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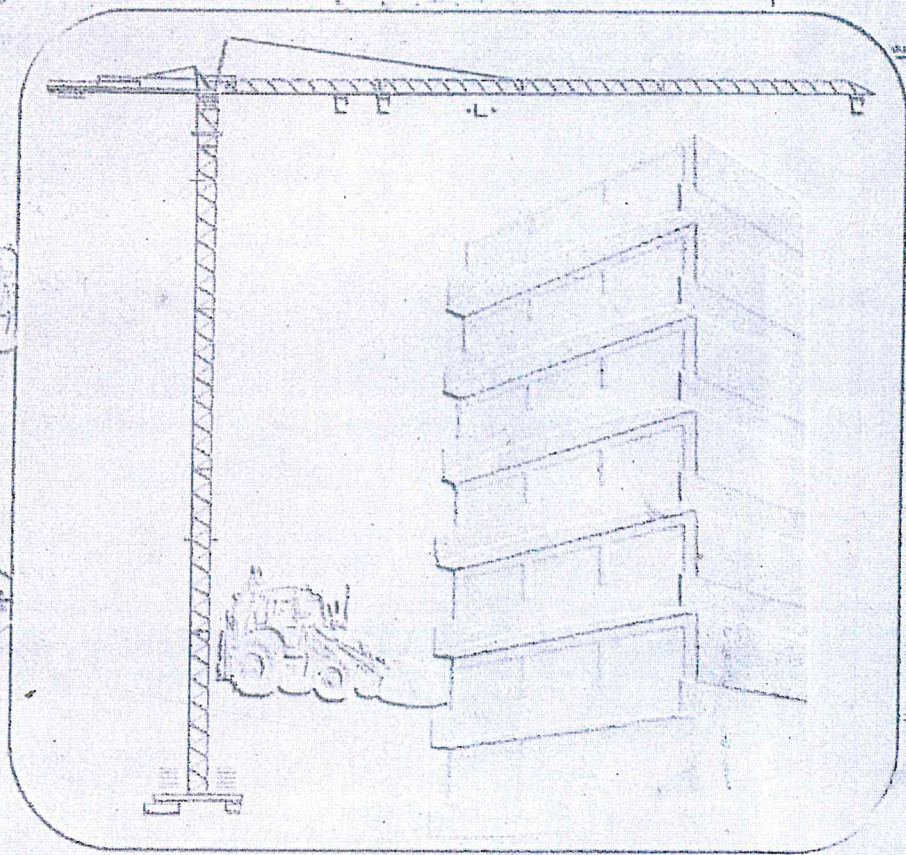
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ANNUAL SINKING FUND PROVISION FOR FINANCING PLANNED MAINTENANCE OF RENTED PRIVATE RESIDENTIAL PROPERTIES IN MINNA, NIGERIA

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ABSTRACT: *Real properties require maintenance throughout their lifecycle until they are replaced at the end of their useful life. Maintenance is also necessary to slow the rate of deterioration in real properties and to restore them to normalcy when the deterioration has occurred. Most property maintenance plans have failed due to lack of financial planning, resulting in unavailability of finance for the execution of maintenance works at the expected date. This paper examines annual sinking fund provision for financing planned maintenance of rented private residential properties in Minna, Nigeria. Primary data for the study were collected from 52 rented private residential properties managed by 6 real estate firms in the city. Results of data analysis reveal that most residential tenements and bungalows under study are in bad state of disrepair as a result of inadequate maintenance. The paper argues that inadequate maintenance of the properties is due largely to unavailability of finance among other problems, arising from the non-provision for annual sinking fund required for planned maintenance of the properties by their owners and occupiers. The paper concludes that provision for annual sinking fund by property owners and occupiers in Minna is necessary for the achievement of effective maintenance of rented private residential properties in the city.*
KEY WORDS: Annual sinking fund, financing, planned maintenance, residential properties

INTRODUCTION

Like other real assets, real properties have specific lifecycle. During this period, real properties gradually decline in condition and deteriorate. Experts in building technology and property management including Mills (1980); Adebiyi (1987); Ngoka (1987); Omoniyi (1994) and Odumodu (1999) have argued that the process of deterioration in buildings is inevitable and that the rate at which it proceeds can be regulated through maintenance. In particular, Adebiyi (1987) holds the view that every building constructed is organic in nature and should be treated as such as it is first born, then matures and finally breaks down and "die" and that every building requires maintenance during its life time.

The British Standard (BS3811, 1964) gave one of the earliest definitions of maintenance as "work undertaken in order to keep or restore every facility, i.e every part of a site, building and contents, to an acceptable standard". This definition was later modified by the committee on building maintenance set up by the British Minister of Public Buildings and Works (DoE, 1965) as "work undertaken in order to keep, restore or improve every facility, i.e every part of the building, its services and surrounds, to a currently accepted standard and to sustain the utility and value of the facility".

Similarly, the committee on maintenance and protection of public property set up by the Federal Government of Nigeria in 1979 defined property maintenance as "all works undertaken to keep or restore a property to a state of preservation and acceptable standard for its present and intended use".

In addition to the contents of the above definitions, Adebiyi (1987) explained that property maintenance also includes servicing, rectification, renovation and replacement of building components. However, in the maintenance of real properties, availability of finance is very important. Omoniyi (1994) and Odumodu (1999) opined that while there are other crucial factors that affect maintenance of residential properties, proper and adequate maintenance of residential properties is a function of availability of finance. Also, planned maintenance is anticipatory in nature and involves a planned maintenance financing system. This paper explores the annual sinking fund as a tool for financing planned maintenance of rented private residential properties in Minna. The annual sinking fund is a savings fund into which a series of equal annual payments are made with the object of ensuring that a specific sum of money is saved by a given future date (Millington, 1982; Johnson, Davis and Shapiro, 2000; Udo, 2003 and Ifediora, 2005) and is computed as follows:-

$$ASF = i/(1+i)^n - 1$$

Where ASF = Annual Sinking Fund of ₦ 1
i = Sinking Fund Rate of Interest or the Accumulative Rate of Interest
n = Number of Years for which the Fund is saved

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This paper examines annual sinking fund provision for financing planned maintenance of rented private residential properties in Minna, Nigeria

RATIONALE FOR PROPERTY MAINTENANCE

Due to the fact that funds available for the development of new properties are insufficient, there is need for continuous maintenance of the existing stock of real properties. Omoniyi (1994) argued that in order to cope with the housing demand in Nigeria, it is necessary to have a continuous maintenance and rehabilitation of the deteriorating building structures which constitute a greater proportion of the existing building stock. Thus, lack of sufficient funds for the development of new real properties has necessitated the need for the maintenance of those already existing (Omoniyi, 1994; Odumodu, 1999). With particular reference to rented properties, Odudu (1987) lists the reasons for undertaking maintenance as follows:-

(i) To maintain an acceptable quality standard
(ii) To raise the quality of life
(iii) To prolong the life span of the building
(iv) To upgrade the standard of the building
(v) To attract higher rentals

METHODOLOGY

Sources of Data

Data for the study were collected from primary and secondary sources. The real estate firms in Minna constituted the primary sources of data for the study while the Central Bank of Nigeria (CBN) was the main source of secondary data for the study.

Methods of Data Collection

Primary data for the study were collected through surveys and interviews. Visits were made to 6 real estate firms in Minna which are involved in the management of private residential properties in the city and their property files examined. However, some of the real estate firms refused to grant access to the files of many residential properties managed by them. This affected the sample size for the study. A total of 52 property files were examined. Secondary data for the study were obtained from the annual reports and statements of account of the Central Bank of Nigeria for the period, 2000 – 2005, and the apex bank's analysis of economic indicators for the period, 2006 – 2008.

Tools for Data Analysis

A 5 – point Likert Scale was used in the overall assessment of the condition of building components in the residential properties under study. Also, arithmetic mean was used in the determination of the average age of the residential properties used for the study. The sinking fund rate of interest adopted for the study was based on the weighted average interest rates in commercial banks in Nigeria for the period, 2000 – 2008.

DATA PRESENTATION AND ANALYSIS

Data collected by the Central Bank of Nigeria (CBN, 2005) from its nationwide survey of Ministries of Lands and Surveys show that in Niger State, out of 229 building approvals that were granted by the state government during the period, 1998-2005, only 19 buildings were actually started, representing 6.35% of the total approvals granted as presented in Table 1.

Table 1: Housing Construction Index (Residential) for Niger State 1998- 2005

Year	No. of Applications	No. of Approvals	No. of Buildings Started
1998	100	103	0
1999	10	10	0
2000	42	39	0
2001	70	79	0
2002	55	8	0
2003	10	0	0
2004	49	22	0
2005	58	38	19
Total	394	299	19

Source: CBN (2005)

Table 1 show that the rate of residential property development in Niger State is very low. This may be attributed to unavailability of finance for development, among other reasons. Besides, building elements have renewal cycles which if not adequately maintained may break down and stop functioning at the end of their lifecycle. Lee (1976) estimated the renewal cycles of specific building elements as presented in Table 2.

Table 2: Building Elements and their Renewal Cycles

Building Element	Frequency of Renewal
Roof coverings	20 years
External walls (brick or block unplastered)	30 years
External doors	50% at 30 years
Ironmongery	50% at 20 years
Floor finish	10% at 10 years
External and internal decoration	5 years
Sanitary fittings	50% at 20 years
Electrical wiring	30 years
Electrical fittings	15 years

Source: Lee (1976)

The composition of residential properties accessed for the study is presented in Table 3.

Table 3: Composition of Residential Properties accessed for the study

Residential Property Type	Frequency
Tenements	9 (17.31%)
Bungalows	23 (44.23%)
Flats	14 (26.92%)
Maisonettes	6 (11.54%)
Total	52 (100%)

Source: Field Survey (2008)

Based on the information contained in the files of the properties accessed for the study, data on the present condition of the buildings were collected as presented in Tables 4, 5, 6 and 7.

Table 4: Condition of Building Components of Tenements under Study.

Building Components	No. of Tenements and their present condition				
	Very Good	Good	Fair	Bad	Very Bad
Floors	1	2	3	2	1
Walls	-	1	4	3	1
Windows	-	3	2	3	1
Doors	-	2	3	4	-
Roof	-	-	2	2	5
Bathrooms	-	-	-	2	7
Toilets	-	-	-	3	6

Source: Field Survey (2008)

Table 5: Condition of Building Components of Bungalows under Study

Building Components	No .of Bungalows and their present Condition				
	Very Good	Good	Fair	Bad	Very Bad
Floors	3	4	8	6	2
Walls	2	3	12	5	1
Windows	1	14	5	1	2
Doors	1	14	6	2	-
Roof	1	2	3	16	1
Bathrooms	1	1	4	17	-
Toilets	1	1	4	16	1

Source: Field Survey (2008)

Table 6: Condition of Building Components of Flats under Study

Building Components	No of Flats and their present Condition				
	Very Good	Good	Fair	Bad	Very Bad
Floors	4	9	1	-	-
Walls	2	8	3	1	-
Window	1	10	2	-	1
Doors	1	10	1	1	1
Roof	1	2	9	-	2
Bathrooms	4	2	8	-	-
Toilets	3	3	8	-	-

Source: Field Survey (2008)

Table 7: Condition of Building Components of Maisonettes under Study

Building Components	No .of Maisonettes and their present condition				
	Very Good	Good	Fair	Bad	Very Bad
Floors	2	3	1	-	-
Walls	1	4	1	-	-
Windows	1	4	1	-	-
Doors	1	4	1	-	-
Roof	1	2	2	1	-
Bathrooms	1	3	2	-	-
Toilets	1	3	2	-	-

Source: *Field Survey (2008)*

The age of the properties as presented in Table 8 was determined based on the date on which their construction was completed. The estimated cost of maintenance of the properties, the duration for such planned maintenance, provision for annual sinking fund as well as persons responsible for the maintenance of the properties as contained in their files were extracted as presented in Tables 9,10, 11, 12, 13 and 14.

Table 8: Age of Residential Properties under study

Age of Properties (in years)	Tenements	Bungalows	Flats	Maisonettes
1-10	1	1	4	4
11-20	1	4	4	2
21-30	1	3	3	-
31-40	2	7	2	-
41-50	2	4	1	-
51-60	1	2	-	-
61-70	1	2	-	-
Total	9	23	14	6

Source: *Field Survey (2008)*

Table 9: Estimated Cost and Duration for Planned Maintenance of theTenements under Study

Tenements	Estimated Maintenance Cost (₦)	Duration for Planned Maintenance (in years)
1	486,000	2
2	302,000	2
3	393,000	2
4	250,000	3
5	252,000	2
6	237,000	3
7	490,000	3
8	280,000	3
9	245,000	2

Source: *Field Survey (2008)*

Table 10: Estimated Cost and Duration for Planned Maintenance of the Bungalows under Study

Bungalows	Estimated Maintenance Cost (₦)	Duration for Planned Maintenance (in years)	Bungalows	Estimated Maintenance Cost (₦)	Duration for Planned Maintenance (in years)
1	317,000	3	13	386,000	4
2	402,000	3	14	215,000	2
3	490,000	2	15	400,000	2
4	468,000	2	16	417,000	2
5	265,000	2	17	448,000	2
6	440,000	2	18	261,000	3
7.	605,000	5	19	220,000	2
8.	233,000	3	20	483,000	2
9.	540,000	3	21	434,000	2
10.	404,000	2	22	276,000	3
11.	490,000	3	23	758,000	4
12.	300,000	2			

Source: *Field Survey (2008)*

Table 11: Estimated Cost and Duration for Planned Maintenance of the Flats under Study

Flats	Estimated Maintenance Cost (₦)	Duration for Planned Maintenance (in years)	Flats	Estimated Maintenance Cost (₦)	Duration for Planned Maintenance (in years)
1	1,486,000	7	8	1,362,000	10
2	520,000	3	9	1,455,000	12
3	2,347,000	10	10	1,460,000	8
4	1,380,000	5	11	1,400,000	10
5	1,265,000	6	12	1,420,000	9
6	1,554,000	6	13	2,565,000	13
7	1,600,000	7	14	1,628,000	8

Source: *Field Survey (2008)*

Table 12: Estimated Cost and Duration for Planned Maintenance of the Maisonettes under Study

Tenements	Estimated Maintenance Cost(₦)	Duration for Planned Maintenance (in years)
1	846,000	5
2	1,400,000	7
3	672,000	3
4	1,840,000	10
5	2,602,000	12
6	584,000	3

Source: *Field Survey (2008)*

Table 13: Provision for Annual Sinking Fund for the Maintenance of the Properties under Study

Provision for Annual Sinking Fund	No .of Residential Properties			
	Tenements	Bungalows	Flats	Maisonettes
Provision Made	- (0%)	1(4.35%)	1(7.14%)	1(16.67%)
Provision Not Made	9(100%)	22(95.65%)	13(92.86%)	5(83.33%)
Total	9(100%)	23(100%)	14(100%)	6(100%)

Source: *Field Survey (2008)*

Table 14: Responsibility for the Maintenance of the Properties under study

Who is Responsible for Maintenance?	No .of Residential Properties			
	Tenements	Bungalows	Flats	Maisonettes
Tenants	2(22.22%)	4(17.39)	1(7.14%)	- (0%)
Landlord	7(77.78%)	19(82.61%)	13(92.86%)	6(100%)
Total	9((100%)	23(100%)	14(100%)	6(100%)

Source: *Field Survey (2008)*

The weighted average interest rates on savings in commercial banks in Nigeria for the period, 2000-2008 were obtained from the Central Bank of Nigeria as presented in Table 15. This data is necessary for the determination of sinking fund rate of interest needed for the computation of annual sinking fund required to meet the estimated maintenance cost of the properties under study at the end of the duration for their planned maintenance.

Source: *From 2000 - 2005 (CBN, 2005)*
[a]*Central Bank of Nigeria Annual Report and Statement of Account for the Year Ended 31st December, 2006.*
[b]*Central Bank of Nigeria Analysis of Economic Indicators as at December, 2007*
[c]*Central Bank of Nigeria Analysis of Economic Indicators as at 23rd May, 2008*

Table 15: Weighted Average Interest Rates on Savings in Commercial Banks in Nigeria, 2000-2008

Year	Interest Rate (%)
2000	5.29
2001	5.49
2002	5.08
2003	4.15
2004	4.44
2005	3.75
2006[a]	3.25
2007[b]	3.02
2008[c]	2.90

RESULTS AND DISCUSSION

The mean points for the overall assessment of the condition of building components in the residential properties under study were determined using a 5-point Likert scale and the result is presented in Table 16. The composite index/mark-off points for the interpretation of values in Table 16 are: 1.00-1.49 (very bad condition); 1.50-2.49 (bad condition); 2.50-3.49 (fair condition) 3.50-4.49 (good condition) and 4.50-5.00 (very good condition).

Table 16: Mean Points for Overall Assessment of the Condition of Building Components of Residential Properties under Study based on 5-point Likert Scale.

Residential Property Type	Building Components and their Mean Points						
	Floors	Walls	Windows	Doors	Roofs	Bathrooms	Toilets
Tenements	3.00	2.56	2.78	2.78	1.67	1.22	1.33
Bungalows	3.00	3.00	3.48	3.61	2.35	2.39	2.35
Flats	4.21	3.79	3.71	3.64	3.00	3.71	3.64
Maisonettes	4.17	4.00	4.00	4.00	3.50	3.83	3.83

Source: *Computed from Data in Tables 4, 5, 6 and 7*

The result in Table 16 indicates that the condition of the tenements and bungalows under study are more deteriorating than those of flats and maisonettes. Of all the building components examined, the roofs, bathrooms and toilets of tenements and bungalows have low mean points with the roofs in bad condition and the bathrooms and toilets in very bad condition. The deteriorating condition of the tenements and bungalows under study may be attributed to inadequate maintenance over the years, coupled with age as they are quite older than flats and maisonettes under study as presented in Table 17.

Table 17: Average Age of the Residential Properties under study

Residential Property Type	Average Age (in years)
Tenements	36.6
Bungalows	35.5
Flats	19.8
Maisonettes	8.8

Source: *Computed from Data in Table 8*

Most of the properties under study do not have provision for annual sinking fund for their maintenance. The non-provision of annual sinking fund for the properties has affected the availability of finance for their maintenance at expected dates. Thus, annual sinking funds required to meet the estimated maintenance costs of the properties for the duration for planned maintenance were determined based on data in Tables 9,10,11,12 and 15 as presented in Tables 18, 19, 20 and 21. The sinking fund rate of interest is the safe interest rate on savings and was determined to be 4.15% as at the time of the study, based on the average weighted interest rate on savings in commercial banks in Nigeria obtained from the Central Bank of Nigeria as presented in Table 15.

Table 18: Annual Sinking Fund Required to Meet the Estimated Maintenance Cost of the Tenements for the Duration for Planned Maintenance

Tenements	Estimated Maintenance Cost (₦)	ASF Factor @ 4.15%	Annual Sinking Fund Required (₦)
1	486,000	0.4898	238,042.8
2	302,000	0.4898	147,919.6
3	393,000	0.4898	192,491.4
4	250,000	0.3199	79,975
5	252,000	0.4898	123,429.6
6	237,000	0.3199	75,816.3
7	490,000	0.3199	156,751
8	280,000	0.3199	89,572
9	245,000	0.4898	120,001

Source: *Computed from Data in Tables 9 and 15*

Table 19: Annual Sinking Fund Required to Meet the Estimated Maintenance Cost of the Bungalows for the Duration for Planned Maintenance

Bungalows	Estimated Maintenance Cost (₦)	ASF Factor @ 4.15%	Annual Sinking Fund Required (₦)
1	317,000	0.3199	101,408.3
2	402,000	0.3199	128,599.8
3	490,000	0.4898	240,002
4	468,000	0.3199	149,713.2
5	265,000	0.4898	129,797
6	440,000	0.4898	215,512
7	605,000	0.1841	111,380.5
8	233,000	0.3199	74,536.7
9	540,000	0.3199	172,746
10	404,000	0.4898	197,879.2
11	490,000	0.3199	159,751
12	300,000	0.4898	146,940
13	386,000	0.2350	90,710
14	215,000	0.4898	105,307
15	400,000	0.4898	195,920
16	417,000	0.4898	204,246.6
17	448,000	0.4898	219,430.4
18	261,000	0.3199	83,493.9
19	220,000	0.4898	107,756
20	483,000	0.4898	236,573.4
21	434,000	0.4898	212,573.2
22	276,000	0.3199	88,292.4
23	758,000	0.2350	178,130

Source: *Computed from Data in Tables 10 and 15*

Table 20: Annual Sinking Fund Required to Meet the Estimated Maintenance
Cost of the Flats for the Duration for Planned Maintenance

Flats	Estimated Maintenance Cost (₦)	ASF Factor @ 4.15%	Annual Sinking Fund Required (₦)
1	1,486,000	0.1260	187,236
2	520,000	0.3199	166,348
3	2,347,000	0.0827	194,096.9
4	1,380,000	0.1841	254,058
5	1,265,000	0.1502	190,003
6	1,554,000	0.1502	233,410.8
7	1,600,000	0.1260	201,600
8	1,362,000	0.0827	112,637.4
9	1,455,00	0.0660	96,030
10	1,460,000	0.1079	157,534
11	1,400,000	0.0827	115,780
12	1,420,000	0.0939	133,338
13	2,565,000	0.0596	152,874
14	1,628,000	0.1079	175,661.2

Source: *Computed from Data in Tables 11 and 15*

Table 21: Annual Sinking Fund Required to Meet the Estimated Maintenance
Cost of the Maisonettes for the Duration for Planned Maintenance

Maisonettes	Estimated Maintenance Cost (₦)	ASF Factor @ 4.15%	Annual Sinking Fund Required (₦)
1	846,000	0.1841	155,745.6
2	1,400,000	0.1260	176,400
3	672,000	0.3199	214,972.8
4	1,840,000	0.0827	152,168
5	2,602,000	0.660	171,732
6	584,000	0.3199	186,821.6

Source: *Computed from Data in Tables 12 and 15*

FINDINGS

Most tenements and bungalows accessed for the study are in deteriorating condition. Also, all the tenements (100%) and most of the bungalows (95.65%); flats (92.86%) and maisonettes (83.33%) do not have provision for annual sinking fund for their maintenance. This has affected the availability of finance for the maintenance of the properties. Besides; available data show that the landlords are responsible for maintenance of most of the properties under study as presented in Table 14. This implies that the sinking fund for maintenance of the properties should be set aside from the rents paid to the landlords by the occupiers. The annual sinking funds determined for the properties can meet their estimated maintenance costs at the end of the duration planned for their maintenance if saved at the sinking fund rate of 4.15%, ceteris paribus. Using the first tenement in Table 18 as an example, compounding the annual sinking fund at an accumulative rate of 4.15% gives the estimated maintenance cost of the property. That is, ₦238, 042. 8 x 2.041649653 = ₦ 486,000. This scenario is applicable to all other properties considered in the study.

CONCLUSION

The provision for annual sinking fund by residential and other property owners and occupiers is necessary if adequate finance must be made available for property maintenance at expected dates. As demonstrated in this paper, the annual sinking funds determined for the properties under study can meet their estimated maintenance costs as planned. To this end, property managers and building maintenance experts in Minna need to educate their clients on the importance of annual sinking fund in the proper and adequate maintenance of their real properties. Such maintenance education would to a great extent promote good maintenance culture among property owners and occupiers in the city.

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