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APPRAISAL OF MAINTENANCE CONDITIONS OF RESIDENTIAL BUILDINGS IN HOUSING DEVELOPMENT CORPORATION ESTATES IN ENUGU METROPOLIS, NIGERIA

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Abstract

Residents always seek to change the use and extend the lives of their buildings by remodelling, modifying or abandoning occupied buildings in the extreme cases of dilapidation. Enugu has faced high building maintenance needs that require the synergy of both residents and facility providers as the needs of the residents would not be met at the rate of population increase. This study aims to appraise the maintenance conditions of physical elements of residential buildings and infrastructure in Housing Development Corporation estates in the Enugu metropolis to improve on the building maintenance framework that could influence design concepts of public residential buildings. The survey design method was applied and it focused on four public residential buildings of ESHDC estates in the Enugu metropolis. After stratification of the estates, based on their ages and simple balloting, occupied buildings were selected for this research. Analysis of Variance (ANOVA) test was used to test differences between the variables Maintenance Conditions of Residential Buildings (MCRB) in ESHDC of Enugu Metropolis V51 (ordinal) and V52 (Nominal). With $p<0.05$, the study found there was a significant difference between the maintenance conditions of the buildings in the four housing estates investigated. The policy implication of these findings was that for improved building maintenance conditions, efforts should be made to spread across all the buildings by both residents of the estates and ESHDC as implementation would likely be easier for the desired higher commitment to building and infrastructure maintenance.

Keywords: Building maintenance, Housing management, Maintenance condition, Residential buildings

INTRODUCTION

Building maintenance culture is an attitude which appears to be lacking in Nigerian public residential buildings, as well as in office, educational or industrial buildings. Poor maintenance culture has become a widely recognized problem in Nigeria which has affected the quality of public residential buildings. These provide occupants with less conducive, safe, comfortable, healthy and secure indoor environments to carry out their daily activities of work, study, leisure and family life as well as social interactions, at times, at subsidized rates. To achieve this purpose, buildings are designed, planned, constructed and managed, based on standards and

specifications established by government agencies, professionals and experts who are conversant with the needs and expectations of residents Meir et al (2009). These standards and specifications do not conform to the changing needs and expectations of residents, and so users always seek to improve the maintenance conditions of their buildings for the continued satisfactory use of their accommodation.

Building maintenance is the work undertaken to keep, restore or improve every building, its services and its infrastructure to an acceptable liveable standard thereby sustaining the utility value of the building. This may include refurbishment to raise the original standards where appropriate. The ability to upgrade an existing residential building extends its useful life but is a more sustainable option than the process of demolition and reconstruction as in urban renewal programmes. The physical environment and infrastructure of residential buildings dictate the well-being of man. Hence, the maintenance of buildings is a teamwork of all the professionals in the building industry and a component of a conclusive phase of sustainable architecture.

Building maintenance programmes in Nigeria, have not received the desired attention in the past as the emphasis is on the development of new facilities by both the facility providers and the beneficiaries (Odediran, Opatunji, & Eghunure, 2012; Kunya, Achuenu, & Kolawole, 2007). This approach by the providers is to solve the haphazard rural-urban paradigm that characterises urban growth in Nigeria. The need for maintenance commences immediately after the buildings are occupied by users. Many development control guidelines are in place to let the building developers remain in tandem with global standards. Buildings are generally required to provide a safe and conducive environment for the performance of various human activities. Odediran, Opatunji, and Eghunure (2012) stated that the ability of a building to provide the required environment for an activity is a measure of its functionality. Therefore, as the components of a building begin to deteriorate, it becomes necessary to take measures to ensure that the desired characteristics of that building, which provide safety and convenience are retained.

Occupied residential buildings, in public housing estates in Nigeria, have been found to lack adequate maintenance attention from the estate managers (Oruwari, 2006; Ikpo 2009). Similarly, the infrastructural facilities are in deplorable conditions. A pilot survey of such estates in the Enugu metropolis corroborates these assertions. There is thus the need for adequate and affordable buildings and infrastructure maintenance in ESHDC estates in the Enugu metropolis. The efforts of the Enugu State Government to achieve sustainable public housing have not led to a better building maintenance framework. It would appear that the adoptive building regulations, tenancy agreements with residents and contract agreements with facilities managers are not being implemented.

It is against this background that this study examines the major challenges militating against building and infrastructure maintenance conditions in Enugu to stimulate relevant stakeholders in designing appropriate strategies for effective building maintenance in the study area. The objective of this research is to evaluate the maintenance conditions of physical elements of residential buildings in Housing Development Corporation estates in Enugu metropolis to keep to

improved maintenance guidelines for public residential buildings. The proposed hypothesis was that 'there is no significant difference between the estates in maintenance conditions of residential buildings in ESHDC estates in Enugu Metropolis'.

LITERATURE REVIEW

If all the building elements were of good quality and built according to international best practices, from the onset, a building is expected to last for between fifty to sixty years before maintenance is required. Hitherto, buildings may become worn out and require maintenance a few months after it is occupied owing to the unreliable quality of available building materials in the market (Olanrewaju, 2011). Odediran, Opatunji, and Eghunure (2012) stated that the ability of a building to provide the required environment for an activity is a measure of its functionality. Therefore as the components of a building begin to deteriorate; it becomes necessary to take measures to ensure that the desired characteristics of that building are retained. Zeiler and Boxem (2008) and Meir, Garb, Jiao, and Cicelsky, (2009) have shown that sometimes original standards and specifications do not conform to the ever-changing needs and expectations of residents; and so users usually seek improved maintenance conditions of their buildings for their continued satisfactory use. The ability to upgrade an existing residential building not only extends its useful life but is a more sustainable option than the process of demolition and reconstruction as in urban renewal programmes (Bullen, 2007).

Due to the multi-disciplinary nature of building maintenance, the purposes for studying maintenance conditions of residential buildings differ among researchers. Hsieh (2008) agreed with Kantrowitz and Nordhaus (1980) that maintenance conditions of residential buildings stemmed from the need to document the problems of public residential buildings, develop solutions to them as well as recommend a framework for future public building maintenance programmes. Issues to be covered in the review of literature are discussed below. These authors agreed commonly on open-ended evaluation, broad-based and multifaceted data gathering approaches and analysis in distinguishing the outcome of different building maintenance strategies in public residential buildings in housing estates. Waziri and Vanduhe (2013) listed ten factors that affect defects of public buildings in Malaysia as lack of building maintenance, moisture problems from wet areas leading to leakage, environmental conditions, ageing of the buildings, poor quality control: preventive methods, lack of training and skills of the maintenance crew, lack of motivation in taking care of buildings, poor communication in the maintenance process, defective materials used for maintenance works, and inability to appreciate the site conditions. These factors have been identified and ranked according to their descriptive analysis and apply to ESHDC residential buildings in the Enugu metropolis.

Most building infrastructure in Nigeria, whether owned or hired by the Government, corporate bodies or individuals are very poorly maintained largely due to poor maintenance culture and relatively high cost of maintenance (Usman, Gambo & Chen, 2012). Zagreus, Huizenga, Arens,

and Lehrer (2004) pointed out how important the views of residents are in investigating the performance of building components to meet the needs and expectations of the residents. Gupta and Chandiwala, (2010) also added that the use of questionnaires in the evaluation of the performance of residential environments has traditionally been based either on researchers' observations or user satisfaction surveys. Vischer (2002) opined that users give their views and feelings about buildings-in-use based on their experience and interactions with buildings.

Chohen, Che-Ani, Memon, Tahir, Abdullah and Ishak (2010) reported that professionals design and construct buildings and never use them and so their views would not be compared to the views of the residents who occupy them particularly as it concerns maintenance. It is observed that in the course of exploring residential building maintenance, some researchers adopted questionnaire surveys to examine residents' satisfaction with the buildings in public housing estates in different countries. For example, in Papua, New Guinea and Abuja, Nigeria, Kaitilla, (1993) as well as Ukoha and Beamish (1997) respectively, reported that residents in public buildings were dissatisfied with the building features. In contrast, Olatubara and Fatoye (2007) as well as Fatoye and Odusami (2009) revealed that residents in public buildings in Lagos, Nigeria, were most satisfied with building design features, including the number of rooms, the ceiling heights, and the location of different rooms in their dwelling units. In Malaysia, Mohit, Ibrahim and Rashid (2010) found out that middle-income households in Bandar Baru Bangi were satisfied with the space and cost of their buildings but dissatisfied with the size of the kitchen and plumbing works. These studies help to explain that occupants of mass-produced buildings in public housing estates in Nigeria are satisfied or dissatisfied with the different components of their buildings and infrastructure. Different factors that determine residents' satisfaction with building maintenance in public housing estates in Nigeria are rare. Fatoye and Odusami (2009) opined that users' satisfaction with buildings was related to the performance of public buildings in housing projects and the existing studies rarely associated occupants' satisfaction with the residential building maintenance in public housing projects in the country. Hence, this research would attempt to address residents' continued use of buildings through building maintenance and the joint involvement of both providers and beneficiaries with maintenance. Thus the gap existing in total involvement of all stakeholders would be filled.

METHODOLOGY

The research design for this study was survey design. It focused on public residential buildings of ESHDC housing estates in the Enugu metropolis. A multistage stratified random sampling method was adopted in the selection of the study sample. The first stage of the stratification involved ESHDC estates based on the ages of the estates. The total number of the ESHDC housing estates is 15 as shown in Table 1. This constitutes the Research population.

Table 1: ESHDC housing estates in Enugu Metropolis Occupied By 2012

S/N	Name of Estate	Location	Year developed	Number of Plots/Flats
1.	African Real Estate, Uwani	Uwani	1963	108
2.	Riverside Estate Phases I & II	A/Nike (low, medium and high density)	1966	821
3.	Trans Ekulu Phases I to VI including RCC Plots and RD Plots	T/Ekulu	1976	2589
4.	Republic Layout Phase I, II, III, IV (former EHOCOL	Ind L/Out (low, medium and high density)	1990	273
5.	Harmony Estate	Umuchigbo (Not yet functional)	1998	1338
6.	Q-series Mini Estate		2000	9
7.	Golf Course Estate Phases I, I ext, II, IV, V	GRA (medium and low density)	2000	509
8.	Independence Avenue Pocket layout	Independence L/out	2001	38
9.	Ekulu East Estate	Former Zoo (Low Density only)	2002	142
10.	Greenland Estate Phases I, II, III	Bungalows @ RACK	2003	216
11.	New Abakaliki Road Layout Area A	Emene	2004	275
12.	Maryland Estate Phases I, II. (Former Loma Linda)	Ind. L/out	2007	406
13.	Coal City Gardens Estate, GRA	GRA, behind CAN	2007	323
14.	Liberty Estate I, II		2008	101
15.	Ivory Quarters Parcel A. B. C	T/E Near CBN Qtrs	2010	78

Source: Fieldwork (2015)

Sampling Frame

A stratified sampling technique was used to first create four columns by their age groupings and then select the four estates based on simple balloting. Simple random sampling was used to select the buildings on streets to interview one resident in one building by choosing the first building on the street and subsequently, any fifth house on the street alternating the two sides of the street. Balloting was then carried out to choose one housing estate from each stratum based on their ages (5 to 15; 16 to 25; 26 to 34; and 35 and above) as highlighted in Table 2 resulting in the choice of Ekulu East, Golf, Republic and Riverside estates respectively. Hence the choice of the four estates emerged as highlighted in Table 2.

Table 2: Stratification of occupied Housing Estates by age (from which balloting was done)

5 to 15 years	16 to 25 years	26 – 35 years	Above 35 years
Coal City	**Golf Estate**	**Republic Layout**	African Real Estate
Ekulu East	Harmony Estate		**Riverside Estate**
Greenland	Ind. Avenue Layout		T/Ekulu
Maryland	Ivory Quarters		
Pocket Layout	New Abakaliki Rd		
	Q-Series		

Source: Fieldwork (2015)

Sampling Technique

All the buildings had equal chances of being investigated. One household head of any of the chosen buildings was interviewed. Thus the number of plots/households in the estates was as shown in Table 3, one hundred and forty-two (142) plots/buildings are in Ekulu East Estate. Five hundred and nine (509) plots/buildings are in Golf Estate Phases I to V. Republic Housing Estate has 273 buildings while eight hundred and twenty one (821) households occupy Riverside Housing Estate Abakpa Nike, Phases I and II. One thousand seven hundred and forty-five (1745) buildings/plots were the sampling frame. The sample size is the number of copies of a questionnaire distributed as shown in Table 3.

Table 3: Selected Housing Estates of the ESHDC and Available number of units

	ESTATE	LOCATION	YEAR OF ESTABLISHMENT	NO. OF UNITS
1.	Ekulu East Estate	Former Zoo	2002(16)	142
2.	Golf Course Estate Phases I, I extension, II, IV, V	GRA	2000(18)	509
3	Republic Layout Phase I, II, III, IV (former ETHICAL	Independence Layout	1990(28)	273
4	Riverside Estate Phases I & II	Abakpa Nike	1966(52)	821
	Total			1745

Source: Fieldwork (2015)

Sample Size

For this study, the sample size was determined statistically using the method given by Taro Yamane (1973) for the calculation of sample size. This gave 326 respondents. Four housing estates were chosen from stratified sampling to balance the sampling from both old and new, as new buildings require maintenance as soon as they are occupied and show different levels of dilapidation. The residents' population distribution for the questionnaire was as follows: Ekulu

East Housing Estate (27), Golf Estate (95), Republic Housing Estate (51), and River Side Estate (153)

RESULTS AND DISCUSSION

The following are the results of the specific ten variables investigated in the study to gather data on the maintenance conditions of the buildings. A composite variable (Maintenance condition of Buildings) was obtained by computing a mean score variable from these. This was then used to test the differences between the housing estates.

(i) Condition of the floor in the house

It is important in this analysis to appraise the perception of residents of their floor finishes. A greater number of residents, up to 70%, indicated that their floors were in good maintenance condition. This is illustrated in Table 6.

Table 6: Aggregated Condition of Floor finishes in the house

Value Label	Valid Percent	Cumulative Percent
Very bad	18.6	18.6
Bad	11.4	30.0
Neutral	14.2	44.2
Good	44.7	88.9
Very good	11.1	100.0
Total	100.0	

Source: Fieldwork (2018)

(ii) Condition of Wall Finishes in the house:

When polled on their perception of the Condition of Wall finishes in the houses, responses from the residents, showed that 74.4%, which is quite significant, considered their walls in the buildings as good and very good. Only 25.6% of residents have bad walls. This is illustrated by Table 7

Table 7: Condition of Wall Finishes

Value Label	Valid Percent	Cumulative Percent
Very bad	3.0	3.0
Bad	22.6	25.6
Neutral	19.0	44.6
Good	42.1	86.8
Very good	13.2	100.0
Total	100.0	

Source: Fieldwork (2018)

(iii) Condition of Roof Frames in the house:

The study collected data from respondents at various levels of study of roof frames. The goal of this is to emphasize the need for adequate roof frames for the stability of the buildings. The responses from the residents indicate that 91.9% considered the roof frames as good in their buildings. The percentage is just 13%. This is illustrated in Table 8

Table 8: Condition of Roof Frames

Value Label	Valid Percent	Cumulative Percent
Very bad	.6	.6
Bad	7.5	8.0
Neutral	13.0	21.0
Good	58.6	79.6
Very good	20.4	100.0
Total	100.0	

Source: Fieldwork (2018)

(iv) Condition of Ceiling in the house:

The area-wise data analysis of this variable indicates that most of the ceilings at Ekulu East and Republic Estates are good. A low percentage of respondents indicate bad ceiling conditions while high percentages of residents are undecided about the condition of their ceilings in Golf, Republic and Riverside estates. This illustration is in Table 9.

Table 9: Area-wise data on the condition of the Ceiling

Value label	Ekulu East		Golf Estate		Republic Estate		Riverside Estate	
	%	Cum %	%	Cum %	%	Cum %	%	Cum %
Very bad	0	0	1.9	1.9	0	0	.6	.6
Bad	3.6	3.6	2.8	4.7	1.7	1.7	2.9	3.5
Neutral	3.6	7.1	34.0	38.7	30.5	32.2	23.5	27.1
Good	53.6	60.7	47.2	85.8	45.8	78.0	57.6	84.7
Very good	39.3	100.0	14.2	100.0	22.0	100.0	15.3	100.0
Total	100.0		100.0		100.0		100.0	

Source: Fieldwork (2018)

(v) Maintenance Condition of External Wall in the house

The area-wise data analysis of this variable indicates that 64.3% of the buildings at Ekulu East estate have good external walls and as high as 35.7% was bad. Buildings with good external walls constitute 55.6% of buildings at Golf Estate; at Republic Estate it was 98.3 of the buildings have good external walls while in Riverside Estate almost half of the buildings have bad external walls. This is illustrated in Table 10.

Table 10: Area-wise data on Maintenance Condition of External Wall

Value label	Ekulu East		Golf Estate		Republic Estate		Riverside Estate	
	%	Cum %	%	Cum %	%	Cum %	%	Cum %
Very bad (1)	0	0	7.5	7.5	0	0	1.8	1.8
Bad (2)	35.7	35.7	36.8	44.3	1.7	1.7	47.1	48.8
Neutral (3)	46.4	82.1	35.8	80.2	72.9	74.6	23.5	72.4
Good (4)	3.6	85.7	13.2	93.4	20.3	94.9	25.9	98.2
Very good (5)	14.3	100.0	6.6	100.0	5.1	100.0	1.8	100.0
Total	100.0		100.0		100.0		100.0	

Source: Fieldwork (2018)

(vi) Appraisal of maintenance condition of doors

Analysis of Doors in the buildings shows that the majority of residents disagree that doors need maintenance. This is shown by the 63.9% of residents who indicated their disagreement with the need to maintain doors. 19.8% of the residents are undecided about the situation of their doors. If the research assumes that the doors are relatively good, the majority of the doors are in good condition since the total percentage of good doors would increase to 83.7%. This is illustrated in Table 11

Table 11: Appraisal of Maintenance Condition of Doors

Value Label	Valid Percent	Cumulative Percent
Strongly disagree	9.4	9.4
Disagree	54.5	63.9
Neutral	19.8	83.7
Agree	14.3	98.1
Strongly Agree	1.9	100.0
Total	100.0	

Source: Fieldwork (2018)

(vii) Maintenance Condition of outdoor paint of the building

The area-wise data analysis of this variable indicates that 78.6% of the outdoor paints of the house are in good maintenance condition in Ekulu East; 80.2% in the Golf estate; 81.4% in Republic estate and 71.2% in Riverside Estate hence the general indication is that outdoor paints are good and very good. This is illustrated in Table 12.

Table 12: Area-wise data on maintenance condition of outdoor paint of the building

Value label	Ekulu East		Golf Estate		Republic Estate		Riverside Estate	
	%	Cum %	%	Cum %	%	Cum %	%	Cum %
Very Bad (1)	0	0	2.8	2.8	0	0	2.4	2.4
Bad (2)	21.4	21.4	17.0	19.8	18.6	18.6	26.5	28.8
Neutral (3)	3.6	25.0	34.0	53.8	45.8	64.4	15.3	44.1
Good (4)	64.3	89.3	37.7	91.5	33.9	98.3	49.4	93.5
Very Good (5)	10.7	100.0	8.5	100.0	1.7	100.0	6.5	100.0
Total	100.0		100.0		100.0		100.0	

Source: Fieldwork (2018)

(viii) Condition of indoor paints of the house

The area-wise data analyses of indoor paints indicate that 92.9% of indoor paints are in good maintenance condition in Ekulu East; 88.7% at Golf estate; 98.3% in Republic estate and 97.6% in Riverside estate, hence it can be concluded that indoor paints are in good maintenance condition. This is illustrated in Table 13

Table 13: Appraisal of Area-wise data on the Condition of indoor paints of the house

Value label	Ekulu East		Golf Estate		Republic Estate		Riverside Estate	
	%	Cum %	%	Cum %	%	Cum %	%	Cum %
Very Bad (1)	0	0	6.6	6.6	0	0	.6	.6
Bad (2)	7.1	7.1	4.7	11.3	1.7	1.7	1.8	2.4
Neutral (3)	3.6	10.7	33.0	44.3	35.6	37.3	14.1	16.5
Good (4)	57.1	67.9	46.2	90.6	57.6	94.9	75.3	91.8
Very Good (5)	32.1	100.0	9.4	100.0	5.1	100.0	8.2	100.0
Total	100.0		100.0		100.0		100.0	

Source: Fieldwork (2018)

Test of hypothesis

ANOVA tests were used to test differences in maintenance conditions of buildings between and within the estates. The result of the analysis showed a significant difference value of 0.000 occurs with a degree of freedoms of 3 and 356, between and within the estates respectively, and mean squares of 6.059 and 0.427 between and within the estates respectively. These are indicated in Table 14.

Table 14: One-way ANOVA analysis test results, showing the differences between and within ESHDC Estates in the Maintenance condition of their buildings in Enugu

		Sum of Squares	Degree of freedom	Mean Square	F	Sig.
Maintenance condition	Between Groups	18.176	3	6.059	14.191	.000
	Within Groups	151.990	356	.427		
	Total	170.167	359			

Source: Fieldwork (2018)

The results were subjected to a Tukey HSD post hoc test to determine the nature of significance amongst the estates, as shown in Table 15. The results show that Ekulu East is significantly different from Golf Estate in maintenance conditions. Equally, a significant difference existed between Ekulu East and Republic Estate. It was indicated also that Golf Estate had a significant difference from Riverside Estate.

Table 15: TukeyHSD Post Hoc analysis test results showing the nature of the difference between ESHDC Estates of Residents and Maintenance condition

Multiple Comparisons TukeyHSD							
Dependent Variable	**(I) ESHDC Estates**	**(J) ESHDC Estates**	**Mean Difference (I-J)**	**Std. Error**	**Sig.**	**95% Confidence Interval**	
						Lower Bound	**Upper Bound**
Maintenance condition mean score (v15,v16,v17,v18,v19,v27,v28,v29)	Ekulu-East Estate	Golf Estate	.675*	.145	.000	.30	1.05
		Republic Estate	.732*	.156	.000	.33	1.13
		Riverside Estate	.313	.140	.115	-.05	.67
	Golf Estate	Ekulu-East Estate	-.675*	.145	.000	-1.05	-.30
		Republic Estate	.057	.106	.950	-.22	.33
		Riverside Estate	-.362*	.081	.000	-.57	-.15
	Republic Estate	Ekulu-East Estate	-.732*	.156	.000	-1.13	-.33
		Golf Estate	-.057	.106	.950	-.33	.22
		Riverside Estate	-.418*	.099	.000	-.67	-.16
	Riverside Estate	Ekulu-East Estate	-.313	.140	.115	-.67	.05
		Golf Estate	.362*	.081	.000	.15	.57
		Republic Estate	.418*	.099	.000	.16	.67

Source: Fieldwork (2018)

The results showed that Ekulu East has a higher mean difference value than Golf Estate and Republic Estate; the difference in maintenance condition is significant. The result also showed that Ekulu East and Riverside Estate have lower mean Difference Values than the others and are not significant. Similarly, results showed in the multiple comparisons that Ekulu East Estate has a higher mean difference than Golf Estate and the maintenance condition is significantly different. The mean difference between Golf Estate and Republic Estate is low and not significant.

The implications were that Ekulu East Estate was superior to others in the maintenance condition of buildings; Republic Estate was inferior to the other three estates in the maintenance condition of buildings; Riverside Estate was inferior to Ekulu East and superior to Golf and Republic Estates.

RECOMMENDATIONS AND CONCLUSION

As a result of the outcomes of the study, the following recommendations are made to aid the improvement of the maintenance framework for public residential buildings in the study area:

1. Efforts should be made to let all occupants and ESHDC have more commitment of resources to maintenance as the research.
2. The management should look into the logistics of organising maintenance of the buildings at regular intervals in line with the chosen maintenance periods (three to five years) as indicated by the respondents and introduce a mechanism to implement it since the extant regulations are jeopardized by bylaws introduced by ESHDC. It would appear hypocritical, therefore, to expect all residents to have equal capacity to improve maintenance conditions at such given intervals without the coordination of the corporation.
3. It is proposed that the state insurance company arrange to collect premiums from residents and ESHDC, at subsidized rates, towards the Maintenance Management Fund. The residents/owners pay insurance premiums towards building and infrastructure maintenance. If this provision was addressed maintenance bills would be taken care of more easily by ESHDC as they arise.
4. Training programmes should be introduced to make the occupants, ESHDC and even the interested public get involved with the maintenance of mechanical and plumbing works in the buildings. It is most important when the sewage systems need urgent attention as soon as the needs arise. The damages are often caused by the residents' insensitivity to the maintenance conditions owing to ignorance.
5. The quest to ensure that public residential buildings provide liveable conditions for the occupants within their lifespan cannot be achieved without adequate and regular maintenance. This is because the maintenance process ensures that the spaces remain secure, healthy, comfortable, safe and conducive, thus enabling their occupants to carry out life activities. Finding ways to improve the existing maintenance conditions is

therefore imperative as well as feasible, particularly as relevant catalysts for this have been identified through research.

6. The management system adopted by ESHDC is one and needs to be decentralized for this dependent variable to seek predictors. The different estates have peculiar demands of maintenance patterns. More staff will be engaged and the improvement of the maintenance framework will be achieved from the management systems. Policy guidelines and integrated action and co-operation of all stakeholders, (including relevant professionals, ESHDC and residents) involved in the planning, development and management of public residential building maintenance in Enugu are recommended.

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