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Evaluation of the factors affecting housing maintenance and its probable solutions

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Abstract: This paper aimed at the evaluation of the factors that are affecting the housing maintenance and its probable solutions to the public and private housing facilities in Nigeria. Data for the study were collected through well-structured questionnaire directed to construction professionals in the construction firm and government ministries. Data collected were analysed using frequency distribution table and relative significance index. The study revealed thatDesign and proper workmanshipranked first with an RSI value of 0.9338, material specifications ranked second with RSI value of 0.847 and construction supervision ranked third with an RSI value of 0.827. These are followed by detailing of working drawings (0.813). The common solution to the housing maintenance is the monitoring and documentation of corrective actions, project expenditures, and accomplishments. This solution was ranked first with an RSI value of 0.880. Provision of accurate data for maintenance and construction programme decision making ranked second with an RSI value of 0.833. The study recommended that theBuilding professionals should participate in design and proper workmanship,building materials to be used for construction must be strictly adhere to its specifications and there must be adequate construction supervision and detailing of working drawings,

I. Introduction

It is important to understand the term "housing and maintenance" before discussing the issue of housing maintenance in depth. Encarta Dictionaries (2009) defined housing as an accommodation such as houses or other buildings where people live, considered collectively and also Encarta Dictionaries (2009) defined maintenance as a continuous repair work i.e. work that is done regularly to keep a machine, building, or piece of equipment in good condition and work order.

Maintenance is defined by British Standards Institution, BS 3811 (1974), as a combination of any action carried out to retain an item in , or restore it to, an acceptable condition. Akintomiwa (2010) put it as the act of controlling the use (exploitation), presering the performance standards, qualities and lifespan of property with a view at perpetuating its full capacity benefits.

Housing maintenance in Nigeria has suffered from lack of funds for a considerable time. While the requirements for good practice in maintenance management of building stock have been established over a considerable period, the achievement of good practice is by no means universal.Maintenance of the built environment impacts on the whole nation. According to Iyagba (2005), it is impossible to produce buildings which are maintenance free, but maitenance work can be minimised by good design and proper workmanship carried out by skilled experts or competent craftsmen using suitable codes of installation, requisite building materials and methods.

Housing is paramount to human existence as it ranks among the top three needs of man. Its provision has always been of great necessity to man. As a unit of the environment housing has profound influence on the health, efficiency, social behaviour, satisfaction and general welfare of the community. Bala Kabir and S.A. Bastani, in their review of housing delivery efforts in Nigeria, defined housing as buildings or other shelters in which people live, a place to live, a dwelling. Olotuah (2000) said that housing is a reflection of the cultural, social and economic values of a society and one of the best historical evidences of the civilization of a country. The provision of adequate housing in any country is very vital as housing is a stimulant of the national economy. Housing is a set of durable assets, which accounts for a high proportion of a country's wealth and on which households spend a substantial part of their income. It is for these reasons that housing has become a regular feature in economic, social and political debates often with highly charged emotional contents(Agbola, 1998).In Nigeria, like in many other developing nations of the world housing maintenance problems are multi dimensional. The problems of population explosion, continuous influx of people from the rural to the urban centres, lack of maintenance culture and the lack of basic infrastructure required for good standard of living have compounded housing maintenance problems over the years. Access to this basic need by the poor who

constitute the largest percentage of the world population has remained a mirage and it needs to be critically addressed.

2.0 Literature Review

Housing has been universaaly acknowledged as one of the most essential necessities of human life and is a major economic asset in every nation. Adequate housing provides the foundayion for stable communities and social inclusion (Bala, 2012). Since independence, the Nigerian nation has desperately continued to make concerted efforts in the area of quantitative supply of housing (though still far from the target) through huge budgetary and polity provisions, but surprisingly, the area of maintenance of the existing stock has suffered inexplicable neglect. Wahab et al (1990) asserted that two-thirds of urban housing are varying degress of serious disrepair.. Of these, a third is not fit for safe habitation as they are either dilapidated or in need of major repairs. Ogieto (1987) has observed that the disparity between the price and quanlity of materials to be use for housing maintenance on the one hand, and the number of households and the money available to them to pay these prices on the other, constitutes the central problem of housing maintenance. The gap between income, shelter cost and the housing maintenance in Nigeria is very wide (Okupe and Windapo ,2000). This has almost eliminated the low-income earners from the housing maintenance.

The overall cost of a unit of housing in any building development includes the cost of providing land, infrastructure such as roads and essential service such as water and electricity. The cost of construction materials and labour constitutes major part of the total cost of the house. The building design process is defined as that through which the Architect and the Builder identify space allocation.

It has also been established that traditional Africa settlement, exhibit a refined form of house type and community structure which is mostly determined by the interaction of culture such as linage or kinship pattern of the community, climate, economy or natural resources of the area. Wahab (2007) also observed that the tropical climate in Nigeria affects not only the patterns of daily life, the planning of settlement and forms of building but also determines the types of materials which could be used for the construction of the building.Building design consideration for the south-western Nigeria should take into account provision for adequate air movement for effective body cooling. This is due to the climate is warm and humid.

Adetomiwa (2010) identified many factors that have been responsible for housing or building deterioration individually or collectively among them are design and proper workmanship, materials specifications, detailing of working drawings, construction supervision, cash flow analysis, environmental factors, users activities, shifting values and modernization, accidents and solar radiation. Other factors may include ageing, wear and tear, preservation of historic buildings, value of buildings, alteration and modifications, inadequate housing stock, low quality of original construction, harsh climatic effects, mixed and changing patterns of building uses, declining quality of building materials and social factors.Sanni (2010) stressed the need for the development of appropriate policies especially in the context of national development in Nigeria.

It is widely believed that the number of construction projects going on in a nation at a particular time is a measure of the development activities of that nation and residential buildings constitute about 70%-100% of the products of the building industry (Chudley, 1987). For a decision to develop a large number of construction projects including housing units, many development activities must be completed. Product of the buildings such as hospitals, stadia, educational buildings, residential buildings and others, do enhance the overall development of a nation (Chadwick, 1987).

Kunya (2012) identifiedthe solutions to the challenges that are facing housing maintenance in public and private housing facilities such as to monitor and document corrective actions, project expenditures, and accomplishments. Systematically identify maintenance needs, deficiencies and capital improvement needs at housing estates. Provision of accurate data for maintenance and construction programme decision making. Enable preparation of service maintenance and construction budget requests using systematic and standardized procedures, optimize the use of available funds, personnel, facilities and equipment through effective maintenance management methods; establish field station, regional, national and construction project priorities and determination of the unfunded maintenance backlog for the services.

3.0 Methodology

Field survey was the tool used in collecting data to evaluate the factors that are affecting housing maintenance and probable solutions to the housing maintenance problems in Nigeria. The questionnaire was administered to construction professionals (Architects, Builders, Quantity Surveyors, Engineers and other related disciplines).Questionnaire was developed to sample professional opinions on the probable causes of identified defects and to proffer remedies to same. About one hundred and twenty (120) questionnaires was distributed, ninety (90) were collected back for analysis. The statistical tools used for this study include percentage, mean, and relative significance index RSI (also known as Index of Relative Importance, IRI or

Relative Importance Index, RII) to determine which of the factors that are affecting housing maintenance and probable solutions to the housing maintenance problems in Nigerian.

The relative significance index ranking (RSI) was used for ranking of the factors studied. These methods had been used in construction research by authors such as, Elhag and Boussabaine (1999), Faniran (1999), Idrus and Newman (2002), Kangwa and Olubodun (2003) andOladapo (2006) among others.

Bakhary (2005) gave an equation that could be useful for determining Relative Significance Index (RSI) in prevalence data as:

$$RSI = \frac{\sum \mu}{AN}$$

Where μ is the weighting given to each factor by respondents;

A is the highest weight (i.e. 5 in this case);

N is the total number of respondents

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

$$RSI = \frac{5a + 4b + 3c + 2d + 1e}{jN} \qquad (0 \leq \text{index} \leq 1)$$

Where: a = number of respondents ‘‘extremely important and perfectly known’’,

b = number of respondents ‘‘very important and partially known’’

c = number of respondents ‘‘somewhat important and known’’

d = number of respondents ‘‘not very important and partially unknown’’

e = number of respondents ‘‘not important and perfectly unknown’’

N = sample size = 90

j = number of response categories = 5

4.0 Data Presentation and Analysis

The data were presented using tables for clarification and better interpretation. The analysis tools included both descriptive and inferential statistics.

4.1 Professions of the respondents

Table 1: Professions of the respondents

	Frequency	Percentage
Builders	23	25.56
Quantity Surveyors	16	17.78
Architects	19	21.11
Estate Surveyor and Managers	18	20.0
Engineers	14	15.56
Total	**90**	**100.0**

Table 1 showed respondents’ occupation. It showed that 25.56 percent are builders, 21.11 percent are architects, 20 are estate surveyors and managers, 17.78 percent are quantity surveyors and 15.56 percent constitutes estate surveyors and valuers.

4.2 Factors affecting the housing maintenance

Table 2 identified the factors affecting the housing maintenance in public and private housing facilities in Nigeria

Table 1: Factors affecting the housing maintenance

FACTORS	5	4	3	2	1	Total	TWV	RSI	Rank
Design and proper workmanship	72	12	3	0	3	90	420	0.933	1
Material specifications	42	33	9	6	0	90	381	0.847	2
Detailing of working drawings	39	36	3	6	6	90	366	0.813	4
Construction supervision	33	48	3	0	6	90	372	0.827	3
Cash flow analysis	24	24	30	6	6	90	324	0.72	5
Environmental factors	12	36	27	9	6	90	309	0.687	8
Users activities	18	33	21	15	3	90	318	0.707	6
Shifting values and modernizations	12	24	30	15	9	90	285	0.633	13
Inadequate waste management plan	12	24	21	24	9	90	276	0.613	15
Accidents	12	28	21	20	9	90	284	0.631	14
Solar radiation	9	15	30	24	12	90	255	0.567	17

Gradual depreciation	6	24	42	15	3	90	285	0.633	13
Ageing	9	42	27	6	6	90	312	0.693	7
Wear and tear	15	39	15	6	15	90	303	0.673	10
Preservation of historical background	9	39	27	3	12	90	300	0.667	11
Value of buildings	15	39	18	9	9	90	312	0.693	7
Alterations and modifications	3	42	24	12	9	90	288	0.64	12
Inadequate housing stock	6	30	24	21	9	90	273	0.607	16
Low quality of original construction	18	36	10	14	12	90	304	0.676	9
Social factors	6	6	48	15	15	90	243	0.540	18

Table 2 showed the relative significance index (RSI) of thefactors affecting the housing maintenance. Design and proper workmanshipranked first with an RSI value of 0.9338, material specifications ranked second with RSI value of 0.847 and construction supervision ranked third with an RSI value of 0.827. These are followed by detailing of working drawings (0.813). They made significant contributions to the conditions of the buildings thus observed.

4.2 Solutions to the challenges that are facing housing maintenance

Table 3: Solutions to the factors that are facing housing maintenance.

SOLUTIONS	5	4	3	2	1	Total	TWV	RSI	Rank
Monitor and document corrective actions, project expenditures, and accomplishments.	54	27	3	3	3	90	396	0.880	1
Systematically identify maintenance needs, deficiencies and capital improvement needs at housing estates.	27	48	9	3	3	90	363	0.807	3
Provide accurate data for maintenance and construction programme decision making.	39	36	9	3	3	90	375	0.833	2
Enable preparation of service maintenance and construction budget requests using systematic and standardized procedures.	36	33	12	6	3	90	363	0.807	3
Optimize the use of available funds, personnel, facilities and equipment through effective maintenance management methods.	21	24	36	6	3	90	324	0.72	4
Establish field station, regional, national and construction project priorities.	21	27	18	15	9	90	306	0.680	5
Determine the unfunded maintenance backlog for the services.	12	30	21	21	6	90	291	0.647	6

Table 3 showed the solutions to the factors that are facing housing maintenance in Nigeria. The common solution to the housing maintenance is themonitoring and documentation of corrective actions, project expenditures, and accomplishments. This solution was ranked first with an RSI value of0.880. Provision of accurate data for maintenance and construction programme decision making ranked second with an RSI value of 0.833. Systematically identify maintenance needs, deficiencies, capital improvement needs at housing estates and preparation of service maintenance and construction budget requests using systematic and standardized procedures were ranked third with an RSI value of 0.807. These are followed by establishment of the field station, regional, national and construction project priorities (0.680) anddetermination of the unfunded maintenance backlog for the services (0.647)**.**

4.3 Discussion of findings

The buildings or housing is a combination of related parts organised into a complex wide.Twenty factors were identified in the sampled buildings in the covered areas. Design and proper workmanshipranked first with an RSI value of 0.9338, material specifications ranked second with RSI value of 0.847 and construction supervision ranked third with an RSI value of 0.827. These are followed by detailing of working drawings (0.813).

Solutions were, thus, proposed in order to reduce the factors that are affecting the housing maintenance. The common solution to the housing maintenance is the monitoring and documentation of corrective actions, project expenditures, and accomplishments. Followed by provision of accurate data for maintenance and construction programme decision making, systematically identify maintenance needs, deficiencies, capital improvement needs at housing estates, preparation of service maintenance and construction budget requests using systematic and standardized procedures. Others are followed by establishment of the field station, regional, national and construction project priorities and determination of the unfunded maintenance backlog for the services**.**

5.0 Conclusion

Design and proper workmanship of the affected and sampled housings was discovered. There should be a relationship between material specifications and construction supervision. Gradual depreciation, ageing, wear and tear. Preservation of historical background and value of buildings is to encourage the housing maintenance by given adequate care of the building.

6.0 Recommendations

The following recommendations are hereby made:

i Skilled artisan and competent workers should be used.
ii Building professionals should participate in design and proper workmanship,
iii The building materials to be used for construction must be strictly adhere to its specifications,
iv There must be adequate construction supervision and detailing of working drawings,

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