

SAFETY MANAGEMENT PRACTICES ADOPTED IN BUILDING CONSTRUCTION SITES IN NIGER STATE, NIGERIA.

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Abstract

The study investigated the safety management practices adopted in building construction sites in Niger State, Nigeria. This study utilized survey research on a target population of 2162 respondents, comprising of 400 site managers and 1762 building workers in building sites in Niger State. Multi stage cluster sampling technique was used to select the opinion of 63 sites managers and 150 construction workers in Niger State, making the total number of respondents to 213. The instrument for data collection was a five point scale questionnaire. Data collected for this study was analyzed using mean, standard deviation and z test statistics. Mean and standard deviation were used to answer all the research questions while the two null hypotheses were tested using z-test statistic at 0.05 level of significance. Cronbach Alfa formula was used to determine the reliability of the instrument which yielded 0.83. Findings from the study revealed that organizing of tools and machine, maintaining and regular servicing of machine among others are management practices adopted by site managers and construction workers in construction site while some of the challenges of safety management is failure to use protective clothing by construction workers. It was recommended that: Nigeria institute of Builders (NIOB) should make efforts to enforce compliance with the best management practices in building construction site in Niger State. The NIOB should also train building construction workers on the strategies to overcome the challenges faced on construction sites.

Introduction

Construction industry workers are usually involved in some forms of excavation for foundations, sewers and underground services. Excavation or trenching work can be highly dangerous. Experienced construction workers have been caught by the sudden and unexpected collapse of the unsupported sides of a trench (Kole, et al 2013). The effectiveness of the construction industry greatly depends on the safety management practices in building construction sites (Paringga, 2010). Management is the act of running and controlling a business or similar organization (Chappell, 2009). Management is an art and science of setting objectives, planning, organizing, co-ordination, directing, supervising, executing, monitoring, and improving various functions to achieve the objectives.

Management comprises planning, organizing, staffing, leading or directing, and controlling an organization or initiative to accomplish a goal (Kole, et el, 2013).

Jomoh (2012) also defined management as involving strategic- innovation, initiating about change, creative problem solving and decision making. Project management is the planning, monitoring and controlling of all aspects of project and the motivation of all those involved in it to achieve the projective objective on time and to the specified cost, quality and performance (Okeole, 2012).

Site management involves the six processes of management: namely: forecasting, planning, organizing, motivating, controlling and communication (Ogbonna, 2010). Ogbonna (2010) further lamented that site management is not a primary occupation within the industry, those who are eligible for responsible positions in site management must therefore have experienced employment with other occupations in the industry and as such developed attitudes and expectations about key industrial roles. The interrelationship of these attitudes and expectations with educational and work-experience

programmes need more careful consideration. Site manager is a person who has received the commission to carry out the intention of the top management through direct leadership of work groups in a construction company (Iden, 2010).

Sites manager is in charge of production and maintenance, always in constant control of a definite site work force, and is in immediate daily contact with the operatives whose work he directs and controls. Most building firms have different titles for these personnel, including site supervisors, site managers, and project managers (Idoro, 2011). Construction management is defined as the management activities that are over and above the normal architectural and engineering services conducted during the predesign, design and construction phase of a project that contribute to control of cost and time (Adeogun & Okofor, 2013).

Construction managers are the most important personnel on the construction sites. The general belief in modern times is that construction site managers are being faced with lack of awareness of best practices in construction sites and lack of adequate knowledge of safety management practices. They have been coping with the dynamism of the changing world of construction Technology, material innovations, management Techniques, and knowledge profusion and client requirements remain a subject of continuous inquiry. The activities in building construction sites greatly depend on the site management practices on the site (Ahmed, 2008). Management practices are those approaches and techniques used by the managers to carry out management functions (Jomoh, 2012). A practice is a way of doing something that is common, habitual or expected (Idubor & Osanoje, 2013). These practices are used by those in authority, the poor management practices have also negatively affected the safety management practices in construction sites in Nigeria.

Safety in construction sites is the state of being "safe, the condition of being protected against physical, social, spiritual, emotional, occupational, psychological, or

other types or consequences of failure, damage, error accidents, harm or any other event which could be considered non desirable (Barbara, 2010). Luke (2011) stated that Safety Management System (SMS) is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedure. This can take the form of being protected from the event or from exposure to something that causes health or economic losses. It can include protection of people or of possessions. Safety and the prevention of accidents is a topic that has been interest of managers and organizational theorists for some time (National Archive, 2012).

Safety practices are those protocols dealing with safety. The term is often used in connection with Occupational Safety and Health (OSH) and may vary between industries or sectors. Safety management practices have been the major problem in construction sites, accident around the globe could be as a result of lack of awareness of the safety management practices (Roux, 2016).

The injuries occur from handling heavy or awkward objects, heavy lifting, and prolonged or sustained work in awkward postures. This injury trend occurs across all types of construction, maintenance work and on all types of constructions. Given the nature of the work there is always the risk of severe injury or fatality. Some risks are obvious, such as concrete falling from height structure, excavation or trenching. Other risks are less obvious such as the long-term effects of breathing asbestos fibers or fumes from solvents and construction paints, while, there may be risks associated with these types of work, these risks can be avoided (Wadick, 2010).

Although safety management practices of construction worker is important in solving problem of accident around the globe, much have not been done by the manager and the construction workers in order to reduce the rate of accident in construction sites especially in Niger State.

(Nnedinma et al., 2014). This is evidenced by the prevailing regular and increasing accident rate in construction sites in Niger State. It appears as if the awareness on the ideas of best practices on safety management practices in construction site is low, there is a need to enhancement of safety management practices in construction sites. Thus, there is need to carry out an investigation on the safety management practices adopted in construction sites in Niger State, Nigeria.

Purpose of the Study

The study investigated the safety management practices adopted in construction sites in Niger State, Nigeria. Specifically the study determined:

- 1 The safety management practices adopted by site managers and construction workers in Niger State.
- 2 The Challenges of safety management practices among site manager and construction workers in Niger State.

Research Questions

1. What are the management practices adopted by site managers and construction workers in building construction sites in Niger state?
2. What are the challenges of safety management practices in building construction sites in Niger state?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

H₀₁, There is no significant difference in the mean responses of rating site managers and construction workers on the management practices adopted in construction sites in Niger State.

H₀₂, There is no significant difference in the mean responses of site managers and construction workers on the challenges of safety management practices in construction sites in Niger State.

Research Method

This research study adopted survey research design to investigate the safety management practices adopted in building construction sites in Niger State, Nigeria. The target population for this study was 2162 respondents comprising of 400 site managers and 1762 building workers in building sites in Niger State. Multi stage cluster sampling technique was used to select the opinion of 63 sites managers and 150 construction workers in Niger State, making the total number of respondents to 213 used for the study. This sampling technique was more appropriate because the sampling was done in stages, beginning from the looking at the population from the senatorial zone levels, local government level and ward level. The instrument for data collection was a five point scale questionnaire, used to elicit information from the respondents. Data collected for this study was analyzed using

mean, standard deviation and z test statistics. Mean and standard deviation were used to answer all the research questions, while the two null hypotheses were tested using z-test statistic of independent population at 0.05 level of significance. The response scales were assigned numerical value as follows: The decision on the respondents scale True limits of the numerical values used as follows: Strongly Agreed (4.50 - 4.49), Agreed (3.50 - 4.49), Moderately Agreed (2.50 - 3.49), Disagreed (1.50 - 2.49) and Strongly Disagreed (1.00 - 1.49).

Results

Research Question One: What are the safety management practices adopted by site manager and construction workers in construction sites.

Result that answered this research question is presented in Table 1

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Table 1: Mean responses and standard deviation of site managers and construction worker on the management practices adopted by site managers and construction workers in Niger State.
 N1=63, N2=150, Total N=213.

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}	SD ₁	SD ₂	SD _t	Decision
1	Planning of the project is construction management practices.	3.88	3.91	3.90	0.68	0.75	0.72	Agreed
2	Use of correct tool for the right job	3.75	3.81	3.78	0.69	0.63	0.66	Agreed
3	Organizing of tools and machine.	4.16	4.12	4.14	0.65	0.61	0.63	Agreed,
4	Implementing of safety practices.	3.93	4.09	4.01	0.70	0.65	0.68	Agreed
5	Supervising the project and staff.	3.91	3.91	3.91	0.61	0.65	0.63	Agreed
6	Time, cost, quality And performance is the work of construction manager.	4.12	3.93	4.03	0.66	0.72	0.69	Agreed
7	Reducing the rate of corruption of Employee	3.90	3.62	3.76	0.80	0.72	0.76	Agreed
8	Controlling the molding and laying of blocks.	3.90	3.93	3.92	0.62	0.65	0.64	Agreed
9	Maintaining and regular servicing of machines.	4.18	4.12	4.15	0.66	0.61	0.64	Agreed
10	Directing and Controlling organizational procedure.	3.90	3.91	3.91	0.62	0.65	0.64	Agreed
11	Having initiative to accomplish goals on sites	4.02	3.88	3.95	0.67	0.64	0.66	Agreed
12	Leading the construction sites regularly	3.88	3.91	3.90	0.68	0.75	0.72	Agreed
13	Time management on the construction site, by use of schedule and programing.	3.91	4.02	3.97	0.66	0.62	0.64	Agreed
14	Monitoring cost of the construction work by budgeting.	4.05	3.75	3.90	0.61	0.63	0.62	Agreed

*Decision was based on Mean Total (xt) with respect to limit of numbers

Table 1 revealed that all the items on management practices adopted by site managers and construction workers in

construction sites in Niger State, have their means rating from 3.73 to 4.15.

Research Question Two: What are the challenges of safety management practices

Table 2: Mean Responses and Standard Deviation of Site Manager and Construction Workers on the Challenges of Safety Management Practices in Construction Sites in Niger State. N1=63, N2=150, Total N=213

S/N	Items	\bar{x}_1	\bar{x}_2	\bar{x}_t	SD ₁	SD ₂	SD	Decision
1	Using equipment inadequately.	4.16	4.26	4.21	0.94	0.84	0.89	Agreed
2	Failure to warn other of danger.	4.03	3.63	3.83	0.76	1.10	0.93	Agreed
3	Availability of qualified and competent workers.	4.35	3.97	4.16	0.81	1.14	0.98	Agreed
4	Working without authority.	3.95	4.10	4.03	0.77	0.75	0.76	Agreed
5	Control of construction personnel.	4.35	4.37	4.36	0.81	0.78	0.80	Agreed
6	Modalities for achieving the requirement of contracting documents	4.16	4.20	4.18	0.94	0.90	0.92	Agreed
7	Smoking in areas where this is not allowed.	4.03	3.91	3.97	0.76	0.78	0.77	Agreed
8	Negligence on the level of awareness.	4.23	4.25	4.24	0.69	0.67	0.68	Agreed
9	Inadequacy of finance for the project.	4.16	4.30	4.23	0.94	0.72	0.83	Agreed
10	Declining competence of trained professionals and artisans.	4.03	4.10	4.07	0.76	0.75	0.76	Agreed
11	Disconnecting safety devices such as guards by employees.	4.35	4.36	4.36	0.81	0.78	0.80	Agreed
12	Inadequately fire warning system and sign.	3.95	4.05	4.00	0.77	0.86	0.82	Agreed
13	Quality control management on site.	4.35	3.90	4.13	0.81	1.24	1.03	Agreed
14	Inadequacy of competent work force.	4.16	3.92	4.04	0.94	1.08	1.01	Agreed
15	Failure to use or protective equipment by employee.	2.20	2.30	2.25	0.50	0.52	0.79	Disagreed
16	Using defective equipment by employee on site.	4.20	4.26	4.23	0.71	0.68	0.70	Agreed

Decision was based on Mean Total (\bar{x}_t) with respect to limit of numbers

Key: \bar{x}_1 = Site managers, \bar{x}_2 = Construction workers \bar{x}_t = Mean Total

Table 2 revealed that the mean score of the respondents ranged from 3.83 - 4.36 under the items are adjudged by the respondents as Agreed on the challenges of safety management practices in construction sites in Niger State. However both site manager

and construction workers do not agree that Failure to use or protective equipment by employee.

Hypotheses

z-test statistics is used to analyse the

hypotheses.

Hypothesis one: HO₁, There is no significant difference among the Site Managers and

Construction Workers with respect to the management practices adopted in construction sites in Niger State.

Table 3: z-test analysis of the mean ratings of Site Managers and Construction Workers on the management practices adopted in construction sites in Niger State.

Group	N	\bar{x}	SD	Df	z-value	p-value, Sig. (2-tailed)	Alpha Level	Decision
SM	63	3.96	0.67	211	2.110	0.018*	0.05	Significant
CW	150	3.92	0.66					

*Significant at $p \leq 0.05$.

SM= Site Managers

CW= Construction Workers

The result of Table 3 show since the p-value, Sig (2- Tailed) (0.018) is less than 0.05 it implies that there is significant difference in the Mean responses of the respondents, also the t-value of 2.110 indicate significant difference in the Mean of the respondents. Therefore, the null hypotheses one was rejected. Hence, there is a significant

difference in the mean responses of sites manager and construction workers on the management practices adopted in construction sites in Niger State.

Hypotheses Two: There is no significant difference among the site managers and construction workers with respect to the challenges of safety management practices in construction sites in Niger State.

Table 4: z-test Analysis of the Mean ratings of Site Managers and Construction Workers on the Challenges of Safety Management Practices in Construction sites in Niger State.

Group	N	\bar{x}	SD	Df	z-value	p-value, Sig.(2-tailed)	Alpha Level	Decision
SM	63	4.16	0.83	211	1.482	0.138	0.05	Not Significant
CW	150	4.13	0.84					

The result in Table 4, revealed that the z-test of the challenges of safety management practice in construction sites. There is no significant difference because the probability value (sig. 2tailed) calculated in table 5 0.138 is greater than 0.05 level of significance set for data reporting. Therefore the research accepted or upheld the null hypothesis three.

Discussion of Findings

The results presented in Table 1 provided answers to research question one. Management practices adopted by site managers and construction workers include: use of correct tools for the right job, supervising the project and staff, reducing the rate of corruption of employee, controlling the molding and laying of blocks, maintaining and regular servicing of

machine, directing and controlling organizational procedure, having initiative to accomplish goals on sites, leading the construction sites regularly, time management on the construction site, by use of schedule and promising and monitoring cost of the construction work by budgeting.

This finding is in line with the findings of Masayuki (2006) and Gordon (1999) which stated that one of the important practices at the construction site is guidance and supervision during work progress. This is an indication that the items were designed to adequately assess the safety management practices in construction sites. The finding is in line with the findings of Gordon (1999) who studied Hong Kong safety culture and found one of the practices implemented in Hong Kong is pink tickets scheme which was introduced by the sub-contractor whereby their safety staff and managers carried a pad of small pink forms printed in English and Chinese version. The details of the failure and the offender's name were entered when there is any offense found. This finding was justified by the fact that the construction workers and construction manager know the management practices but they do not adhere to the management rule.

The results further revealed that the safety practices adopted include: head protection by wearing hard hat clothing, wearing of protective clothing and personnel health, first aid treatment by providing first aid box, use of safety glove for hand protection, use of eye shield for eye protection, use of face shield, use of dust masks, connecting safety devices such as guards to machines, use of respirator, no smoking sign in areas where this is not allowed, use of hearing protection, safety boot or work shoes, use of safety vest effective tools and equipment, adequate fire warning system, effective housekeeping, use of knee protection, fall protection, scaffolding and platform protection, electrical protection, Trenches, excavation & shoring protection, welding, cutting and open flame work protection, building demolition protection, cranes and forklift

protection, heavy equipment protection, motorized vehicle protection and lasers powerful beam of light protection.

The findings were supported by Paringga (2010) who agreed that in order to have a safe and health condition at construction sites, it is essential to provide protective clothing that workers need at the construction site such as head protected equipment, face and eyes protection equipment, ear protection equipment, respiratory equipment and body protection. Elbetagi and Hegazy (2002), Aliyu (2011) who revealed that proper safety zones around the construction areas should be provided to prevent harm from fallings object. Similarly Rosli (2008) state that good safety programmes would certainly help in reducing injuries at construction. Mohammed *et al.*, (2008), Krishnamurthy (2006) also affirmed that the major problem relating to safety issue at construction sites is the attitude of the workers.

The respondent accepts all the items as challenges except one which was supported by Roelofs *et al.* (2011) which is supervisor oriented that play a critical role in setting the expectations for safety on sites. Similarly, Kin and Bonaventra (2006) did a study on challenges of safety management practices in Buthanese construction industry explained that safety policy is a written statement of principles and goals which can demonstrate top management's commitment to safe working methods and environment at the construction sites. Ahmadon *et al.* (2006) stated that safety policy is a requirement of safety and health policy that reflects the management commitment towards the organization's safety and health.

The study further revealed that of z-test there is a significant difference between the Site Managers and Construction Workers with respect to the management practices adopted in construction sites in Niger State. This is in line with Ilyani (2006) Kole, *et al.*, (2013), Idubor and Osanoje (2013). Who stated that any safety program is based on a policy insisting on the safety protected of the employees.

The result revealed that there is no significant difference in the mean responses

of site managers and construction workers on the challenges of safety management practices in construction sites in Niger State. This is in line with the findings of Roli (2008) because both construction manager construction workers have the same view on the challenges of safety management practices in construction sites. Other than that, the project manager can also display the project site accident statistic on safety bulletin boards.

Conclusion

Based on the findings, it is concluded that planning of the construction management practices, use of correct tools for the right jobs, organizing of tools and machine, having initiative accomplish goals on site by the use of schedule and programming are all management practices. it was concluded that head protection by wearing hard hat, wearing of protective clothing and personal health, use of respirators, no smoking sign in areas where is not allowed, are safety practices adopted by site mangers and construction workers in the construction site. In addition, failure to warn other of danger negligence on the level of awareness and declining competence of trained personal are all challenges of safety management practices.

Recommendations

The following recommendations were made on the basis of the findings:

1. Nigeria institute of Builders (NIOB) should make effort to enforce compliance with the best site management practices in building construction site in Niger State.
2. The Nigeria Institute of builders (NIOB) should periodically give detail orientation to site managers and construction workers on safety practice on construction site.

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