in company. The people cannot understand what they are saying they will guide them with the gestures but in case of safety they are wearing personal protective equipment when there are

supervisors in the site and they are removing the equipment and doing the work quickly before the safety inspectors or supervisors coming to the site. The problem here is workers are believing that equipment on their body is reducing their work time and they are not comfortable to wear. Safety practices are there in India but there are lots of errors from government side, organisation side and workers side. The improvisation is to be done by referencing with developed countries.

There is a culture barrier in India. People wear turbans on heads instead of protective equipment and they consider as sin to remove turbans on their heads. They need to be trained for personal protective equipment and safety practices or organisation should select the people who follows the rules and safety practices.

#### *B. Context:*

The main attention of this paper are to improve the safety practices in India. The safety performance is less in India compared to other countries. Other countries like china and US are implementing safety practices and the accidents and death ratios in developed countries like Australia and U.S is less compared to India. Wearing protective equipment having white cards and utilizing them properly but, in India the people are not using protective equipment and lack of implementation in safety practices can be clearly observed. Personal protective equipment consists of helmets, gloves, boots, eye glasses, jackets, nets, and other equipment based on the job they do in the site. Special training, management control, educating people, creating awareness are some practices which are to be improvised in India. the mind set of workers should be changed because most of the people coming from agriculture background and they are not educated properly so they need to be trained with some new techniques and make sure that they learn about the equipment and start their work. These problems are to be changed in India by taking reference from other countries like US and Australia.

### *C. Aims and Objectives:*

The main aim of this paper is to improve the safety practices in India such as Personal protective equipment, training sessions and educating at 3 levels organization, government, and project level.

*The objectives include*

- 1) Identifying the problems faced by construction industry regarding safety practices.
- 2) Examining safety practices in developed countries and implementing in India.
- 3) Implementing safety practices at 3 levels in India.
- 4) Identifying the weak zone areas of safety practices in India and improvising them.

## II. LITERATURE REVIEW

In India, construction industry is the second largest employer industry. Now a day's Indian construction industry is implementing the latest techniques as well as using man power. Compared to other countries the problems faced by Indian construction industry are very high. The safety practices in different countries are using personal protective equipment, quality training. Educating practically can bring a good result in countries like India by following from the countries where they are already implemented can bring out the good results in safety performance. [13]. Due to minor injuries every construction worker will be temporarily unfit or weak after working on a construction site. The problems faced in construction in India their challenges and safety practices in India and in developed countries are been clearly explained in this literature review.

### *A. Problems faced in India regarding safety in construction*

Since India is developing country from ages, the construction labour force is more i.e., nearly 7.5% of total world labour force. A recent survey by International Labour Organization shows that India had world's highest accident rate among

construction workers i.e. nearly 165 out of 1000 workers are getting injured. [18]. As in common there are lots of workers and injuries are common, but the percentage of injuries are very high because of ignorance and carelessness. The accidents are due to less skilled labour and more workers from agricultural background as agriculture being the main backbone for India.

In Indian construction industry there are nearly 33 million people are working which is next to agriculture. Compared to the manufacturing industry the rate of accidents in construction industry is 4 to 5 times more. [18]. Agricultural being the main background in India, many people are turning from agricultural field to construction field without any knowledge is becoming major problem for safety in construction industries in India.

### *B. Challenges faced by construction industries regarding safety in India*

There are many challenges faced by construction and some of the safety practices are not followed in country like India due to various reasons and some of the reasons are mentioned here

- 1) *Training infrastructure*[4] which is being main reason for lack of safety in construction sites as many people are coming from agricultural background and the people are not able to get quality training about the safety practices.
- 2) *Unorganized structure* [4] is also a main reason for the safety backdrop in India as the organization is busy in making money instead of taking safety precautions and following the rules.
- 3) *Culture*[4] the main barrier in India for safety. The people has different cultures and believes, and they do not wear personal protective equipment as the people in India have some turbans on their heads which is the main reasons for injuries and they believe work can be easily done without protective equipment.



- 4) *Awareness*[4] among workers regarding safety is not clear as the training is not good, and the people are not from educational background
- 5) *Government rules and regulations*[4] there are lots of acts and regulations in India which are applicable to construction industries, but the implementation process is not going in a clear way so, the safety practices are not strictly considered by workers and organizations.
- 6) *Contractor's selection and safety*[4] which is also considered as one of the safety practices and not properly followed by India and they are appointed based on recommendations by higher authorities without any qualification.

**C. Few reasons for accidents and injuries in Indian construction sites**

- 1) *Bad fire protection*[18]: The fire protection in construction sites is very poor as they do not have proper equipment to fire. The related injuries and damages has increased in the last two years.



**Figure 1: Bad Fire Protection**

- 2) *Unsafe tools*[18]: The tools used in the construction sites in India are very old and rust which affects the safety of the people working in the construction and leads to injuries.



**Figure 2: Unsafe Tools**

- 3) *Unsafe handling*[18]: In India unsafe handling is the major problem in construction sites where labour does not wear personal protective wicket to carry the things. In this figure the people not wearing boots and gloves to carry the steel rods which is not good safety practice.

**Figure 3: Unsafe Handling**

**D. Statistics of accidents and injuries in India**



The statistics prepared by “National crime Record Bureau, Govt. of India” for year 2017-2019, the accidents in construction sector were

**TABLE I**

Cause of deaths	Total deaths		Major injuries	
	2017	2018	2018	2019
Electrocution	10,228	17,560	26,550	23,050
Falls	12,803	21,225	33,885	41,011
Fire	6960	9,500	21,250	30,560

**E. Safety practices**

Generally the safety work practices should be in written method, so that the people working will have minimum risk and less accidents. They are to improve the safety in construction sites and to decrease the injuries and accidents in construction sites. All the safety work practices equipment should be performed and readily available on the center of the work place, so that the people can reach if needed. All. In developing country like India many safe work practices should improve. And for safe work practices specific job procedures and chronological order for each step is required.

The utilization of work health and safety practices was very high among construction employers with almost all reporting that they make work practices safe, remove hazards as much as possible and use personal protective equipment in the workplace. Safety practices include use of protective equipment which can decrease the accident ration in construction sites and the employers are guided to wear to eliminate risk factors and hazards.

### III. EXPERIMENTAL STUDIES

This chapter includes methodology and research design and they are clearly explained in this chapter. The research methodology is qualitative analysis and the literature review is research design. Different papers, articles, journals and websites are referred, and data is collected from all the articles and then literature review is done based on all the collected articles, papers and books.

The improvising safety practices is done by collecting all the data from all the sources in India and developed countries find the papers about problems and weak zones and then improvising the safety practices in India by referring from all the collected data.

#### A. Methodology and research design

##### 1) Methodology

The methodology in this paper is literature review. Journals, articles, books and websites are the minimum sources to collect data and then literature review is done by using data from all the sources and then analysis is done at three levels by finding the weak zones in Indian safety practices. Finally, results are done based on the analysis.

Improving Construction safety is the main light of this paper. The methodology for fulfilling the gap include

- A literature review is done to identify the problems for construction safety by comparing the safety performance with countries like US and Australia.

- Recent problems in India in construction safety and training given to the workers are studied from journals, papers and internet source and then new training sessions are adopted for the workers to improve the safety performance.
- Safety practices in developed countries is studied and all the data from developed countries regarding safety practices is collected from journals, articles and books.
- The training given to workers and education about safety practices India is also studied and all the data is collected from all papers, journals and articles.
- The weak zones of safety practices are also identified from papers, journals, articles, websites and then all the data is collected and then improvise the practices by referencing with developed countries.
- Literature review is done on all the problems and safety practices by the collected data from all the sources. Qualitative research is done for 11 weeks from data gathering to final findings.
- The data is analyzed at three levels after the literature review is done. It is analyzed at government, organizational and project levels for the safety practices to be used in India and improvising the safety practices at three levels in India by collected data from developed countries.

##### 2) Research design

This is a qualitative research and this research is done in 11 weeks from data collection to final findings. The data is collected from all the articles, journals and books and then data is analyzed. The problems in India regarding safety performance in construction is studied and data is collected from all the sources and then literature review is done from collected sources on safety practices in developed countries and safety practices weak zones in India. Data is analyzed at 3 levels government,

project and organizational level and then results are done based on the findings.

### 3) Procedure and timeline

- i. *Gathering research papers:* Data is gathered from article, journals, books and websites and all the data is gathered regarding problems in India, safety practices in India and in developed countries like Australia and US.
- ii. *Literature review:* Data is collected from literature reviews about problems in India and safety practices in developed countries and safety practices weak zones in India.
- iii. *Data collection:* Data is collected from all the available sources about safety practices and problems and statistics of previous years reports are also collected from different articles.
- iv. *Data analysis:* Data is analyzed from literature reviews, articles, books at organizational, government and project level for the safety measures to be taken and to be improvised by 3 levels at construction sites.
- v. *Final findings:* The results are done based on the analysis and the collected data. Improvised and new techniques from developed countries are added in India for good safety improvisation.

## IV. ANALYSIS AND RESULTS

The findings in this chapters are improvisation of safety practices in India by finding the problems in construction sites and weak zones in implementing the safety practices. The improvisation is done at three levels that is organizational level, project level and government level which includes all the necessary precautions to improvise the safety practices. The main safety practices done in this paper are improving special training techniques by introducing penalty and incentive provisions,

educating the people about health programs and white cards, training the management to select the contractors based on skills, inspections to be on weekly basis rather than monthly basis as in developed countries. Improving safety practices in done in India by identifying the weak zones in safety practices and compare them with developed countries and improve the techniques.

Improving of safety performance in construction site can be done by implementing the safety practices without any errors is the main light in this paper. This can be done by involvement of public, government and organization where everyone has their own role in improving safety performance and they are responsible for decreasing injuries and accidents in construction sites. Involvement of government in safety awareness, organization role in safety improving safety performance and awareness of people in safety performance are the key issues to improvise the safety practices and the common element for these issues can be solved by referencing with developed countries.

## V. CONCLUSION AND RECOMMENDATIONS

This paper focused on improving safety practices in India. The safety practices which are to be improvised in India from developed countries are discussed in this paper. The three organizational, government and project levels are explained clearly and what roles they should take and what are their responsibilities in implementing the safety practices are clearly explained in this paper. Various articles, journals and books are referred for collected the data and literature review is done on problems in India regarding safety performance in construction sites and safety practices in developed countries are also written. The information is gathered about weak zones of safety practices in India and statistics about injuries and deaths in India in recent years is collected for deep research.

The data analysis with results is done at three levels about how to improvise the safety practices in India and precautions to be taken for better India with good safety performance in construction sites is

explained clearly in the chapter. The techniques, training sessions, laws, awareness and selection are the main elements in these 3 levels.

The improving of safety performance can be done by regulating the three levels to follow the basic elements mentioned in these chapter.

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