



Factors Affecting Residential and Public Buildings Maintenance in Nigeria

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ABSTRACT: Building is a machine that involves the process and the product which was designed and built to carry loads and resist forces. Residential and public building maintenance plays an important role in extending the lifespan of a private, commercial or industrial properties. This study examined among the most frequently observed factors that affect the residential and public buildings maintenance in Nigeria. Lack of preventive maintenance, abandonment, accidents, faulty or poor design, low quality materials, shifting values and modernization, general neglect, vandalism, wrong behaviour of the users, client's attitude to building maintenance, lack of building maintenance policy, lack of skilled maintenance professionals, and insufficient fund for maintenance activities. Data for the study were collected through well-structured questionnaire administered randomly within the populace in southwestern states of Nigeria. The factors affecting residential and public buildings maintenance in Nigeria. Lack of preventive maintenance ranked first with RSI value of 0.685 (68.50%) followed by vandalism of the building with RSI value of 0.677 (67.70%) and shifting values and modernization with RSI value of 0.662 (66.20%). Lack of skilled maintenance professionals was ranked least with RSI value of 0.46 (46%). Regular maintenance of building is overall less costly than instant maintenance after failure symptoms in building. Conclusion and recommendation are made on the report of this work.

Keywords: residential building, public building, maintenance, machine, loads, abandonment

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I. INTRODUCTION

Maintenance of the built environment has impacts on the whole nation. According to Barrett et al. (2019) [1], the state of the environment in which we have learned is a reflection of how well the country is doing and one of the essential areas in which the construction industry must make substantial progress is the maintainability of buildings [2]. Residential and public buildings clients suffer from the lack of maintenance culture and financial allocations for maintenance work. Maintenance is a process and product in addition to restore the weak part of the building element in order to keep the maintenance work performed, so there is great importance for maintenance, as it preserves the existing buildings and extends their life, so the maintenance work must be done continuously, carefully and in a way that achieves the required purpose. The measure of a building's function is its ability to provide the required environment for a particular activity, and thus the deterioration of the building components makes it necessary to take appropriate measures to maintain the required building characteristics, which provide comfort and safety [3]. Preserving the building in its structural, aesthetic and functional condition is the main goal of the maintenance process [4]. While the criteria for good practice in maintenance management of building stock have been established over a significant period of time, good practice is by no means universal in Nigeria, where housing maintenance in the public sector has long been plagued by a lack of funding [5].

Maintenance involves the repair and maintenance of all facilities that belong to a particular organization or system to currently acceptable standard and to sustain utility and value. In other words it is the act of keeping and or restoring the functional state of properties and services therein to sustain utility and value. All elements of building deteriorate at different rates, depending on the qualities of materials, method and quality of construction workmanship, environment conditions and the intensity and type of usage of the building.

II. LITERATURE REVIEW

There are several factors affecting residential and public buildings maintenance in the previous literature to include design and proper workmanship, materials specifications, detailing of working drawing, construction supervision, cash flow analysis, environmental factors, users' activities, shifting values and modernization, accidents and solar radiation. Maintenance can be defined as all continuous repair work procedures that ensure that all elements and parts of the building are in an acceptable standard to perform the desired [6]. Maintenance is all administrative and technical procedures, including supervision, to preserve the item or return it to a location that enables it to perform the function for which it was made [7]. Maintenance is a combination of procedures that are carried out either to return an item to an acceptable condition or to preserve it [8]. Reducing all negative impacts of inactivity and maximizing attachment at a lower cost [9]. There are five main factors affecting the maintenance of public buildings: lack of preventive maintenance, insufficient amounts allocated for building maintenance, lack of a standard for building maintenance, lack of spare parts and components, and lack of response to maintenance requests [10]. Residential building users indicated in the survey that the causes of maintenance problems are: faulty workmanship, design accuracy appropriate to user needs, use of inexpensive and low-level materials; the most influential factor in residential building maintenance is the lack of funding for building maintenance [11].

Breesam and Jawad (2021), [12] concluded that the most important factors affecting maintenance procedures and their time are: With regard to factors that fall within the appearance of technical defects; Maintenance time (when it started), safety and health measures, time to complete work, flawed construction, failure to implement, poor maintenance work performed, design problems. Walter Emiedafe (2016), [13] identified the factors affecting building maintenance as lack of preventive maintenance, faulty workmanship, use of substandard materials, insufficient fund, non-utilization of skilled building maintenance professionals, non-application of building maintenance policy, owners' attitude to building maintenance and wrong behaviour of occupants.

Residential and public building maintenance plays an important role in extending the lifespan of a private, commercial or industrial properties. Without it, buildings could fall into disrepair. A building is an asset, a process and a product which can be one of the best and largest investments anyone can make. Thus, it is within a building owner's or manager's best interests to perform proper maintenance or hire professionals to do so. This will help preserve the structural integrity of the building as well as its initial appearance and functionality. And, as a result, the building will manage to retain its value. Unfortunately, as with a lot of assets, buildings do deteriorate over time. This is a natural process, though there are certain factors that purposely and significantly contribute more to the deterioration than others. The first step in ensuring adequate maintenance is to understand the causes of building deterioration. The most common causes of residential and public building maintenance failures and deterioration among others that owners or managers should know about and prepare for include lack of preventive maintenance, low-quality materials, lack of skilled professionals, lack of a building maintenance policy, poor and weak workmanship, limited maintenance budget, general neglect, poor treatment by occupants, building obsolescence, vandalism, and abandonment.

III. METHODOLOGY

The questionnaire was conducted, it is one of the methods of collecting non-quantitative information from the community, the questionnaire was distributed to a group of professionals with not less than thirty years of experience, in different specialties related to the maintenance of residential and public buildings, and various educational certificates, and they work in different parts in Nigeria and with different culture, custom, tradition and beliefs. In line with statistical theories.

One hundred and eighty (180) copies of the questionnaire were distributed, and only (125) forms were returned, and (120) forms were approved, and 5 forms were ignored due to errors and incomplete information. The questionnaire consists of two axes, the first axis includes personal information (characteristics of the study population), and the second axis includes a question related to the factors affecting the maintenance procedures and time.

After analyzing the data with IBM SPSS-V23 software, the mean was calculated for each factor. Also, the relative importance index (RII) was calculated using the equation below, to determine the weights of the factors affecting the maintenance performance measurement. Also, the level of the relative importance indicators was also calculated.

The Likert scale involving rating on interval scale of 5 and 1 developed for application in social sciences and management researches for quantification of qualitative variable were used. It elicited information from the building construction professionals concerning the causes of rivalries among professionals in Nigeria construction industry. The responses of the items on the questionnaire were obtained on a 5-point scale ranging from 1 to 5. "Very Important" were scored 5, "Important" were scored 4, "Medium" were scored 3, "little" were scored 2 and "scarcely" were scored 1.

But for this type of research work where a 5-point scale was used, the RSI shall be calculated via the equation:

$$RSI = \frac{\sum \mu}{AN} = \frac{5a+4b+3c+2d+1e}{AN} \quad (0 \leq index)$$

RSI: Materiality Index.

μ is the weighting given to each factor by respondents.

Y: the weight is given to the factors according to the scale to be adopted, as the five Likert scale was adopted in the questionnaire (very important = 5, important = 4, medium =3, little =2, scarcely =1)

A: The total number of worker responses = 120.

N: the largest weight (i.e. 5 because the scale used is five) = 5

IV. RESULTS AND DISCUSSION

The data of the prepared questionnaire was obtained and distributed. Tables (1), (2) shows the characteristics of the sample of respondents.

This research work was based on the main factors that are affecting residential and public buildings maintenance. The data were presented using tables for clarification and better interpretation. The analysis tools included both descriptive and inferential statistics.

4.1 Respondents Profile

Table 1: Sex

Sex	Frequency	Percentage
Male	92	76.67
Female	28	23.33
Total	120	100.00

Table 1 showed the gender of the respondents. It showed that ninety two percent (76.67%) are male and eight percent (23.33%) are female. The result shows the representation of genders in the construction industry in the study area.

Table 2: Professional qualification

Educational Qualification	Frequency	Percentage (%)
NIOB	64	53.33
NIQS	20	16.67
NIA	16	13.33
NSE	12	10
Others	8	6.67
Total	120	100

Table 3 represents the educational qualification obtained by the respondents. 53.33% is registered with NIOB, while 16.67% is registered with NIQS, 13.33% is registered with NIA, 10% with NSE and 6.67% with other professional bodies. The result shows that all respondents possess registration of their various professional bodies in Nigeria and adequate professional training to supply reliable data for the study.

Table 3: Distribution of the sample on the public and private sectors

Copies of the questionnaire	Frequency	Percentage (%)
Distributed	150	100
Returned	125	83.33
Approved	120	80.00
Non approved due to incomplete information	5	3.33

The Cronbach Alpha Test was calculated to measure the reliability of the questionnaire and the result was equal to (0.80) for the entire questionnaire used, which indicates an excellent level of reliability.

4.2 Residential and public building maintenance in Nigeria

Table 4: Factors affecting residential and public buildings maintenance in Nigeria

S/N	Factors	1	2	3	4	5	Total	TWV	RSI	Rank
1.	Lack of preventive maintenance	20	16	17	27	40	120	411	0.685	1
2.	Faulty design	26	15	18	31	30	120	384	0.640	5
3.	Poor workmanship	21	20	15	44	20	120	382	0.637	6
4.	Use of substandard materials	25	23	26	29	17	120	350	0.583	11
5.	Shifting values and modernization	22	20	15	25	38	120	397	0.662	3
6.	Accidents	30	13	19	30	28	120	373	0.622	7

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7.	Solar radiation	21	28	16	36	19	120	364	0.607	9
8.	Insufficient fund/cash flow analysis	30	23	24	25	18	120	338	0.563	13
9.	Lack of skilled maintenance professionals	30	11	12	27	40	120	276	0.460	15
10.	Lack of building maintenance policy	21	20	18	31	30	120	389	0.648	4
11.	Owners' attitude to building maintenance	31	10	15	44	20	120	372	0.620	8
12.	Wrong behaviour of occupants.	35	13	16	29	27	120	360	0.600	10
13.	Abandonment	23	33	14	34	16	120	347	0.578	12
14.	Vandalism	25	14	16	20	45	120	406	0.677	2
15.	General neglect	38	25	15	20	22	120	323	0.538	14

TWV: Total Weight Value; RSI: Relative Significance Index

It shows the factors affecting residential and public buildings maintenance in Nigeria. Lack of preventive maintenance ranked first with RSI value of 0.685 (68.50%) followed by vandalism of the building with RSI value of 0.677 (67.70%) and shifting values and modernization with RSI value of 0.662 (66.20%). Lack of skilled maintenance professionals was ranked least with RSI value of 0.46 (46%).

V. CONCLUSION

Preventive maintenance is a type of maintenance procedure that aims to prevent damages or malfunctions in the building. It anticipates potential problems and addresses them before they can even start to show. Preventive maintenance is vital to any building maintenance process as it helps extend the lifespan of the building and its components. Residential and public building maintenance is the process of restoring the quality of the building to perform its intended use. There is the need for the professional bodies to engage on public enlightenment on the effect of building maintenance abandonment or lack of knowledge on the use skilled professional in building maintenance to avoid building collapse and waste of resources.

VI. RECOMMENDATION

Building owners, construction officers or managers and their team should adopt proactive approach to encourage building maintenance. Regular maintenance of building is overall less costly than instant maintenance after failure symptoms in building. If the repair and maintenance of building is not done properly, the age of building may decrease. Due to this building will not be able to perform its construction purpose properly. Mostly it is seen that building owner do not care about repair and maintenance of building until sign of failure are visible due to this repair and maintenance becomes a matter of urgency. The following recommendation were made for the achievement on construction safety and occupational health in the fourth industrial revolution.

- i. There should be adequate and enough maintenance awareness on the use of the newly introduced tools and equipment.
- ii. There should be adequate fund for maintenance set aside for buildings maintenance, training and retraining of staff and workers on maintenance education.
- iii. Building maintenance managers and their team should adopt proactive approach to reduce the occurrence of defects, which needs to take into consideration the age of buildings, works and maintenance workers to provide the best physical and functional buildings.
- iv. There should be a proper planning and site coordination to prevent recklessness.
- v. Proper and adequate communication must be enhanced between the workmen and the maintenance officers.
- vi. Government should equally make it as a matter of policy for promulgate legislation on building maintenance.
- vii. There should be a maintenance safety manual and occupational health policy guiding safety and of maintenance workers.

It is necessary to know that maintenance works and the building maintenance owners or maintenance managers work together with top administration management to ensure sufficient funds, availability of resources, provision good atmospheric conditions and social considerations for the smooth running of the building maintenance on site and to ensure that such funds and facilities are judiciously utilized. Maintenance is related to the background of any project, unfortunately development plans and approved recurrent and capital estimates in Nigeria have revealed that thought have not be given to maintenance work [14].

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