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ASSESMENT OF THE EXTENTOF COMPLIANCE WITH PRELIMINARY INVESTIGATIONS BEFORE ERECTING BUILDING STRUCTURES IN ABUJA METROPOLIS, NIGERIA

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Abstract
The study was designed to assess the extent of compliance with preliminary investigations before erecting building structures in Abuja Metropolis. Two research questions and two null hypotheses guided the study. The research was carried out in Abuja Metropolis Nigeria Descriptive survey research design was used for the study. The target population for the study was 148 subjects comprising of 72 Builders and 76 Engineers. Since the population is manageable no sampling technique was used. The instrument for data collection was a structured questionnaire titled "Questionnaire on Assessment of the Compliance with Preliminary Investigations Before Erecting Building Structures in Abuja Metropolis Nigeria (QAECPIEBS)". The questionnaire was validated by two experts from the Department of Industrial and Technology Education, Federal University of Technology, Minna and one expert from the Department of Building Technology Niger State College of Education Minna. Statistical Package for Social Sciences (SPSS version 23) was used to determine the internal consistency of the instrument to be 0.80. Data collected for the study was analyzed using mean, standard deviation and z-test. Mean was used to answer the research questions while z-test was used to test the hypotheses at 0.05 level of significance. The findings of the study revealed that lack of adequate qualified personnel to conduct preliminary investigations, the absence of relevant laws to guide conducting of preliminary investigations, involvement of quacks in the construction industry, long period of time taken before results are obtained after conducting site investigations. The findings also showed that there should be training and re-training program in place for personnel conducting preliminary investigations, swiftness on the part of government and building regulatory bodies in punishing defaulters of preliminary investigations, It was recommended that all the preliminary investigations identified in this study should be made a requirement for approving any building plans and construction also government should enact laws to punish violators of preliminary investigations in Nigeria.

Keywords: Challenges, Extent of Compliance, Building Structures.

Introduction

There is always a need to ascertain the presence of desirable characteristics in the materials that is to be used for any form of construction in the building industry. The only means of achieving this is by subjecting such materials delivered to site to the needed and necessary tests as detailed in the specification document of the contract. But unfortunately most construction site in the country do not have laboratory where such tests can be carried out and those that exist are not equipped with sufficient equipment's and facilities to carry out the test effectively (Oke, 2006). Oke further noted that most of the personnel in such laboratory have little or faint knowledge about the tests. Tests of materials are the responsibility of various professional as well as contractors that are involved with the use of such materials in other to achieve value for client's money. According to Aibinu and Odeyinka (2006) in Ogunmakinde *et al.,* (2019) the construction industry lacks coordination of all associations including professional bodies and trade unions. Although these bodies are present but the lack of synergy between them exposes the industry to risks including influx of quacks who illegally carryout the work of professionals.

The activities of these quacks inhibit the execution of credible site investigation which in turn discourages clients to allocate money to conduct preliminary site investigations as the client will no longer have faith on the results of conducted investigations. Adebowale *et al.,* (2016) identified the use of quacks instead of professionals, poor workmanship, non-enforcement of building codes or construction regulations, corruption in the building industry among other things as the major factors that bedevils the construction industry in Nigeria. These factors as highlighted by Adebowale *et al.,* (2016)may not be unconnected to the observed lack of zeal of some clients to carry out important preconstruction activities such as preliminary site investigations due to fear of being exploited by quacks. Archibong (2016) stressed that

the use of quacks in the building industry had contributed in no small measure in preventing clients from carrying out lawful practices that will ensure the successful completion of the project by boycotting available code of practice.

Code of practice are collection of laws, regulations and decrees or other statutory requirements adopted by a government legislative authority involved in assuring the suitability of the physical structure and welfare of the building users (Osuizugbo,2018). These codes of practice are meant to guide, control and set high standards for every activities and practice in the construction process in order to achieve smooth and safe built environment and the only way these expectations could be achieved is through the compliance of law and order in all aspects of human endeavors. It explains the reason why the provision of any buildings, which involved the processes of pre-design, design, pre-construction, construction and post construction stages, should not be done anyhow. But unfortunately due to lack of guide or code of practice regarding the quality of site investigation work, geotechnical failures often occurred. These failures sometime lead to catastrophic disaster and imposed serious threat to public safety as captured by Moh (2004) in Zumrawi (2014). In developing countries such as Nigeria these codes of practice are usually beautifully spelt out to guide and control every aspect of construction process but unfortunately they are only beautiful on papers not in practice.

This is in line with the view of (Osuigbo, 2018) who stated that "The current National Building Code was crafted and agreed by all the stakeholders in the Nigerian Built environment in 2006, with the aim to set minimum standard on building Pre-design, Designs, Pre-construction, Construction and Post Construction stages with a view to ensuring quality, safety and proficiency in the building industry. Twelve years after, this publication in the industry still remain very fragmented and operating in Business-as-usual". In real terms, poorly constructed buildings, structural failures and even total collapse of building within the environment are still experienced. Despite the beauty of these codes of practice they still lack a vital element which is the aspect of enforcement as such contractors or clients most at times do not respect these codes especially those presumed to be unimportant and resource consuming as such most client tend not to fund preliminary investigations.

Generally, clients provide fund for a project, however some client may delay, default or may provide insufficient funding to cover for preliminary investigation and in cases like this the contractor may decide not to conduct the investigations in order to save cost and proceed with other aspect of the construction process which in the long run may turn out to be devastating. Fatoye (2012) identified lack of funding for projects as one of the major challenges facing the construction industry.

Statement of the Research Problem

The use of necessary information gathered from the preliminary investigations will assist in reducing the menace of building failure. But it is regrettable to note that building collapse appears to be on the increase particularly among the residential building owners in Abuja metropolis. Building collapse is a situation where building which has been completed and occupied, completed but not occupied or under construction, crumple on its own due to action or inaction of man. There is no state in Nigeria and the Federal Capital Territory (FCT) that building collapse has not occurred in the past ten (10) years. Mathebula *et al.,* (2017), cited the case of Reigners Bible church in Akwa Ibom State Nigeria that collapsed killing about one hundred (100) worshipers. In the same vein a seven (7) storey building at Woji road in Rivers State Porthharcourt Nigeria collapsed killing about five persons respectively (Odeyemi *et al.,*2019*)*. Also On the 13th of March, 2019 a three (3) storey building located at Ita-Faji area of Lagos State Nigeria collapsed killing about twenty persons (20) and injuring scores (Odeyemi *et al.,*2019), on the 6th of October 2021 a two storey building under construction located behind Citec estate along airport road Jabi Abuja collapsed killing one occupant ("Breaking '1 dead as building collapses in Abuja'", 2021). Finally on the 19th of October 2021 a two storey building in Ikorodu area of Lagos killing one person and trapping many (Toromade, 2021).

Hundreds of lives and properties worth millions of naira has been lost in recent years due to building collapse as highlighted above. What may actually be the cause of the increase in building failure?

Probably negligence on the part of building owners to carry out preliminary investigation before erecting building structures. Omoogun *et. al.,* (2010) stated that, negligence and disregard in areas such as soil type, bearing capacity of the soil, building design, planning for extra ordinary loads and stress from strong winds, earth quake for tall buildings, foundation works and quality of building materials are several related cause of building failures. Based on the foregoing, therefore, the study was designed to determine the extent of compliance with preliminary investigations before erecting building structures in Abuja metropolis.

Purpose of the Study

The purpose of the study is to determine the following

1. The challenges that hinders compliance with preliminary investigations before erecting building structures.
2. The measures that will encourage complying with preliminary investigations before erecting building structures.

Research Hypotheses

The following null hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

1. There will be no significant difference between the mean responses of the Builders and Engineers on the challenges that hinders compliance with the preliminary investigations for erecting building structures in Abuja metropolis.
2. There will be no significant difference between the mean responses of the Builders and Engineers on the measures that will encourage compliance with the preliminary investigations for erecting building structures in Abuja metropolis.

Methodology

The study adopted a descriptive survey design to elicit information from builders and engineers in Abuja Metropolis. The targeted population for the study was 148 respondents comprising of 72 builders and 76 engineers in Abuja Metropolis, Nigeria. Since the population is of manageable size, the entire population was used for the study hence no sampling was employed for the study. A structured questionnaire titled Questionnaire for Assessment of the Extent of Compliance with Preliminary Investigation before Erecting Building Structures (QAECPIEBS) was developed by the researcher and was used for data collection. The instrument was validated by two experts from the Department of Industrial and Technology Education, Federal University of Technology Minna, and one expert from the Department of Building Technology, Niger State College of Education, Minna. A trial testing was conducted in Minna to establish the reliability coefficient of the instrument using split half reliability method. Cronbach's alpha Statistical tool was used to determine the internal consistency of the instrument and was found to be 0.80 indicating that the instrument had a high reliability. Data collected were subjected to mean and standard deviation to answer research questions while z-test statistics was used to analyze data and test the research hypotheses at 0.05 level of significance.

Results

Research Question One

What are the challenges that hinder compliance with preliminary investigations before erecting building structures in Abuja Metropolis?

Table 1: Mean Responses and Standard Deviations of Respondents on the Challenges that hinder Compliance with Preliminary Investigations before Erecting Building Structures in Abuja Metropolis

S/N	Items	$\bar{x}_T$	S_{D1}	Remark
	Problems associated			
1	Lack of adequate qualified personnel to conduct preliminary investigations	3.00	0.47	Agree
2	Absence of relevant laws to guide conducting of preliminary investigations	3.24	0.72	Agree
3	Involvement of quacks in the construction industry	3.40	0.48	Agree

4	Long period of time taken before results are obtained after conducting site investigations	3.10	0.60	Agree
5	Lack of awareness on the part of clients on the importance of preliminary investigations	3.42	0.81	Agree
6	Corrupt tendencies from the part of contractors handling the project	2.96	0.69	Agree
7	Absence of well-equipped laboratories for conducting the investigations	3.23	0.73	Agree
8	Presumable high cost of conducting preliminary investigation	3.15	0.67	Agree
9	Laxity on the part of Government and regulatory bodies to enforce strict compliance	3.30	0.63	Agree
10	Negligence on the part of contractors/residential building owners to carry out preliminary investigations before erecting building structure	3.43	0.61	Agree
11	Incompetency of relevant professional bodies	3.50	0.50	Strongly Agree
	Grand Mean/SD	**3.25**	**0.42**	

Key: N_T = Number of respondents, $\bar{x}_T$ = Total, S_{D1} = Average Standard Deviation..

Table 1 shows responses of the respondents on the 11 challenges that hinder compliance with preliminary investigations before erecting building structures with the mean ranging from 2.96 to 3.50 and a grand mean of 3.25. This signifies that all the 11 items are the challenges that hinder compliance with preliminary investigation before erecting building structures. The standard deviation of the items ranges from 0.47 to 0.81. This standard deviation showed that the respondents were not too far from the mean and were closed to one another in their responses. This closeness of the responses added value to the reliability of the item.

Research Question Two

What are the measures that will enhance compliance with preliminary investigations in Abuja Metropolis?

Table 2: Mean and Standard Deviations on the Measures that Enhance Compliance with Preliminary Investigations in Abuja Metropolis.

S/N	Items	$\bar{x}_T$	S_{D1}	Remark
	Solutions			
1	There should be training and re -training program in place for personnel conducting preliminary investigations	3.48	0.50	Agree
2	Enacting of laws to guide conducting preliminary investigations	3.13	0.76	Agree
3	Only qualified and licensed builder should be allowed to conduct and interpret investigation results	3.36	0.48	Agree
4	Results of preliminary investigation should be made available and on time	3.36	0.77	Agree
5	Regular awareness program should be carried out to educate the client on the importance of conducting preliminary investigations.	2.88	0.66	Agree
6	Corrupt acts from anybody should be dealt with decisively.	3.46	0.72	Agree
7	Government and regulatory bodies such as Nigeria Institute of Building (NIOB), Council of Registered Builders of Nigeria (CORBON) should setup and equip laboratories where test can be conducted	3.39	0.61	Agree

8	Cost of preliminary investigation should be made affordable in order to encourage clients to conduct it.	3.02	0.98	Agree
9	Building regulatory bodies and other relevant agencies should be sensitized to enforce building standard regulation at building construction site.	3.35	0.49	Agree
10	Government and regulatory bodies should be swift in punishing defaulters of preliminary investigation.	3.06	0.78	Agree
11	Competent bodies should oversee construction projects.	3.17	0.79	Agree
	Grand Mean/SD	3.24	0.81	

Key: N_T = Number of respondents, $\bar{x}_T$ = Total, S_{D1} = Average Standard Deviation.

The results in Table 2 shows responses of respondents on the 11 items posed to determine the measures that will encourage compliance with preliminary investigations with a mean ranging from 2.88 to 3.39 and a grand mean of 3.24. This signifies that all the 11 items are the measures that will encourage compliance with preliminary investigations. The standard deviation of the items ranges from 0.61 to 0.98. This shows that the respondents were not too far from the mean and were close to one another in their responses. This closeness of the responses adds values to the reliability of the items.

Hypothesis One

There is no significant difference between the mean responses of Builders and Engineers on the challenges that hinders compliance with preliminary investigations before erecting building structures in Abuja metropolis.

Table 3: Z-test Analysis of Significant Difference in the Mean Responses of the Respondents on the Challenges that Hinder Compliance with Preliminary Investigations before Erecting Building Structures in Abuja Metropolis.

Building Professionals	N	Mean	S.D	df	Z	P-value
Builders	69	3.24	0.12	141	0.03	0.97
Engineers	74	3.25	0.15			

The result of analysis as presented in Table 3 shows that there was no significant difference ($p > 0.05$) in the mean scores of the respondents. The hypothesis was therefore upheld (accepted). The mean and standard deviation for Builders were 3.24 and 0.13 respectively while the mean and standard deviation for Engineers were found to be 3.25 and 0.15 respectively as regards the challenges that hinder compliance with preliminary investigations before erecting building structures in Abuja Metropolis.

From the result, there is no significant difference between the mean ratings of Builders and Engineers as regards the challenges that hinder compliance with preliminary investigations before erecting building structures in Abuja Metropolis.

Hypothesis Two

There is no significant difference between the mean responses of Builders and Engineers on the measures that will encourage compliance with the preliminary investigations before erecting building structures in Abuja metropolis.

Table 4: Z-test Analysis of Significant Difference in the Mean Responses of the respondents on the Measures that will Encourage Compliance with preliminary Investigations in Abuja Metropolis.

Building Professionals	N	Mean	S.D	Df	Z	P-value
Builders	69	3.21	0.18	141	-2.12	0.03
Engineers	74	3.27	0.11			

Table 4 shows the z-test analysis of differences in the responses of Builders and Engineers as regards the Measures that will encourage compliance with preliminary investigations. The table reveals the probability value obtained to be 0.03 which is less than the probability value of 0.05 in comparison. The null hypothesis was therefore rejected. Therefore, there was significant difference between the mean responses of Builders and Engineers as regards Measures that will encourage compliance with preliminary investigations in Abuja Metropolis.

Discussion of Findings

Findings on the challenges that hinder compliance with preliminary investigations before erecting building structures in Abuja Metropolis revealed that lack of adequate qualified personnel to conduct preliminary investigations, the absence of relevant laws to guide conducting of preliminary investigations, involvement of quacks in the construction industry, long period of time taken before results are obtained after conducting site investigations, lack of awareness on the part of clients on the importance of preliminary investigations, corrupt tendencies from the part of contractors handling the project, the absence of well-equipped laboratories for conducting the investigations, the presumable high cost of conducting preliminary investigations, laxity on the part of government and regulatory bodies to enforce strict compliance with preliminary investigations, the negligence on the part of contractors/residential building owners to carry out preliminary investigations before erecting building structure and the incompetency of relevant professional bodies were all identified as challenges to preliminary investigations.

This finding is in line with the view of Oke, (2006) who opined that most construction site in the country do not have laboratory where preliminary investigation tests can be carried out and those that exist are not equipped with sufficient equipment's and facilities to carry out the test effectively. Oke further noted that most of the personnel in such laboratory have little or faint knowledge about the tests. The findings were also in consonant with the view of Adebowale *et al.,* (2016) who identified the use of quacks, poor workmanship, non-enforcement of building codes, corruption among other things as the major factors that bedevils the construction industry in Nigeria.

Findings on the measures that will encourage compliance with preliminary investigations revealed that there should be training and re-training program in place for personnel conducting preliminary investigations, swiftness on the part of government and building regulatory bodies in punishing defaulters of preliminary investigations, enacting of laws to guide conducting preliminary investigations, allowing only qualified and licensed builders to conduct and interpret preliminary investigation report to mention but few ensures compliance with preliminary investigations. These findings corroborate with the view of

Conclusion

The study investigates the extent of compliance with preliminary investigations before erecting building structures in Abuja Metropolis. Based on the findings of the study, the following conclusions were made. It was concluded that all the identified challenges hindering preliminary investigations such as, Lack of adequate qualified personnel to conduct preliminary investigations, cost, corrupt tendencies from the part of contractor, clients based knowledge, negligence of the law enforcement agencies and long period of time taken before results are obtained after conducting site investigations if not properly addressed will continue to deter or totally hinder execution of preliminary investigations. Subsidizing the cost of preliminary investigation, timely and prompt release of investigation results, conducting regular awareness programme, supervision of building by the professional builders and relevant agencies among others will ensure compliance with preliminary investigations.

Recommendations

Based on the findings of this research work, the following recommendations were made

1. Government should build and equip laboratories that will be conducting preliminary investigations at a subsidized rate
2. Only registered qualified personnel should be allowed to oversee any construction project in Nigeria.
3. The federal government should adopt and enforce the National Building code into law.

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