

Survey Datasets on Categories of Factors Mitigating Safety Practices on Construction Sites

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ABSTRACT

Construction sites are known to be one of the most dangerous areas for human health and safety. In developing countries, enforcement of safety rules are often negligible to minimize occupational injuries and illnesses. The success of any construction project is highly depending on health and safety management and its objective is to obtain a clear and successful work on the construction sites without fatalities or injuries among the workers and other administrators on the construction site. The information in this work is gathered by on ground workers and their status in terms of getting Personal Protective Equipment or PPE's. A survey was done at the construction site and total of 76 workers were targeted, out of which 68 responded.

The results were presented in figures, text file and tables using Mean Score. The data presented in this study enables construction managers to standardize project risks and safety management. The results show the lack of proper training considering the use of PPE and significance of safety at construction site. Carelessness is seen in many places regarding the use of PPE. A loose handling is also seen where no check-ups are done for the use of PPE and following of the guidelines for safety are not checked on daily basis. Lacks of equipment's are one of the major causes identified in the lacking of the safety at construction site.

KEYWORDS: Building construction, Health and safety, Personal protective equipment, Work-related injury

I. INTRODUCTION

Safety is a critical concern in the construction industry. The construction sector is one of the most major occupational branches playing a role in the economies of countries. It is a sector that deals with a large number of people, since it addresses a wide audience in terms of work areas. Since both the public institutions and the private sector are stakeholders, it is the business gateway for a variety of people. The fact that the boundaries of the sector are so wide also brings some problems along[1].

The construction industry is divided into three major sectors as follows[2]:

- The first is the construction of buildings (both residential and nonresidential).
- The second involves heavy and civil engineering such as utility systems, land subdivision and highways, streets and bridges. Firms in these two sectors are primarily engaged in contracts that include responsibility for all aspects of individual projects and are commonly known as general contractors.
- The third major sector of construction industry includes establishments in the specialty trades, which are primarily engaged in activities to produce a specific component (e.g. masonry, painting and electrical work) of a project. Specialty trade contractors obtain orders for their work from general contractors, architects or property owners.

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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 respectively. Timings and schedules vary considerably from place to place. The inherent nature of construction jobs combined with the above factors make this industry as one with accident risks [3].

The general safety inspection program that has to be followed in Construction site is shown in figure.

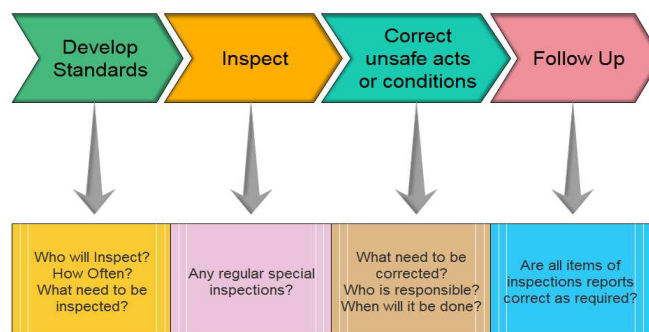


Figure 1: General Safety Inspection Program

Problem Statement

Construction managers focus mainly on productivity in terms of cost, quality, and time. Construction project can never achieve its objectives unless construction professionals become aware of the safety-related issues. Workers working in the construction industry are incessantly bared to unsafe

working conditions and have to confront several kinds of hazards. This embraces exposure to sound, dust and toxic substances, issues of ergonomics, stress etc. This study therefore seeks to investigate factors affecting safety in construction sites: the case of public funded building projects in Bhopal District.

II. Methodology

This study adopted a stratified sampling design to get the sample size. The population of the study was organized into 4 different strata namely; Aryan Build Estates at Bhopal Bypass and Himalaya Residency, Bhopal Bypass, Bhopal English Villas at Neelbad and Park City Neelbad, Bhopal, Shri Balaji Swastik Grand Villas Phase I, Meerpur, Bhopal. Thereafter the sites falling in each strata were be subjected to a random sampling to arrive at the sites to be studied.

The sample size of sites under study shall be 03 sites. This is calculated using Yamane Taro's (1967:886) simplified formula $n = N / (1 + N(e^2))$, where n is sample size and N is the population and e is the error margin, thus $n = 6 / (1 + 6(.05)^2)$ to calculate sample sizes we get a sample size 5. This formula assumes a 95% confidence level and P = 0.5 (being estimated variability/or distribution of attributes in the population) and margin of error e of +5% or - 5%.

Table 1: Distribution of sample in the strata

Category	Frequency/Number of active sites(F)	Percentage	Sample Size $5/6 \times F$
Bhopal Bypass	3	50	2.49
Neelbad	2	33.33	1.66
Meerpur	1	16.66	0.83
Total	6	100	4.98 = 5

Primary data is collected through questionnaires, Construction site observational checklist and focused group interviews involving site foremen, skilled laborers and contractors. The questionnaire consisted of both open and closed ended questions providing both qualitative and quantitative data. Secondary data was collected through document review of recently completed projects by the researcher.

III. Result

In this study, respondents were drawn from the building construction workers in seven randomly chosen building construction sites of public funded projects in Bhopal district. The following characteristics were considered: age, gender and experience in building construction industry. The results show that out of the 76 anticipated sample sizes, 68 respondents were analysed forming an 89% response rate.

The ages of construction workers in public funded building projects in Bhopal district are distributed as follows; the ages from 18-20 formed 13.05%, from 21-30 formed 31.5%, from 31-40 formed 34.15% and from 41-50 formed 18.3% while above 50 years 3%. Table 4.1 and figure 4.2 shows the distribution by age. The majority of construction workers lie between the ages of 31-40 years. Figure 2 shows the distribution by age.

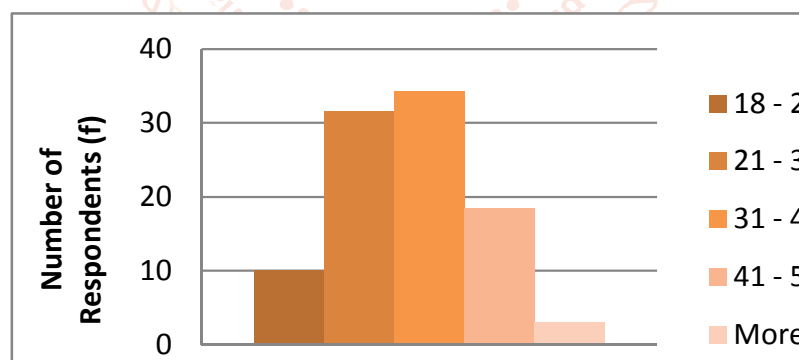


Figure 2: Distribution of respondents by age

The data collected reveals that 63.1% of the respondents were male compared to 36.9% who were female. The frequency table for this distribution is captured in below figure 3 is a bar-graph showing distribution by gender.

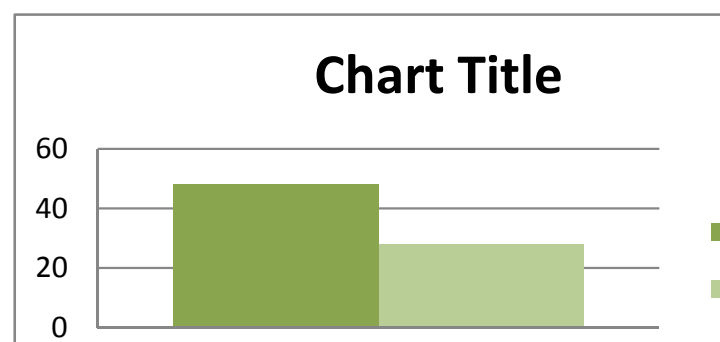


Figure 3: Distribution of respondents by levels of experience

The research question aimed at establishing the relationship between personal protective equipment and safety in building construction sites of public funded projects in Bhopal district. Table 2 below indicates the weight the respondents gave to the effect of PPE's on site safety.

Table 2: Effect of PPE's by respondents

Site	S1	S2	S3	S4	S5	S6	Average
Average Score on Likert Scale	3.7	4.7	4.3	3.6	4.2	4.9	4.23

An average score of 4.23 on Likert scale indicates agreement with the effect of PPE's on site safety.

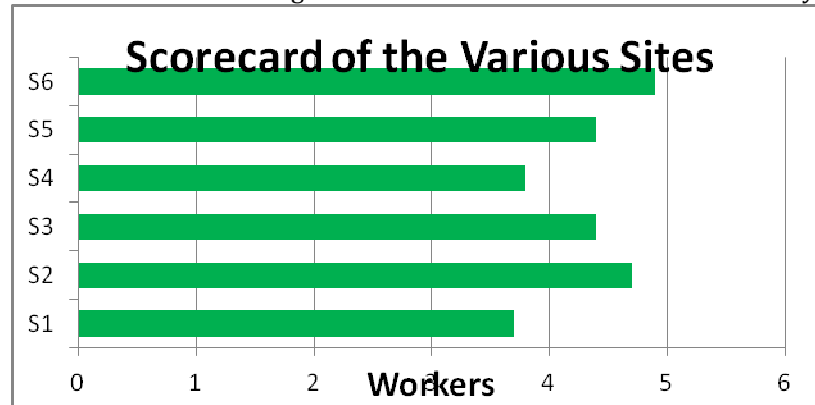


Figure Error! No text of specified style in document.: Effect of PPE's at different sites

The availability of PPE's in all the sites visited was as follows: 67.1% had overalls, 46% of sites, had helmets, 19.7% of the sites had safety goggles and only few of the sites had hand gloves, safety footwear, ear plugs and first aid kit.

IV. Conclusion and Future Scope

This work majorly aims at finding the possible factors affecting safety at building construction site located in Bhopal district. There are five factors identified which are contractors safety policy, use of PPE's, enforcement of legal requirements, training on safety and costs associated with safety measures. Implementation of PPE further helps in improving the safety at construction site and they must be provided to all workers. Study shows the carelessness in providing these equipment's to the workers and therefore findings have shown the lack of these equipment's among the workers. The equipment's that lack are, safety goggles, gloves, and foot wears, which lacked in major proportion. Use of PPE's shows the most valued answer by the respondents, whereas cost is given the least rating, but still given importance, that means, cost affects the safety but it is still took care by the company. Safety policy's impact is hugely over the construction safety and so as the fundamental training. Safety helmet and hand gloves are the equipment that can be considered to be well managed at the construction site. On the other hand, first aid kit lacks the rating by minor points, but well close to good rating. Safety foot wear, and safety are still needed to be taken care of and should put more focus by the contractors.

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