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SAFETY PROCEDURES AND ACCIDENTS PREVENTION METHODS IN CONSTRUCTION

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Abstract:

Over the last 20 years, building operations have substantially progressed as a result of an increase in development activities and public demand. But in the construction sector, worries about working health and safety have greatly increased. The global economy and society have suffered financial and human losses as a result of poor safety management in the building industry. However, the impact is larger in less developed countries. The objective of this research is to look at significant safety rules. The administration of safety on construction sites has also been thoroughly investigated. The many accident types that occur on construction sites are also examined in this article, along with the measures taken to avoid them. The information was compiled using a variety of site inspections, literature reviews, and data from construction safety laws including BIS and OSHA (Occupational Safety and Health Administration). After offering many recommendations for construction companies to improve worker safety at construction sites, the essay has come to a conclusion.

Keywords: Safety, Construction and Infrastructure Management, safety standards, Accidents.

1. INTRODUCTION

Accidents cause loss of productivity, injury to employees, damage to plant and equipment, and eventually halt the flow of production because they interrupt a planned sequence of activity since they are unexpected and unanticipated. By limiting or coercing anything to happen a specific way, control techniques stop something from spreading, getting out of hand, or becoming worse. Consider safety in construction to be the process or approach utilised to protect the lives and health of workers who build, maintain, and demolish engineering structures as well as others who could be affected by such structures. Working in the construction industry may be risky. Construction site accidents cannot be prevented; however, they may be minimised to safeguard the workers from minor to significant consequences. Therefore, it is essential to implement accident prevention strategies to safeguard workers' well-being and lower accident-related waste on construction sites. As a consequence, this study's ultimate objective is to make construction sites less likely to have accidents. The specific objectives are to identify the various accident types that take place on the job site and the controls that are used to prevent them, to identify methodologies for preventing accidents, to examine how frequently controls are used on the job site, and to demonstrate that the majority of

accidents can be prevented by taking basic precautions or implementing proper working procedures. If we work carefully and take the appropriate safety measures, there will be fewer work accident cases and our workplaces will become a safe and secure place to work. The occupational safety and health ordinance, which went into force on May 23, 1997, to protect employees' health and safety, applies to the majority of workplaces. Construction sites are also subject to the factories and industrial undertakings legislation and its subsidiary regulations, particularly the construction sites (safety) rules. The work that goes into the construction industry is quite risky. Indirectly, it attracts a range of people with different skill levels. The CEO, project managers, superintendents, foremen, and individual employees on the job site must all take part in the development of a sustainable safety culture, however. The selection of subcontractors that share the same dedication to safety should likewise reflect this commitment.

1.1 Purpose of the study

The study's goal was to investigate the variables influencing the adoption of occupational health and safety measures in Hyderabad, India's construction industry.

1.2 Objectives of the study

The study's main goal was to investigate the variables influencing Hyderabad, India's construction industry's adoption of occupational health and safety regulations.

The study's precise goals were to:

1) Determine how much workplace health and safety metrics are impacted by health and safety management systems.

2) To determine how much training and induction have an impact on how workplace health and safety standards are implemented at construction sites for buildings.

3) To determine if the price of risk control measures has an impact on how occupational health and safety policies are implemented.

4) To determine how a construction project customer affects how occupational health and safety standards are implemented in a building project.

2. LITERATURE REVIEW

It is clear from the literature review that health and safety measures are required in the workplace to ensure worker welfare and safety in order to: Maintain and enhance productivity and quality of work; Minimize absenteeism and labour turnover; Reduce indiscipline and accidents; Improve employee motivation and morale; Reduce spoilage and operational costs; and reserve the physical and mental health of employees. But in order for this to be realised, a good health and safety management system and programme should be put in place, including the following: a written statement of safety policy, organisation and allocation of responsibilities for health and safety matters, training employees in health and safety matters, establishment of a safety committee, assurance of first aid facilities, provision of appropriate procedures and documentation to minimise accidents, and regular consultation with employee representatives. All personnel in construction enterprises should get training and orientation so that they are made aware of potential dangers and given instructions on how to prevent them. Utilizing reliable risk assessment techniques, risk management measures are to be implemented with the goal of hazard elimination via design modification and improvement, replacement

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through replacement, use of barriers, use of warning systems, and use of personal protective equipment. By guaranteeing adherence to applicable laws and the terms and conditions of a project, procurement processes and contract documents may be a helpful method to improve health and safety in construction projects. On the other hand, in order to effectively administer the Occupational Health and Safety Act, the government should step up its efforts to enhance the institutional structure and inspectorate operations (2007).

3. RESEARCH METHODOLOGY

In an effort to identify the variables influencing the application of occupational health and safety measures in the construction sector, a descriptive survey study was used as the research approach. It was determined that a descriptive survey study would be the most effective way to respond to the study's "what" and "how" research questions.

3.1 Sample size and Sampling procedure

The optimal sample size for the study was 153 people, which was in accordance with Madhapur's (1997) suggestion that the sample size be set at 50% for populations above 100. The researcher thus attempted to include at least 50% of subjects in each group, as shown in the table (3.1).

Building construction businesses that register with the Ministry of Public Works are divided into categories from A to H based on their capacity and the value of the job in millions of shillings, starting with category A and decreasing to category H. In order to get homogeneous people within each group, the researcher used stratified sampling to group the categories as A and B, C and D, E and F, G and H. Selection of participants from each group was made possible by simple random sampling, with each subject having a known nonzero probability of being chosen.

Table 3.1 Population and sample description

Group	Target population	Samplesize	percentage
A and B	8	4	50
Cand D	30	15	50
Eand F	121	60	50
Gand H	148	74	50
Total	307	153	50

Table 3.2 Operational Definition of Variables

The researcher measured the conclusions he suggested for the study, as shown in the table below.

Objective design	Variables	Indicators	Measurement	Study
1.To establish the extent to which health and safety management systems affect implementation of occupational health and safety measures	Independent Health and safety policy	Health and safety personnel on sites	Number of accidents	Descriptive
2.To determine the extent to which training and induction affect implementation of occupational health and safety measures	Independent Training and inductions	Safety conscious tasks operations	reduced record of accidents and injuries	Descriptive

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Objective design	Variables	Indicators	Measurement	Study
3.To investigate weather the cost of risk control measures affect implementation of occupational health and safety procedures.	Independent Safety control measures	warning signs and personal protective equipment	number of workers in protective equipment	Descriptive
4.To assess how a building-project client influences the implementation	Independent type of client (corporate or individual)	Contract Agreement	Adherence to health and safety measures	Descriptive

4. DATA ANALYSIS

4.1 Response Rate

The sampled respondents included in the four grouped groups of registered construction contractors operating in Hyderabad, namely A and B, C and D, E and F, and G and H, were each given 153 copies of the questionnaire by the researcher. The primary method of dissemination was email conversation, with physical delivery of the same occurring when it was practicable. The management of the firms received this instruction. The answer is summarised in Table 4.1 below.

Table 4.1 Respondents Return Rate

Target group	Copies issued	Copies returned	Response percentage
A and B	4	3	75%
C and D	15	9	60%
E and F	60	39	65%
G and H	74	41	55.4 %
Total	**153**	**92**	**60%**

4.2 Health and Safety Management systems

Table 4.2 indicates the respondent's position with respect to establishment of a health and safety policy in their construction sites

Table 4.2 Health and Safety Policy In Construction Site

Options	Frequency	Percent	Valid Percent	Cumulative Percent
YES	53	57.6	57.6	57.6
NO	39	42.4	42.4	100.0
Total	92	100.0	100.0	

Table 4.3 Respondent's Reaction to the Health and Safety Checklist

Item	Observed Frequency	Expected frequency
Developing health and safety statement	16	53
Safety roles and responsibilities	21	53
Planning and implementation	12	53
Measuring achievements	13	53
Performance reviews	5	53
Auditing for compliance	8	53
Total		53

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4.3 Testing of hypothesis1

Null hypothesis (H_0): Most building contractors do not have health and safety management systems.

Alternative hypothesis (H_1): Most building contractors do have health and safety management systems.

Table 4.4 Testing of Hypothesis 1

O	E	O - E	(O - E)²	(O – E)²/E
16	53	-37	1,369	25.8
21	53	-32	1,024	19.3
12	53	-41	1,681	31.7
13	53	-40	1,600	30.2
5	53	-48	2,304	43.5
8	53	-45	2,025	38.2
				Total=188.7

Chi – Square Test Result

Calculated value of $X^2 = 188.7$

IX^2I Table value with v = 5 degrees of freedom using 5% level of confidence = 11.07 Therefore since X^2 greater than IX^2I we accept the null hypothesis (H_0) that: most building contractors do not have health and safety management systems and reject the alternative hypothesis (H_1) that: most building contractors do have health and safety management systems.

4.4 Accidents recorded in the last 5years

Table 4.5 below shows accidents recorded in construction sites in the last 5 years

Table 4.5 Accidents Record In The Last 5 Years

Option	Frequency	Percent	Valid Percent	Cumulative Percent
YES	66	71.7	71.7	71.7
NO	26	28.3	28.3	100.0
Total	92	100.0	100.0	

Table 4.6 Nature of Accidents Recorded in Construction Sites in the Last 5 Years

Options	Frequency	Percent	Valid Percent	Cumulative Percent
Fatal injury	1	1.1	1.5	1.5
Severe injury	6	6.5	9.1	10.6
Minor injury	41	44.6	62.1	72.7
Near miss	18	19.6	27.3	100.0
Total	66	71.7	100.0	
Missing	26	28.3		
Total	92	100.0		

4.5 Testing of hypothesis3

Null hypothesis (H_0): Risk control measures are not adhered to in building construction sites. Alternative hypothesis (H_1): Risk control measures are adhered to in building construction sites.

Table 4.7 Testing of Hypothesis 3

O	E	O - E	(O - E)²	(O – E)²/E
33	92	-59	3,481	37.83
70	92	-22	484	5.26
31	92	-61	3,721	40.44
45	92	-47	2,209	24.01
49	92	-43	1,849	20.09
36	92	-56	3,136	34.08
42	92	-50	2,500	27.17
55	92	-37	1,369	14.88
11	92	-81	6,561	71.31
				Total=71.31

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Chi – Square Test Result

Calculated value of $X^2 = 71.31$

IX^2I Table value with v = 8 degrees of freedom using 5% level of confidence = 15.51 Therefore since X^2 greater than IX^2I we accept the null hypothesis (H_0) that: Risk control measures are not adhered to in building construction sites and reject the alternative hypothesis (H_1) that: Risk control measures are adhered to in building construction sites.

4.6 Testing of hypothesis4

Null hypothesis (H_0): Most project clients do not use formal contract agreements in their building projects.

Alternative hypothesis (H_1): Most project clients use formal contract agreements in their building projects.

Table 4.8 Testing of Hypothesis 4

O	E	O - E	$(O - E)^2$	$(O - E)^2/E$
25	68	-43	1,849	27.19
29	35	-6	36	1.02
24	44	-20	400	9.09
				Total=37.3

Chi – Square Test Result

Calculated value of $X^2 = 37.3$

Value for the IX^2I Table at the 5% level of confidence and v = 2 degrees of freedom is 5.99. As a result, since X^2 is greater than IX^2I, we accept the null hypothesis (H_0), according to which the majority of project clients do not use formal contract agreements in their construction projects, and we reject the alternative hypothesis (H_1), according to which the majority of project clients do use formal contract agreements.

4.7 Site inspection visits by government health and safety officials

Tale 4.9 below shows the frequency of site visits by government health and safety officials

Table 4.9 Site inspection visits by government health and safety officials

Options	Frequency	Percent	Valid Percent	Cumulative Percent
Very often	8		8.69	8.69
Often	17		18.47	27.17
Rarely	24		26.09	53.25
Not at all	43		46.75	100.0
Total	92		100.0	

4.8 Respondents opinion about government policy

The researcher asked respondents for their thoughts on government policy regarding health and safety in the building construction industry in light of the aforementioned findings from the respondents. The results are shown in the table 4.10 below.

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Table 4.10 Respondent's Opinion about Government Policy on Health and Safety in Building Construction Industry.

Options	Frequency	Percent	Valid Percent	Cumulative Percent
Very good	14		15.21	15.21
Good	31		33.70	48.91
Poor	35		38.04	86.95
Very poor	12		13.05	100.0
Total	92		100.0	

According to the findings in table 4.10 above, respondents had limited confidence in the government's commitment to addressing health and safety concerns in the building construction sector. The majority of them (51.08%) had "bad" or "extremely poor" opinions on the government's policies, while just 48.92% thought the government was committed.

5. RESULTS

According to the respondents, unskilled labour makes up the majority of construction site accident casualties at 72.3%, while skilled labour and others make up 20.0% and 9.09%, respectively. While worker carelessness accounted for 51.5% of the incidents, it was followed by improper work practices (19.7%) and defective equipment (16.67%). The least significant factor, worker ineptitude, came up at 4.55%, while other reasons accounted for 7.58%. The government may have a positive influence on increasing occupational health and safety awareness among construction contractors by developing solid policies and an effective implementation structure, but given the comments from the respondents, much more has to be done on the government's end. Only 45.7% of those surveyed said they have a copy of the 2007 Occupational Safety and Health Act. In the building construction sites where they work, 46.74% of the respondents had never seen any government health and safety inspectors. Only 26.08 percent report that they seldom ever keep track of official visits. As a result, the respondent's assessment of the government's policies for health and safety in the building construction business is mostly negative (38%), extremely negative (13%), and positive (15%).

6. CONCLUSIONS

The study's findings suggest that in order to effectively implement occupational health and safety measures on construction sites, building construction businesses should place a strong priority on establishing health and safety management and creating safe systems of work. The success of this depends on the involvement of everyone in the company, including senior management and every employee, with the aim of fostering a

favorable culture of health and safety via dedication, cooperation, and good communication. The top management should contribute to developing a clear set of goals and objectives for the organization's health and safety policy. Supervisors should assist in ensuring that health and safety protocols are being followed on a daily basis. Safety consultants to provide guidance on investigating and reporting incidents. On behalf of the workers, safety advocates will speak with the employer. To take responsibility for both their own health and safety and that of others. First responders to help the wounded The following factors will determine the effectiveness of the health and safety management system: accident investigation and reporting; health and safety monitoring and audit; monitoring of plant equipment, its maintenance, and risk assessment; management and employee safety committees; health and safety training and information; and general surveillance.

Given that training imparts information and instruction about work, ensuring that those hired to undertake a particular task have a basic understanding of preventive measures needed to address potential hazards, training and induction form an important aspect in the implementation of occupational health and safety measures. According to the study, unskilled labourers are the group of workers most frequently involved in accidents on construction sites, which confirms that most accidents are caused by a combination of personal factors, including lack of skill and competence, exhaustion, boredom, low morale, and individual medical issues. By providing pertinent information, instruction, and training, training and inductions on construction sites should specifically target this job category in order to decrease errors and mistakes and enhance the application of health and safety standards across the construction sector. The results of the hypothesis testing also support the idea that raising awareness via inductions and training would contribute to a decrease in the number of accidents on building construction sites.

Although the respondents agree that the cost of providing and maintaining risk control measures prevents construction sites from implementing health and safety measures, this is made worse by the likelihood that enterprising building contractors prioritise their own business profits over safety requirements. The mentality of the contractors in this situation has to alter if occupational health and safety in the building sector is to improve.

The study's findings show that project clients' influence in requiring occupational health

and safety in their construction projects is still lacking, particularly in the case of private individual clients. This could be attributed to an effort on their part to reduce costs since procurement procedures and contract documentation incur additional costs by involving the relevant professionals.

The fact that only 45.7% of building contractors have a copy of the Occupational Safety and Health Act of 2007 and that government health and safety officials rarely visit construction sites to conduct inspections may help to explain why building contractors have little faith in the government's commitment to issues of occupational health and safety in the construction industry.

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