Sustainable Safety and Site Management Best Practices in Building Construction Sites in Kogi State, Nigeria

by
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Abstract
The study assessed the Sustainable Safety and Site management Best Practices in building construction sites in Kogi State. Three research questions were answered while a null hypothesis formulated was tested at 0.05 level of significance. The study adopted descriptive survey research design involving a population of128 building construction site project managers and professional. The entire population was studied because it was manageable. A structured questionnaire with -items titled Sustainable Safety and Site Management Best Practices (SSSMBP) Questionnaire was used to collect data. The instruments for data collection were face validated by five experts. Three of the experts were from the Department of Industrial Technical Education, Faculty of Vocational and Technical Education, University of Nigeria, Nsukka while two experts are from the Kogi State Ministry of works. Cronbach Alpha Reliability technique was used to determine the internal consistency of the instruments. A reliability coefficient of 0.72 was obtained for the instrument. Data were analyzed using Mean to answer the research questions while t-test was used to test the null hypothesis at 0.05 level of significance. The findings revealed that there was low awareness by project managers on sustainable safety and site management best practices in building construction sites in Kogi State, also the findings also identified some barriers to effective implementation of safety and site management best practices in building construction sites in Kogi State. The hypotheses tested revealed that there was no significant difference in the mean responses of project managers and professionals in Works department in the Local Government areas on the level of awareness of safety Practices in selected building construction sites in Kogi State, also there was no significant difference in the mean responses of project managers and professionals in Works department in the Local Government on the barriers to effective implementation of sustainable safety and site management best practices in building construction sites in Kogi State. Based on the findings of the study, it was recommended among others that Ministry of works should embark on sensitization programs to improve the awareness of project managers on sustainable safety and site management best practices in building construction sites in Kogi State. Also, the Ministry of works should enforce and monitor the implementation of safety and site management best practices on building construction sites in Kogi State.
Keywords: Safety, Sustainability, Sustainable Safety, Construction, Building Construction Site.

Introduction

The basic necessities of life are Food, clothing and shelter. Shelter is usually provided through building. Building is the general term applied to a fixed structure in which people dwell and work. A building is commonly considered to refer to an enclosure within which activities can be carried out (Designing building Ltd, 2023). It is a structure, usually consisting roof, walls, floors and openings such as doors and windows that is usually but not always positioned permanently in one location. A building structure is a type of man-made construction. Construction is the techniques and industry involved in the assembly and erection ofstructures, primarily those used to provide shelter by builders in building construction sites (BCS). Construction can be described in terms of Management and Engineering. In terms of Management, construction is the process of assembling materials and erecting structures; the medium in which a

building is built (Construction Glossary of Building Terms, 2021). In terms of Engineering, Dina (2020) defined construction as the activity of putting together different elements using detailed design and plan to create a structure for a certain location.In project architecture and civil engineering, construction is the building or assembly of any infrastructure on a site or sites. Although this may be thought of as a single activity, in fact, construction is a feat of multitasking activities. Normally the job is managed by the construction manager, supervised by the project manager, design engineer or project architect. While these people in most cases work in offices, every construction project requires a large number of laborers, carpenters, and other skilled tradesmen to complete the physical task of construction. In the context of this study, construction can broadly be categorized into three (3) namely: industrial type, public works, building of houses. In other words, construction means the action or operation of building structures like factory, highway, bridge, slope protection, landfill, dam, water supply and building construction.

Building construction is some site activities that lead to the realization of a specific building.Building construction is the process of adding structure to real property. The vast majority of building construction projects are building of public and residential apartments, small renovations, such as the addition of a room, or renovation of a bathroom. Often, the owner of the property acts as a laborer, paymaster, and design team for the entire project. However, all building construction projects have some elements in common - design, financial, and legal considerations. Unfortunately, many projects of varying sizes reach undesirable end results, such as structural collapse, cost overruns, and/or litigations, reason which could be as result of use of sub-standard building materials, carelessness of the workers, poor site management practices and non-complianceto safety rule.

Safety put simply, is a state of being free from harm. According to Adeagbo, Dakas, and Izam (2019) safety is key to achieving success in building construction project. In other words, safety is the prime requisite in all the workplaces especially in the building construction sites. The safety of building construction workers on site is paramount to the overall success of the project. This is because it is only when workers are in good state of mind and are physically healthy and site operations properly managed, that work can go on efficiently. Safety is not a complex matter that can only be understood by trained specialists or that needs a significant financial commitment to make improvements (Omeje 2017). It can be integrated into existing building construction site programmes and processes.

There are numerous benefits of good safety performance in the construction industry associated with the effective implementation of safety programs (Mohamad, Idris, Riza, Ahmed, Eveline and Hayroman, 2021).Acadimy (2017) stated that the lower rates of accidents and illnesses in the workplace reduce the costs of accidents, reduce absenteeism and turnover, increase productivity and improve the morale of workers. Rowlinsonin Mohamad et al(2021) clarified that the goals of implementing safety programs in construction projects are to avoid unnecessary and dangerous conducts, to report risks and hazards, and to ensure that accidents are documented and handled appropriately. Oliveira, et al. (2010) added that organizations that have implemented safety programs enhance the quality of their work, increase their reputation, improve collaboration among staff, increase their profits and creates sustainable site safety.

Sustainable Safety Practices refer to strategies and actions taken within an organization to ensure a safe working environment while considering the long-term impacts on health and the environment. This approach recognizes that employee safety is not just about immediate risk management; it also involves a commitment to reducing waste, conserving resources, and fostering a culture

of continuous improvement. For instance, a manufacturing plant may implement energy-efficient machinery that not only reduces energy consumption but also lowers the risk of equipment-related accidents. Such integrative strategies can lead to enhanced employee morale and improved overall productivity. Sustainability put simply, is fulfilling the needs of the current generation without compromising the needs of the future generation. That is ensuring a balance between economic growth, environmental care and social well-being.

Sustainable site safety and effective site management affects everyone in building construction sites and work environment, including construction workers, visitors, construction professionals namely; Site Managers and Supervisors (Architects, Civil Engineers, Surveyors, Estate Managers and Builders). Unsafe behavior of construction workers could be the major contributor to theprominent construction accidents, and more and more studies claimed that suffering from non-compliance to safety rules by theconstruction workersand lack of awareness or inadequate enforcement of safe work practicesand sustainable safe work-habits by construction professionals could exacerbate the unsafe behavior of workers. In other words, Safety is a state of being secure from hazard, injury or accidents due to measures put in place to prevent such from happening, usually through sustainable and effective site management best practices.

Site management best practices are set down safety rules that must be rigidly observed to avert accidents in building construction site. Accident is an undesirable, unplanned and unintended event which frequently leads to undesirable effects, and is preceded by preventable act(s) and/or unsafe habits and condition(s). Accidents are unintended events that have taken place, causing damage to person, materials, machinery or to property. In some cases, accident leads to injury, death and loss of properties. Accidents are caused; hence it can be controlled when their causes are identified, understood and managed appropriately/correctly through sustainable safe site management practices. The good safety and site management plan could help a deal to achieve this. Perceived increment in number of accidents and resultant casualties and illnesses reported in project sites in Kogi State are unacceptably high considering the numerous regulatory standards and control systems for construction projects, thereby creating serious menace to construction workers' safety at work. Thus, proactive step must be taken to identify this unsafe practices and work habits and be averted accordingly.

All these are usually blamed on poor safety and site management practices.

Building construction site safety and site management in the context of this study means observing the laid down provisions on site management and safety rules required for every physical activity involved in the erection of a structure, cladding, external finish, formwork, fixture, fitting of services, installation and the unloading of plant, machinery, materials or the like in the building construction site.

The amount of risk in a building construction site is affected by the likelihood of the occurrence (event) and the severity of the consequence that may occur and may even lead to irrecoverable damage to human lives, equipment and machineries, with resultant low productivity of workers. Strict adherence to safety rules, practices and precautions can facilitate and ensure a safe on-site working environment and enhance workers' productivity. Commitment from site managers and supervisors, consulting with workers and identifying, prioritizing and acting on key issues are the way to go to make real improvements in safe habits, safety and site management practices in building construction sites in kogi state.

For the successful execution of a project, effective planning is essential. Those involved with the design and execution of the infrastructure in question must consider the environmental impact of the job, the successful scheduling, budgeting, availability of materials, logistics, inconveniences to the public caused by construction delays, preparing tender documents, occupational

health and safety of the workers on site. These are usually achieved through effective safety and site management practices.

Construction site safety is an aspect of construction-related activities concerned with protecting construction site workers and others from death, injury, disease or other health-related risks.According to Adeagbo, Audi and Yohana (2019) the safety of construction workers on site is paramount to the overall success of the project. The authors emphasized that it is only when workers are in a sound state of mind and are physically healthy that work can go on efficiently.

Despite the fact that construction activities are labor-intensive, polluting and dangerous, building construction workers are often required to work long and irregular hours, leading to strain-based conflicts, such as physical and mental exhaustion, as well as time-based conflict such as work-life imbalance. Thus, unattractive physical conditions of work have been identified as regular stressors of construction workers (Omeje et al 2020). According to the authors, such conditions have led to the high incidence of job hazards among building construction workers.The safety and safe working atmosphere are basic necessities for workers and has to be ensured in the building construction sites in Kogi State.

The amount of risk in a construction site is affected by the likelihood of the occurrence (event) and the severity of the consequence that may occur and may even lead to irrecoverable damage to human lives, equipment and machineries, with resultant low productivity of workers. Strict adherence to sustainable safety rules best practices and precautions can facilitate and ensure a safe on-site working environment and enhance workers' productivity. Commitment from site managers and supervisors, consulting with workers and identifying, prioritizing and acting on key issues are the way to go to make real improvements in safe habits and safety practices in building construction sites.

Equally the buildingconstruction Industriesareknown generally to be prone to hazards. The industry has earned this reputation because of high rate of occurrence ofaccident and the fatality involved in their operations. Workers and Professionals on the buildingconstruction sites have to face constant changes in the nature of work,location of work as well as work with new workers. For instance, cost, duration, quality and safety are very important characteristics ofevery construction project. Very often, there use to be greateremphasis on other aspects, at the expense of safety. A lot of people have beenexposed to risk situation on construction sites, resulting in a high chance ofaccidents as a result of lack of safety provisions and rules compliance. This implies that, a lot ofcontractors in the construction industry are much more concerned about theCost, Time and Quality of projects, but are less concerned about the health and safety ofthe workers. Accident frequencies and property losses create negative impactto the building construction industry. This has been a source of concern and worry of this study and has given rise to question onthe state of Safety and site management practices on building construction sites in Kogi State, Nigeria.

Therefore, the assessment of the present condition of safety and site management practices inbuilding construction sites in Kogi State is most necessary so as to identify the areas of failure andsafety compromises. This will help in proffering remedies to the deficienciesthat may have been identified.

Statement of the Problem

The building construction sites should be should be made to be free from accidents, so that the workers in the construction sites would be able to carry out their jobs without fear of hazards or injuries. However, building construction sites are known generally to be prone to hazards. Construction accidents has remained an ongoing concern in developing countries such as Nigeria, Kogi State not left out, despite the level of awareness in promoting sustainable safety practices over the decades. The industry has earned this reputation because of high rate of occurrence of accident and the fatality involved in their

operations. Workers and Professionals on the building construction sites have to face constant changes in the nature of work, location of work as well as work with new workers. For instance, cost, duration, quality and safety are very important characteristics of every construction project. However, there use to be greater emphasis on other aspects of the construction site operations, at the expense of workers' sustainable safety and site management best practices. For instance, a lot of people have been exposed to risk situation on construction sites, resulting in a high chance of accidents as a result of lack of safety provisions and observance. This implies that, a lot of contractors in the construction industry seem to be much more concerned about the cost, time and quality of projects, but are less concerned about thesafety of their workers and compliance to rules and standard site management practices, these can lead to the workers encountering accidents or hazards in the construction site.

To reduce these accidents in the building construction sites it is important to implement safety and site management practices in building construction sites. Therefore, the assessment of construction site workers' sustainable safety and site management best practices inbuilding construction sites in Kogi State is necessary so as to identify the areas of failure and safety compromises and proffer possible solution.

Purpose of the Study

The general purpose of the study was to assess the sustainable safety and site management best practices in building construction sites in Kogi State. Specifically, the study assessed:

1. The level of awareness of project managers on safety and site management practices in building construction sites in Kogi State.
2. The extent of implementation of sustainable safety and site management practices in building construction sites in Kogi State.
3. The barriers to effective implementation of safetyand site management practices in building construction sites in Kogi State.

Research Questions

The following research questions were posed to guide the study:

1. What is the level of awareness of project managers on safety and site management practices in building construction sites in Kogi State?
2. What arethe barriers to effective implementation of safety and site management practices in building construction sites in Kogi State?
3. What is the extent of implementation of sustainable safety and site management practices in building construction sites in Kogi State?

Hypotheses

The following null hypothesis which was tested at 0.05 probability level guided the study:

1. There is no significant difference in the mean responses of project managers and professionals in Works department in the Local Government on the level of Implementation of Safety and site managementpractices in building construction sites in Kogi State.

Methodology

The study adopted the descriptive survey research design. Descriptive Survey according to Uzoagulu (2011) is a method of data collection in which questionnaire is utilized in order to sample or gather information from a representative of the population which can be generalized to the entire population. Descriptive Survey design was considered appropriate for this study because it involves the use of structured questionnaire to seek the opinion of building construction site project managers and professional on the state ofsafety and site management practices of building construction site workers in building construction sites in Kogi state.

The study was carried out in Kogi State. The state has twenty-one (21) local government areas.The choice of Kogi state as area of the

study is based on high concentration of building construction companies in the state, maybe because of Dangote cement factory and Ajaokuta steel factory thatcould have led to population explosion and consequently increase in building construction sites.

The population for the studywas 128 building construction site project managers and professional. This comprisesThirty-three (33) building construction site professionals(project Managers)selected from building construction sites in all the 21 Local government areas in Kogi State and Ninety-five (95) building construction professionals in kogi state ministry of works and works department in the local government. The selection of construction site project managers is based on site with project that have reached 25% - 75% completion. This is to make sure that the project managers/supervisors were on site to respond to the questionnaire. The information regarding the population of some registered building construction firms was obtained from the Corporate Affairs Commission (CAC) office in Kogi state, however, most of the firms are not registered. The population of the building construction professionals in the works department of the local governments was obtained from the various LGAs and Kogi State ministry of works. The entire population of registered building construction site project managers and professional in the 21 local government areas and the State Ministry of works were used.

A structured questionnaire titled "Sustainable Safety and Site management Best Practices Questionnaire" (SSSMBPQ)was used for data collection. The questionnaire was adaptedfrom previous studies through literature searches and modified to suit the study. The level of adaptation includes rephrasing the items to focus on safety practices.The instrumentwas divided into two parts. Part 1 was designed to collect data on personal information of the respondents. While Part 2 contained sections A to C. Each section was designed to collect data for a particular research question. Section A,B and C weremade up of 22 items each of five-point Likert's scale types of Highly Aware (HA), Moderately Aware (MA), Neutral (N), Somewhat Aware (SA)and Not Aware (NA); Very Often (VO), Often (O), Neutral (N), Somewhat (Sw) and Not at all (Naa); and Very high (VH), High (H), Average (A), low (L) and Very low (VL)respectively, with nominal corresponding values of 5; 4; 3; 2; and 1, designed to measure the level of awareness; level of implementation respectively of the building construction site professionals on safety and site management practices in building construction sites in Kogi State.

The internal consistency of the instrument, the instrument was trial tested with ten (10) respondents. These respondents consisted professionals and project managers in building construction sites and some selected local government areas in Benue State. The choice of Benue State was based on the fact that they share common boundary and have similar features and culture with Kogi State. An overall reliability coefficient value of 0.72 was obtained.

Data collected from the study were analyzed using Mean, Standard Deviation and T-test. Mean and Standard Deviation was used to answer all the research questions. The decision rule was that any mean response whose value is 3.50 and above was accepted, while any whose mean value is below 3.50 was rejected. Standard deviation was used to find out how close or far the responses of the respondents are to the mean.T-test wasused to test the three (3) null hypotheses at 0.05 level of significance using Statistical Package for the Social Sciences (SPSS) software. Any null hypothesis whose P-value based on real limit of numbers is less than 0.05 level of significance was rejected and regarded as significant. Also, any null hypothesis whose p-value is equal to or greater than 0.05 level of significance was upheld and regarded as not significant.

Results

The data collected for this study was analyzed statistically in tables in this chapter. The data were analyzed using mean, standard deviation and independent

samples t-test, the presentations were organized according to the research questions and hypotheses that guided the study.

What is the level of awareness of project managers on safety and site management practices in building construction sites in Kogi State?

Research Question 1

Table 1: Mean and Standard Deviation of awareness of project managers on safety and site management practices in building construction sites in Kogi State

S/N	Item Statements	X	SD	Remarks
1	Effective communication process	2.55	0.70	Low Awareness
2	Provision of adequate workers shelters	2.98	0.53	Low Awareness
3	Employment of skilled workers	3.35	0.98	Low Awareness
4	Giving compensation to accident victims on site	2.60	0.79	Low Awareness
5	Presence of safety policy within construction firms.	2.72	0.61	Low Awareness
6	Provision of adequate sanitary stations	2.20	0.66	Low Awareness
7	Adequate housekeeping throughout the site	2.64	0.79	Low Awareness
8	Adequate design of safety equipment	2.38	0.86	Low Awareness
9	Proper design of workplace prior to commencement of construction work	2.29	0.88	Low Awareness
10	Provision of appropriate medical facilities	1.29	0.70	Low Awareness
11	Adequate safety supervision on site	2.77	0.88	Low Awareness
12	Proper investigation of accident by supervising contractors	2.08	0.66	Low Awareness
13	Enforcement of safety policy on site	2.52	0.74	Low Awareness
14	Adequate report of accident cases to relevant authorities	2.00	0.70	Low Awareness
15	Adequate risk management and assessment before the commencement of construction work	2.69	0.87	Low Awareness
16	Use of Personal Protective Equipment at all times during construction work	2.39	0.73	Low Awareness
17	Provision of proper safety training on site	3.69	0.62	High Awareness
18	Adequate supply of personal protective equipment.	2.26	1.03	Low Awareness
19	Introduction of innovative means of preventing accidents on site.	1.91	0.76	Low Awareness
20	Provision of health and safety insurance	3.11	0.82	Low Awareness
21	Sufficient Governmental support in enforcing safety regulations on site	2.42	0.91	Low Awareness
22	Safety commitment	3.79	0.69	High Awareness
	Grand Mean	**2.57**		

Key: X- mean, SD- Standard deviation

The data presented in Table 1 revealed that twenty items had a mean value ranged from 1.29 to 3.35, this showed that their own mean value was below 3.50 which indicates that the level of awareness of project managers on these safety and site management practices in building construction sites in Kogi State was low. The table also revealed that the two remaining items have their mean value ranged from 3.69 to 3.79. This showed that the Mean value of each item was above the cut-off point of 3.50, indicating that the level of awareness of project managers on these

safety and site management practices in building construction sites in Kogi State was high. The table also showed that the standard deviations (SD) of the items are within the range of 0.53 to 1.03, this indicated that the mean values of the respondents were not far from one another in their responses.

Hypothesis 1

There will be no significant difference in the mean responses of project managers and professionals in Works department in the Local Government areas on the level of awareness of safety Practices in selected building construction sites in Kogi State.

Table 2: The t-test Analysis of the Mean Responses of project managers and professionals on the level of awareness of safety Practices in selected building construction sites in Kogi State

S/N	Item Statements	X_1	X_2	Sig.	Remarks
1	Effective communication process	3.541	3.375	0.234	NS
2	Provision of adequate workers shelters	3.000	2.964	0.738	NS
3	Employment of skilled workers	3.270	3.410	0.472	NS
4	Giving compensation to accident victims on site	3.625	3.571	0.734	NS
5	Presence of safety policy within construction firms.	3.729	3.714	0.903	NS
6	Provision of adequate sanitary stations	2.229	2.178	0.698	NS
7	Adequate housekeeping throughout the site	1.625	1.660	0.822	NS
8	Adequate design of safety equipment	3.416	3.357	0.728	NS
9	Proper design of workplace prior to commencement of construction work	3.229	3.339	0.531	NS
10	Provision of appropriate medical facilities	2.250	2.321	0.609	NS
11	Adequate safety supervision on site	2.666	2.857	0.275	NS
12	Proper investigation of accident by supervising contractors	2.833	3.285	0.073	NS
13	Enforcement of safety policy on site	3.666	3.410	0.083	NS
14	Adequate report of accident cases to relevant authorities	3.041	2.964	0.575	NS
15	Adequate risk management and assessment before the commencement of construction work	2.604	2.767	0.342	NS
16	Use of Personal Protective Equipment at all times during construction work	3.270	3.500	0.111	NS
17	Provision of proper safety training on site	3.791	3.607	0.134	NS
18	Adequate supply of personal protective equipment.	2.312	2.214	0.631	NS
19	Introduction of innovative means of preventing accidents on site.	1.916	1.910	0.969	NS
20	Provision of health and safety insurance	3.166	3.053	0.488	NS
21	Sufficient Governmental support in enforcing safety regulations on site	3.395	3.446	0.779	NS
22	Safety commitment	2.729	2.857	0.347	NS

Key: X_1 = project managers, X_2 = professionals, NS = Not Significant

Data presented in Table 2 revealed that each of the 22 items on level of awareness of safety practices had a significance value ranging from 0.073 to 0.969 which was greater than 0.05, set as the level of significance for testing the hypothesis (P>0.05) This indicated that there was no significant difference in the mean responses of project managers and professionals on the on the level of awareness of safety Practices in selected building construction sites in Kogi State. Therefore, the null hypothesis of no significant difference in the mean responses of project managers and professionals on the level of awareness of safety practices in selected building

construction sites in Kogi State was accepted.

Research Question 2

What is the level of Implementation of safety and site management practices on building construction sites in Kogi State?

Table 3: Mean and Standard Deviation on Level of implementation of safety and site management practices on building construction sites in Kogi State

S/N	Item Statements	X	SD	Remarks
1	Effective communication process	3.03	0.76	Low Implementation
2	Provision of adequate workers shelters	3.52	0.81	High Implementation
3	Employment of skilled workers	3.78	0.59	High Implementation
4	Giving compensation to accident victims on site	2.77	0.81	Low Implementation
5	Presence of safety policy within construction firms.	3.72	0.59	High Implementation
6	Provision of adequate sanitary stations	2.51	0.62	Low Implementation
7	Adequate housekeeping throughout the site	2.58	0.87	Low Implementation
8	Adequate design of safety equipment	2.19	0.76	Low Implementation
9	Proper design of workplace prior to commencement of construction work	2.25	0.76	Low Implementation
10	Provision of appropriate medical facilities	1.92	0.82	Low Implementation
11	Adequate safety supervision on site	2.85	0.75	Low Implementation
12	Proper investigation of accident by supervising contractors	2.00	0.69	Low Implementation
13	Enforcement of safety policy on site	3.38	0.85	Low Implementation
14	Adequate report of accident cases to relevant authorities	3.33	1.01	Low Implementation
15	Adequate risk management and assessment before the commencement of construction work	3.07	0.73	Low Implementation
16	Use of Personal Protective Equipment at all times during construction work	2.18	0.83	Low Implementation
17	Provision of proper safety training on site	3.66	0.55	High Implementation
18	Adequate supply of personal protective equipment.	2.08	0.86	Low Implementation
19	Introduction of innovative means of preventing accidents on site.	2.66	0.86	Low Implementation
20	Provision of health and safety insurance	3.62	0.75	High Implementation
21	Sufficient Governmental support in enforcing safety regulations on site	3.06	0.87	Low Implementation
22	Safety commitment	3.21	0.80	Low Implementation
	Grand Mean	**2.88**		

Key: X- mean, SD- Standard deviation

The data presented in Table 3 revealed that seventeen items had a mean value ranged from 1.92 to 3.38, this showed that their own mean value was below 3.50 which indicates that the level of implementation of these safety and site management practices on building construction sites in Kogi State was low. The table also revealed that the five remaining items have their mean value ranged from 3.52 to 3.78. This showed that

the Mean value of each item was above the cut-off point of 3.50, indicating that the level of implementation of these safety and site management practices on building construction sites in Kogi State is high. The table also showed that the standard deviations (SD) of the items are within the range of 0.59 to 1.01, this indicated that the mean values of the respondents were not far from one another in their responses.

Hypothesis 2

There will be no significant difference in the mean responses of project managers and professionals in Works department in the Local Government on the level of implementation of safety and site management practices in building construction sites in Kogi State.

Table 4: The t-test Analysis of the Mean Responses of project managers and professionals on the level of implementation of safety and site management practices in selected building construction sites in Kogi State

S/N	Item Statements	X_1	X_2	Sig.	Remarks
1	Effective communication process	2.875	3.160	0.059	NS
2	Provision of adequate workers shelters	3.458	3.571	0.482	NS
3	Employment of skilled workers	3.854	3.714	0.230	NS
4	Giving compensation to accident victims on site	2.687	2.857	0.290	NS
5	Presence of safety policy within construction firms.	3.895	3.571	0.065	NS
6	Provision of adequate sanitary stations	3.395	3.625	0.061	NS
7	Adequate housekeeping throughout the site	3.750	3.428	0.062	NS
8	Adequate design of safety equipment	2.145	2.232	0.568	NS
9	Proper design of workplace prior to commencement of construction work	2.229	2.285	0.708	NS
10	Provision of appropriate medical facilities	1.958	1.892	0.687	NS
11	Adequate safety supervision on site	2.687	3.000	0.095	NS
12	Proper investigation of accident by supervising contractors	2.000	2.000	0.992	NS
13	Enforcement of safety policy on site	3.437	3.339	0.560	NS
14	Adequate report of accident cases to relevant authorities	3.541	3.160	0.055	NS
15	Adequate risk management and assessment before the commencement of construction work	3.000	3.142	0.324	NS
16	Use of Personal Protective Equipment at all times during construction work	2.416	1.982	0.067	NS
17	Provision of proper safety training on site	3.562	3.750	0.083	NS
18	Adequate supply of personal protective equipment.	1.937	2.214	0.102	NS
19	Introduction of innovative means of preventing accidents on site.	2.895	2.464	0.111	NS
20	Provision of health and safety insurance	3.750	3.517	0.117	NS
21	Sufficient Governmental support in enforcing safety regulations on site	2.854	3.250	0.070	NS
22	Safety commitment	3.104	3.303	0.212	NS

Key: X_1 = project managers, X_2 = professionals, NS = Not Significant

Data presented in Table 4 revealed that the 22 items on level of implementation of safety and site management practices had a significance value ranging from 0.055 to 0.992 which was greater than 0.05, set as the level of significance for testing the hypothesis (P>0.05) This indicated that there was no significant difference in the mean

responses of project managers and professionals on the level of implementation of safety and site management practices in building construction sites in Kogi State. Therefore, the null hypothesis of no significant difference in the mean responses of project managers and professionals on the level of implementation of safety and site management practices in building construction sites in Kogi State was accepted.

Research Question 3

What are the barriers to effective implementation of safety and site management practices in building construction sites in Kogi State

Table 5:Mean and Standard Deviation on the barriers to effective implementation of safety and site management practices in building construction sites in Kogi State

S/N	Item Statements	X	SD	Remarks
1	Lack of safety standards Interview	4.03	0.85	Agree
2	Insufficient resources	4.12	0.70	Agree
3	Tight project schedule	4.81	0.80	Agree
4	Inadequate commitment to safety and site practices program	3.55	1.07	Agree
5	Putting safety as a lower priority	3.59	0.76	Agree
6	Lack of training	4.01	0.97	Agree
7	No safety rules and policy Interview	3.87	0.85	Agree
8	Assuming that safety is only the responsibility of safety	3.04	0.79	Disagree
9	Personnel	3.01	0.84	Disagree
10	Lack of safety inspection reports Interview	3.06	0.86	Disagree
11	Higher management unaware about safety consideration	3.60	0.89	Agree
12	No safety officers	3.99	0.80	Agree
13	No Provision of adequate workers shelters	3.67	0.85	Agree
14	Employment of unskilled workers	4.28	0.74	Agree
15	No presence of safety policy within construction firms.	4.10	0.83	Agree
16	Inadequate provision of sanitary stations	3.55	0.89	Agree
17	Inadequate housekeeping throughout the site	3.93	0.96	Agree
18	Inadequate design of safety equipment	4.26	0.81	Agree
19	Improper design of workplace prior to commencement of construction work	3.74	0.66	Agree
20	Non-provision of appropriate medical facilities	3.86	0.84	Agree
21	Inadequate safety supervision on site	3.55	0.70	Agree
22	Improper investigation of accident by supervising contractors	3.98	0.53	Agree
23	Lack of enforcement of safety policy on site	4.34	0.98	Agree
24	Inadequate report of accident cases to relevant authorities	3.59	0.79	Agree
25	Lack of adequate risk management and assessment before the commencement of construction work	3.72	0.61	Agree
26	Lack of use of Personal Protective Equipment at all times during construction work	4.20	0.65	Agree
27	Non-provision of proper safety training on site	3.64	0.79	Agree
28	Inadequate supply of personal protective equipment.	4.38	0.86	Agree
29	No introduction of innovative means of preventing accidents on site.	2.28	0.88	Disagree
30	Insufficient Governmental support in enforcing safety regulations on site	4.28	0.70	Agree
31	Safety commitment	3.76	0.88	Agree
	Grand Mean	**3.80**		

The data presented in Table 5 revealed that twenty-seven items had a mean value ranged from 3.55 to 4.81, this showed that their own mean value was above 3.50 which indicates that the respondents agreed that the items were barriers to effective implementation of safety and site management practices in building construction sites in Kogi State. The table also revealed that the four remaining items have their mean value ranged from 2.28 to 3.06. This showed that the Mean value of each item was below the cut-off point of 3.50, indicating that the respondents did not agree that the items were barriers to effective implementation of safety and site management practices in building construction sites in Kogi State. The table also showed that the standard deviations (SD) of the items are within the range of 0.53 to 1.07, this indicated that the mean values of the respondents were not far from one another in their responses.

Hypothesis 3

There is no significant difference in the mean responses of project managers and professionals in Works department in the Local Government on the barriers to effective implementation of safety and site management Practices in building construction sites in Kogi State.

Table 6:The t-test Analysis of the Mean Responses of project managers and professionals on the barriers to effective implementation of safety and site management Practices in building construction sites in Kogi State.

S/N	Item Statements	X_1	X_2	Sig.	Remarks
1	Lack of safety standards Interview	3.083	3.000	0.624	NS
2	Insufficient resources	3.083	3.160	0.580	NS
3	Tight project schedule	2.729	2.892	0.306	NS
4	Inadequate commitment to safety and site practices program	2.583	2.535	0.824	NS
5	Putting safety as a lower priority	3.541	3.642	0.507	NS
6	Lack of training	3.083	2.946	0.476	NS
7	No safety rules and policy Interview	2.854	2.892	0.819	NS
8	Assuming that safety is only the responsibility of safety	3.104	3.000	0.507	NS
9	Personnel	3.041	3.000	0.804	NS
10	Lack of safety inspection reports Interview	3.083	3.053	0.862	NS
11	Higher management unaware about safety consideration	3.666	3.553	0.524	NS
12	No safety officers	1.750	2.196	0.084	NS
13	No Provision of adequate workers shelters	3.750	3.607	0.397	NS
14	Employment of unskilled workers	2.333	2.250	0.573	NS
15	No presence of safety policy within construction firms.	2.979	3.214	0.153	NS
16	Inadequate provision of sanitary stations	3.416	3.678	0.136	NS
17	Inadequate housekeeping throughout the site	2.916	2.946	0.877	NS
18	Inadequate design of safety equipment	3.375	3.178	0.222	NS
19	Improper design of workplace prior to commencement of construction work	3.833	3.660	0.190	NS
20	Non-provision of appropriate medical facilities	2.937	2.803	0.425	NS
21	Inadequate safety supervision on site	3.320	3.588	0.058	NS
22	Improper investigation of accident by supervising contractors	2.981	2.980	0.994	NS
23	Lack of enforcement of safety policy on site	3.358	3.333	0.897	NS
24	Inadequate report of accident cases to relevant authorities	3.660	3.529	0.403	NS
25	Lack of adequate risk management and assessment before the commencement of construction work	3.886	3.549	0.505	NS
26	Lack of use of Personal Protective Equipment at all times	2.075	2.333	0.056	NS

	during construction work				
27	Non-provision of proper safety training on site	1.509	1.784	0.080	NS
28	Inadequate supply of personal protective equipment.	3.169	3.607	0.099	NS
29	No introduction of innovative means of preventing accidents on site.	3.207	3.372	0.346	NS
30	Insufficient Governmental support in enforcing safety regulations on site	2.226	2.352	0.363	NS
31	Safety commitment	2.886	2.647	0.168	NS

Key: X_1 = project managers, X_2 = professionals, NS = Not Significant

Data presented in Table 6 revealed that all the 31 items on the barriers to effective implementation of safety and site management Practices had a significance value ranging from 0.056 to 0.994 which was greater than 0.05, set as the level of significance for testing the hypothesis (P>0.05) This indicated that there was no significant difference in the mean responses of project managers and professionals on the barriers to effective implementation of safety and site management practices in building construction sites in Kogi State. Therefore, the null hypothesis of no significant difference in the mean responses of project managers and professionals on the barriers to effective implementation of safety and site management practices in building construction sites in Kogi State was accepted.

Discussion of Findings

The findings of this study are discussed based on research questions and hypotheses as follows:

Level of awareness of project managers on safety and site management practices in building construction sites

The findings of this study revealed that there was low awareness by project managers on twenty items of safety and site management practices in building construction sites in Kogi State. These practices include: effective communication process, provision of adequate workers shelters, employment of skilled workers, giving compensation to accident victims on site, presence of safety policy within construction firms, provision of adequate sanitary stations, adequate housekeeping throughout the site, adequate design of safety equipment, proper design of workplace prior to commencement of construction work, provision of appropriate medical facilities, adequate safety supervision on site, proper investigation of accident by supervising contractors, enforcement of safety policy on site, adequate report of accident cases to relevant authorities, adequate risk management and assessment before the commencement of construction work, use of personal protective equipment at all times during construction work, adequate supply of personal protective equipment, introduction of innovative means of preventing accidents on site, provision of health and safety insurance and sufficient governmental support in enforcing safety regulations on site. This finding is in line with Arijeloye and Oriyomi (2023) who carried out a study on the evaluation of site management practices for building projects, they observed that respondents are not aware about the site management practices. The finding is also in line with Foster (2020) who noted the importance of site management practices, thereby making the level of awareness of site management practices very important.

Level of implementation of safety and site management practices on building construction sites

The findings of this study revealed that there was low implementation by project managers on seventeen items of safety and site management practices in building construction sites in Kogi State. These practices include: effective communication process, giving compensation to accident victims on site, provision of adequate sanitary stations, adequate housekeeping throughout the site, adequate design of safety equipment, proper design of workplace prior

to commencement of construction work, provision of appropriate medical facilities, adequate safety supervision on site, proper investigation of accident by supervising contractors, enforcement of safety policy on site, adequate report of accident cases to relevant authorities, adequate risk management and assessment before the commencement of construction work, use of personal protective equipment at all times during construction work, adequate supply of personal protective equipment, introduction of innovative means of preventing accidents on site, sufficient governmental support in enforcing safety regulations on site, safety commitment. This finding is in accordance with Mohammed, Shittu and Hassan (2022), they examined the trend of accidents occurrence at construction sites in Minna and they observed that there was low implementation of safety and site management practices. Also, the study is in accordance with Esan, Kolawole and Kupoluyi (2019), they observed that low implementation of safety practices in construction sites can lead to safety compromises and cause poor performance.

Barriers to effective implementation of safety and site management practices in building construction sites

The findings of this study revealed thattwenty-seven items were barriers to effective implementation of safety and site management practices in building construction sites in Kogi State. These barriers include: lack of safety standards interview, insufficient resources, tight project schedule, inadequate commitment to safety and site practices program, putting safety as a lower priority, lack of training, no safety rules and policy interview, higher management unaware about safety consideration, no safety officers, no provision of adequate workers shelters, employment of unskilled workers, no presence of safety policy within construction firms, inadequate provision of sanitary stations, inadequate housekeeping throughout the site and inadequate design of safety equipment. This finding is in agreement with Daniel (2015), who investigated the safety issues involving workers on building construction sites in Nigeria, they observed that lack of training is a barrier to safety practices. The finding is also supported by Sobral and Soares (2019), they stated that lack of skilled workers automatically results in poor safety behaviors due to poor safety awareness and inadequate knowledge on how to work safely.

Conclusion

Based on the findings of this study, it was concluded that there was low awareness by project managers on safety and site management practices in building construction sites in Kogi State. This no doubt, have result to poor implementation of safety practices. It was also concluded that there were barriers to effective implementation of safety and site management practices in building construction sites in Kogi State.

Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations are made:

1. Ministry of works should embark on sensitization programs to improve the awareness of project managers on safety and site management practices in building construction sites in Kogi State.
2. Ministry of works should enforce and monitor the implementation of safety and site management practices on building construction sites in Kogi State.
3. Policies should be put in place by the Ministry of woks to reduce the barriers to effective implementation of safety and site management practices in building construction sites in Kogi State.

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