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"SAFETY MANAGEMENT AND SAFETY PERFORMANCE OF DIFFERENT CONSTRUCTION PROJECTS IN NASHIK CITY (MAHARASHTRA): A COMPARATIVE STUDY"

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Abstract: The construction industry in India has had the highest share of fatal accidents at work 2021, with more than one in six accidents. Construction safety management is required, as complex technical and organizational construction projects Research on the effectiveness of occupational health and safety management in the performance of safety the importance of different things is debated. Safety performance organizational development can increase resistance or resilience and lower risk of accidents. Safety management systems are policies, strategies, procedures, and activities used or followed by the management of the organization that directed their safety staff. It is an important factor that will enable the successful management of security organization. This study seeks to investigate the relationship between security management practices and safety practices in the construction industries of Nashik City. This study found that security management processes are important predictors of safety performance in it organization. The purpose of this study is to determine the safety features of a study, contextual factors, as well as the combination of such factors contribute to security performance. This paper focuses on safety management in construction projects primarily from a client perspective.

The construction industry has a high rate of deaths and long-term injuries. This unacceptable in modern society and makes the industry less efficient. Results from The questionnaire emphasized that construction projects still pose a serious risk to life once and for all the safety of the construction teams, because the majority of respondents met weekly or monthly health and safety difficulties. This study found that a higher level of risk is created a few common factors such as lack of safety in construction, improper construction planning, adequate security training, staff conduct, and lack of knowledge of domain rules. Also, construction risk may be generated by organizations' lack of awareness of health care and workers' safety, especially in developing countries like India. In a tree land project, contractors focus on security. Provide all staff resources. But in the operation of a bridge over the road, there are no safety measures and due to those accidents they occur in such an environment. In the Rialto commercial project, some of the four security services provided to employees. There is a need to improve building safety measures in Nashik City. The results of this study suggested that organizations should take more seriously taking care of the health and safety of their construction teams to reduce the risk of construction acceptable value. Companies should prepare employees before starting construction work once provide them with the necessary information to identify hazardous risks to their health as well safety. Contractors should encourage employees to follow health and safety instructions. In addition, organizations through personnel management can reduce health and safety risks by to provide human resource managers in each of the work groups / groups working in different areas within similar projects, especially in larger projects. Personnel managers should be adequate knowledge and information to encourage employees to perform their duties safely.

IndexTerms **- Safety Management, Safety Performance, Construction Safety, etc.**

I. INTRODUCTION

Safety performance is an important factor to consider. Safety performance is defined as the quality of safety-related work, and its development in the organization can increase resistance or durability and low risk of accidents. Performance safety can contribute to lack a controlled work environment and complexity, variability in organizational size. Good safety high performance and productivity are compatible and should not be separated separately. The practice of security management is an important factor in improving the effective management of a security organization.

According to Surienty, Hong & Hung, they had mentioned that security management was related the original practices, components and objectives connected to the safe, are generally regarded as one of A comprehensive organizational management framework is also developed by security manager's system with the help of many security management processes. As security manager's procedures include management commitment, safety training, employee involvement, safety communication and feedback, safety rules and procedures, security promotion and policy. Management commitment is critical to reducing the number of accidents at work. In addition, it also mimics the importance of managing security issues, which are reflected in care as well support provided to implement a security-related program. Safety training is especially important for teaching staff about safety and compliance. It will provide risk prevention and controls. If not, safety training is also important for the success of the OSH program.

Staff engagement as a behavior-based approach that involves individuals or groups on the rise the flow of communication and the decision-making process within the organization. Internal communication staff and management is essential to the participation of employees in making any proposal, commenting on safety issues. Involving employees in the security management system was key organizational safety performance because such engagement empowers employees psychologically for their participation in safety committees. Communication safety and feedback one of the most important practices that need to play a major role, especially in reporting any problem, cause, trouble, danger, disobedience.

There must be two ways of communicating between employees and management. Staff should encourage them to provide their feedback, comments on related security improvements. Safety rules as well Procedure refers to an organization that clearly sets out their goal, vision, responsibilities, set-up employee ethics standards and the provision of a safety plan to address employee safety behavior. Safety and policy promotion is essential for an organization to apply for sustainability, motivation security policy developed by the organization. Reporting employee safety is very important prevents accidents at work.

1.1 OBJECTIVE OF STUDY

a) Selection of different construction projects from Nashik City which includes residential project, commercial project, industrial project and infrastructure project,
b) To analyze different construction project from Nashik City considering safety management, safety performance.
c) To perform comparative analysis of different construction projects from Nashik City considering safety management and safety performance and implement of latest safety measures for different construction project in Nashik city.

1.2 AIM OF STUDY

a) The purpose of the study is to explore ways to manage safety safely performance.
b) Employees find safety and health measures if they are able to behave and eliminate their work and live safety within the daily workplace and when possible emergencies occur in their workplace.
c) Safety management systems also help workers and employers to reduce the risk of an accident at work.

II. LITERATURE SURVEY

Literature reviews that include previous research papers on safety management research and safety performance and its conclusion are provided. These papers help to consider the various parameters that affect the study of the project and the results. This report also directs the research process and assists in taking appropriate action in relation to the previously mentioned variable parameters. Books are available on safety management and safety performance.

Stig Winge et. al. [2019] studied a comparative analysis of safety management and safety performance in twelve construction projects. Safety management in construction is complicated due to the complex "nature" of the construction industry. The aim of this research was to identify safety management factors, contextual factors and combinations of such factors connected to safety performance.

Nurulhuda Ahmad Razali et. al. [2018] performed study on safety management practices and safety performance. Safety performance improvements in an organization can increase its resistance or robustness and lower risk of accidents. Safety management practices are the policies, strategies, procedures, and activities implemented or followed by the management of an organization targeting safety of their employees.

Amir Mohammadi et. al. [2018] reviewed on factors influencing safety performance on construction projects. Construction is one of the most dangerous industries due to its unique, dynamic, and temporary nature. This paper aims to review and extract the factors influencing safety performance on construction projects.

Yousif S. Saeed et. al. [2017] studied on safety management in construction projects. The aim of this research is to identify and evaluate the safety management in construction projects to minimize and control health and safety (H&S) of construction workers. Questionnaire is used to collected a wide range of opinions from experienced professionals working in different construction sites for comparison between them.

K. Hongling Guo et. al. [2017] reviewed on visualization technology-based construction safety management. Construction safety management has been a popular issue in research and practice in recent years due to the high accident and death rates in the construction industry. The complexity and variability of construction sites makes safety management more difficult to implement than in other industries. As a promising technology, visualization has been extensively explored to aid construction safety management.

III. RESEARCH METHODOLOGY

3.1 Research Flow

The different phases of this project of work are shown in the following diagram. The figure simply describes the experimental strategy of this study step by step.

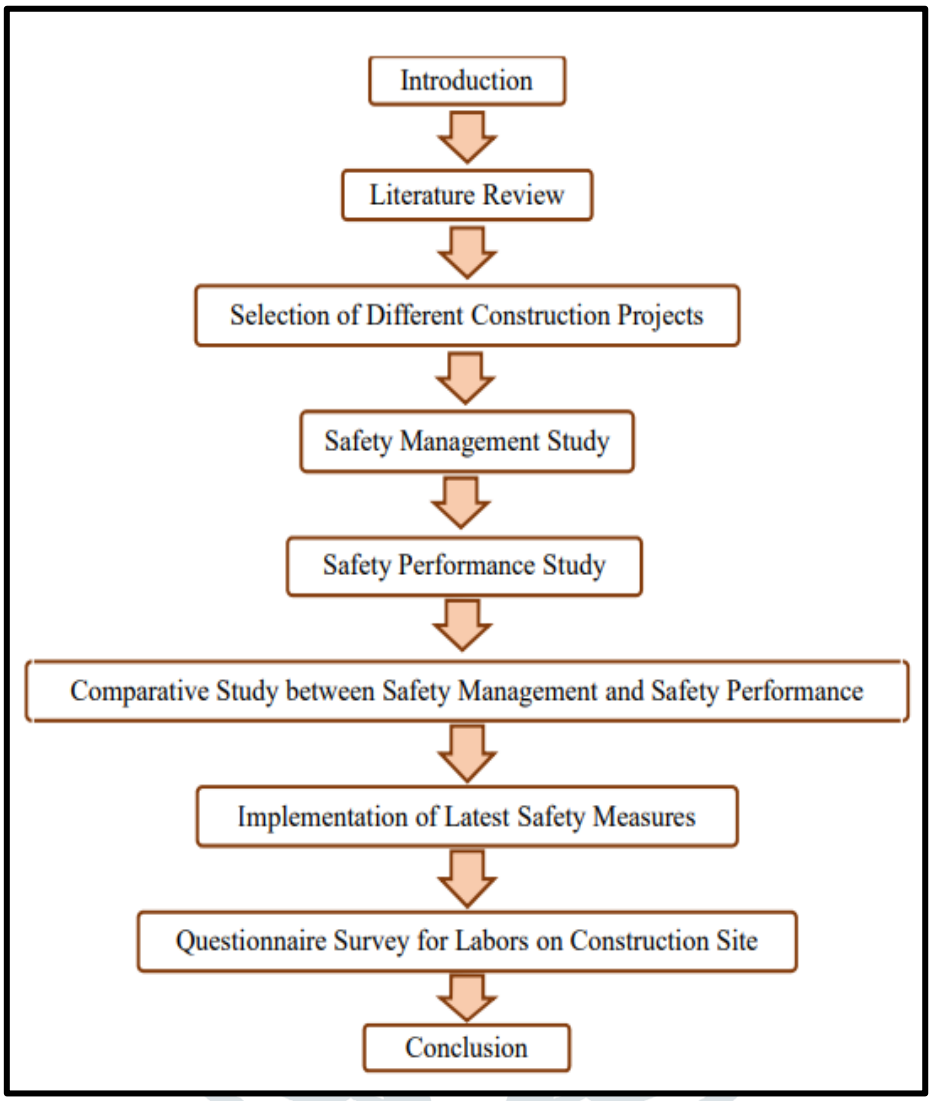

Figure 1: Experimental strategy

3.2 The State of Construction Safety in 2021

Construction safety continues to emerge, as well as the development of equipment and wear technology has helped push the industry forward. However, renewed commitment to security as well training is essential in 2021 given the number of preventable injuries and deaths in each industry year. Doubling security requires investment in proper employee education. For example, strategies such as "3 points of contact" help reduce falls, which are the leading cause of death as well injuries to construction workers. In the meantime, proper understanding of equipment such as the aerial elevators or cranes are important to avoid accidents involving falling objects or collisions. Finally, communication development whether through a comprehensive or special security system communication such as hand gestures has a measurable effect on safety.

By 2021, the focus on defense has increased dramatically as a result of the coronavirus epidemic. Previous research suggests that construction workers are five times more likely than the general public to get a COVID-19 contract, which adds to the list of risks they take to provide the service that is most important to them building new buildings. Like all other hazards construction workers, appropriate The response involves an increase in awareness, training, control, and equipment. Putting safety first is key to helping to reduce the high level of injury in the construction industry, and security companies save money over time. Everyone benefits by encouraging a culture of safety in the construction site, so don't forget to update your safety regulations now.

IV. RESEARCH ANLYSIS

Different Construction Projects in Nashik City are as follow,

Project 1: Treeland – A Premium Residential Township
a) Name of Project:- Treeland – A Premium Residential Township
b) Type:- Residential Project
c) Name of Contractor:- ABH Developers
d) Location: - Gangapur Road, Nashik.

Project 2: Road Overhead Bridge
a) Name of Project:- Road Overhead Bridge
b) Type:- Infrastructure Project c) Name of Contractor:- ABH Developers
d) Location:- Asaram Bapu Ashram, Gangapur Road, Nashik.

Project 3: Rialto- Road Front Showrooms
a) Name of Project:- Rialto – Road Front Showrooms
b) Type:- Commercial Project c) Name of Contractor:- Archit Group
d) Location:- S. No. 61/B, Opp. Bobby's, Anandwali, Gangapur Road, Nashik – 422013

4.1 Need of Improvement in Safety on Construction Sites in Nashik

Safety will always be a hot topic in construction. Construction is a very dangerous industry and far away many people are killed or badly injured on the Internet each year. Not only is safety a top priority prevents your employees from being killed or harmed, but it is also a priority for your business profit and growth. The impact of site risk is significant for businesses. Big companies with big investors as well significant gains can usually absorb the costs associated with the risks, but they can still be a lasting impact. Loss of product and ethics, insurance and penalties, loss of dignity and clients.

4.2 Different points to improve safety culture in the construction industry in Nashik

a) **Start with senior management:** From CEO to down, security should be a priority of your company and management should lead as an example by participating in security meetings and training.
b) **Making security an integral part of the task:** The use of security committees, including both level managers and staff and file, can be an effective way to improve security. But if the work is big enough to forgive you, the budget should include the site security manager.
c) **Creating accountability at all levels:** All employees must be accountable for safety and safety rules should be applied consistently.
d) **Check safety during project planning:** Planning your project the process should include performing a Operational Safety Analysis for each part of the project in order to apply the appropriate controls before the work begins.
e) **Make sure your contractors are safe:** You should review security performance of potential subcontractors as part of your purchase process. This may include reviewing OSHA's recorded ratings and conducting security surveys management systems.
f) **Make sure your employees are properly trained:** Train your staff through safety equipment, safety expectations, and any safety hazards and safety measures associated with their work jobs.
g) **Focus on fall prevention:** Fall is one of the leading causes of injury and death, therefore make sure your fall protection system is working. You have to have some fall a management plan for each project where the risk of falls is present.
h) **Prevent drug abuse:** Make sure you have drug and alcohol policies to avoid employees are disabled from working on your site.
i) **Make safety a part of everyday conversation:** Make sure safety is mentioned during the transition changes, weekly meetings, and whenever there is a change of job.
j) **Review the risks and misses closely:** Investigate all risks and misses closely to determine their causes and use that knowledge to improve safety procedures and prevent future events.
k) **Perform a standard field safety test:** This is one of the best management tools there to improve security. Tests may reveal safety hazards posed by obsolete equipment, unsafe behavior, or tools placed in the wrong place and giving you a chance to fix them before they can create danger.

4.3 Result and Questionnaire Survey

For this research, the target population is from employees at Nashik. There are 100 questionnaires were distributed to all level of employees, but only 75 questionnaires were received. Data was collected using the questionnaire. The questionnaire consists of 30 item questionnaires. Part A consists of demographic profile of respondent such name, age, gender, position, year of service and educational background. Whereby, part B consist items of safety management practices and safety performance. Data that were collected can be analyzed using graphs. Responses noted from different employees of different construction sites.

Table1: Descriptive Statistical Analysis

	Characteristics	Frequency	Percentage %
Gender	Male	50	66.67
	Female	25	33.33
Race	Local	40	53.33
	Others	35	46.67
Position	Upper level	10	13.33
	Middle level	25	33.33
	Lower level	35	46.67
	Others	05	6.67
Years of Experience	More than 5 years	30	40.00
	5 years-3 years	20	26.67
	1-3 years	15	20.00
	Less than 1 years	10	13.33
Age	More than 45 years	18	24.00
	44-35	12	16.00
	34-25	35	46.67
	Less than 25	10	13.33
Education	Master	0	0.00
	Bachelor's Degree or Equivalent	0	0.00

Table 2: Response of Questionnaire Survey

Questions	Positive Answer	Negative Answer	No Safety	Need of Improvement	Not Answered
1.What was the most complex construction project you've been involved with?	45	10	--	--	20
2. Do you have any experience, licenses, or certifications that would allow you tooperate special equipment?	25	35	--	--	15
3. How would you handle a rule violation or an accident? Support your answer withexperience.	43	12	10	10	--
4.Do you think communication and comprehension are important in physical labor?Why or why not?	60	0	--	10	5
5. How do you begin each workday? How do you end it?	63	5	--	--	7
6. Explain how do you deal with situations where customers have problems with the quality of your work?	40	0	--	32	3
7. Tell us What Specialized Construction Equipment Can You Use?	48	0	12	12	3
8. Tell me what are the key responsibilities of a construction worker?	60	0	--	15	0
9. Explain what is your experience on previous jobs?	35	5	15	15	5
10. Explain a situation in which you had little or no direction. How did you deal with it?	16	12	--	25	22
11. Tell me what do you know about the job role and career path?	19	5	--	30	21

12. Tell me do you have any experience in interpreting a blue print or a building designlayout?	5	52	--	--	18
13. Explain how important is it to be able to read and interpret blueprints and electricaldrawings?	9	40	--	--	26
14. Tell me do you have the physical ability?	12	60	--	--	3
15. Tell me have you ever had an on-the-job injury? Describe what happened and themeasures you would take to ensure that it does not happen again?	40	5	30	--	0
16. How familiar are you with reading and interpreting blue prints and/or electricaldrawings?	9	40	--	--	26
17. Describe some of your most recent projects.	62	13	--	--	--
18. Have you ever been injured on the job? What happened? What would you dodifferently now to prevent the injury from happening again?	8	--	--	65	2
19. Have you/your company ever caused/been involved in an accident that causedsomeone to receive hospital treatment or be hospitalized?	45	25	--	--	--
20. What is on your personal check-list to ensure you are ready to leave the job daily?	10	45	--	20	0
21. How have you demonstrated safe work practices in your former job?	10	25	25	15	0
22. How strong are your math skills?	58	16	--	--	1
23. What would you do if a customer had a problem with the quality of your work?	10	12	--	38	15
24. Have you ever walked off of a job? If so, for what reason?	45	5	--	--	25
25. Give me an example of a time when you had little or no direction in solving anissue. What happened? What did you do?	55	5	--	15	0
26. Tell me about a suggested you made on the job that was implemented.	48	2	--	20	5
27. What procedures do you follow to prevent injuries on the job?	53	12	--	10	0
28. How do you prioritize the necessary tasks of a job?	16	12	--	25	22
29. Tell us about the biggest roadblocks you have encountered during a project. Howdid you resolve them?	58	17	--	--	1
30. Tell us for you, what is the most enjoyable and most difficult part of this job?	30	15	--	20	15
Average	**34.57**	**16.72**	**18.40**	**22.18**	**9.63**

V. CONCLUSION

a) In treeland project, contractors have focused on safety. They have provided all the equipments to the labors. But in road overhead bridge project, there is lack of safety measures and because of that accidents were occurred at such place. In Rialto commercial project, some of the safety kits have provided to the labors. There is need to improvement in construction safety measures in Nashik city.

b) The results of this study suggested that the organizations should be more take care about health and safety of their construction teams to minimize construction risks to an acceptable value. Companies should prepare employees before

starting construction work and provide them with relevant information to identify risks to avert risks on their health and safety.

c) Contractors should encourage workers to follow health and safety instructions. Moreover, organizations through worker supervisors can reduce health and safety risks by providing worker supervisors for each team/ group of workers engaged in different places within the same projects, especially in large projects. The worker supervisors should have sufficient experience and knowledge to encourage the workers to carry out their works safely.

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