Appraisal of the Maintenance of Public Residential Estates in Ogun State: Case Study of Ibara Housing Estate, Abeokuta

1Jolaoso, B. A., 2Musa N.A. and 3Oriola, O. A

1Dept of Architecture, Moshood Abiola Polytechnic, Abeokuta
2Dept of Building and Quantity Surveying, Federal Polytechnic
3Dept of Architecture, Olabisi Onabanjo University, Ibogun Campus.

Corresponding Author: Jolaoso, B. A

Abstract
This paper examined the physical conditions of the stock of buildings and its environment vis-a-vis the various maintenance strategies adopted in the past twenty years for their maintenance in Ibara Housing Estate Abeokuta, Ogun State. This is with a view to determining the effectiveness of the adopted strategies and hence evolving good maintenance practice(s) suitable for the estate in particular and public estates in Nigeria in general. Pertinent data were obtained through reconnaissance and questionnaire surveys conducted on a sample of 105 buildings and their occupiers selected randomly in the study area respectively. The study is limited to the physical conditions of buildings constructed not later than thirty years ago and its environment in the study area. The data collected were subjected to both descriptive and inferential statistical analyses using Statistical Package for Social Science (SPSS) version 17. The results obtained revealed that at 95% confidence level there were no significant differences in the original quality standard and environmental condition of the buildings maintained by all the three identified groups (tenants/occupants, public agents and private agents) at the time of tenure and after the maintenance exercise. The results further revealed that at 5% significant level, while the response period to maintenance/repair works by tenants/occupants was significantly shorter than that of private agents, the response period of public agents is significantly longer than that of the private one. The paper concluded that the occupiers’ coordinated maintenance strategy is most effective.

Keywords: maintenance, residential estate, strategy, effective, public.

INTRODUCTION
Provision of adequate, affordable and high standard and quality housing that meets the social, economic and political aspirations of the citizenry remains the primary and major focus of all governments in the world over. This is because the fulfillment of this desirable social objective is a key component of sustainable development (Ibem and Amole, 2010) and a measure of the well being of the people. According to Leong (2009), housing is a major factor impacting on the health, safety, socio-economic and political life of the occupants. In fact it impacts all aspect of human endeavour. Thus, the state of housing and its environment is an indicator of the level of development and condition and state of the citizenry.

Despite the pivotal roles of housing in the socio-economic development of a nation and the life of the people, majority of the public housing are in deplorable condition and state of disrepair, due to long period of neglected maintenance. According to Olahubara and Fatoye (2006), public residential estates, when compared with existing private housing estates, are known to be lacking in basic infrastructural facilities and services and their respective maintenances that are meant to enhance the liveability of such estates. These deplorable housing standard and deteriorated physical environmental conditions in the opinion of Blome (2010) are responsible for the social problems, poverty, poor academic performance, poor health, riots, and high arsons and crime rates prevalent in our societies. A poor quality living accommodation according Brennan (2000) will impact negatively on the physical and mental health of the residents of a housing estate. To address this intractable housing problem and ensure sustainable housing in Nigeria, all the three tiers of government had been investing heavily in the construction of new housing estates and maintenance of the existing ones as far back as 1928 when the Lagos Executive Development Board (now, Lagos State Development and Property Corporation), under the 1928 Town Planning Ordinance Law, Cap 95 of the Federation of Nigeria was established. Consequently, the National Housing Policy of 1991 charged various tiers of government and their housing corporations with the responsibilities of facilitating the design and construction of new housing units for low income group; improving upon the existing housing conditions; reducing the production cost of housing
units; encouraging the manufacture and use of local building materials; providing scientifically-based physical plan etc, inclusive of essential amenities and infrastructures to support habitable environment, which shall be revised from time to time. However, due to dwindling budgetary allocation to the housing sector and resources becoming more and more limited in the face of growing population, governments are increasingly shifting their attention away from new housing development towards maintenance of existing ones (Leong, 2009). Maintenance primarily, is to preserve buildings in their initial functional, structural and aesthetic states so that they continue to remain as such and retain their investment value over a long period of existence. It is therefore necessitated by deterioration of the materials and components of building(s) and its environment. It is the works undertaken in order to keep or restore every part of the building(s), its contents and its environment in an acceptable standard or condition. This includes but not limited to the carrying out regular repairs of works and the replacement of items in buildings and its environment that are in deplorable conditions.

Odeleye (1995) has posited that in order to prolong the economic life of property, it is necessary to have a programme of action that would be effectively implemented to keep the property in top form to enable optimum returns to be received on a continuous basis. This implies that, there is the need to look at the maintenance of existing public residential estates in order to restore them into acceptable conditions for habitation or at least to prolong the life-span of the buildings and other complimentary services through regular maintenance activities, more so that the intensity of building maintenance becomes higher with its age, especially in the face of climatic change and its attendant effects on the building materials, elements and physical environment for sustainable development. It is against this backdrop that this study attempt to examined the strategies adopted in the past two decades for the maintenance of stock of buildings and the environment in Ibara housing estate with a view to determining the effectiveness of the adopted strategies and evolving a good maintenance practice suitable for the estate in particular and public residential estate in general.

STATEMENT OF RESEARCH PROBLEM
The main purpose of maintenance of property is essentially to retain its values for investment, aesthetic, safety, durability, with a view to ensuring that the property is continually in good condition for habitation and to the satisfaction of the owner(s)/users and communal prestige (Brennan, 2000). However, despite the various strategies been adopted by the state government for maintenance of Ibara housing estate since the creation of the state in 1976, effect of prolong neglect and poor maintenance culture is manifesting in various degrees in the estate. In order to evolve an effective good maintenance practice regime for the estate in particular and public estate in general, knowledge of effectiveness of the strategies adopted in the past is very pertinent, hence, this study.

RESEARCH QUESTIONS
The following questions are very germane to the study:

i) What are the strategies adopted by the government for the maintenance of the housing estate in the past?
ii) How effective are these strategies?

OBJECTIVE OF THE STUDY
The study explored the various strategies adopted by Ogun state government for maintenance of Ibara Housing estate in the past twenty years. The objectives of the study are to:

i) Identify and evaluate the various maintenance strategies adopted by the state government for maintenance of the estate; and
ii) Determine the effectiveness of the adopted strategies.

LITERATURE REVIEW
Maintenance is primarily to preserve buildings in their initial functional, structural and aesthetic states so that they continue to remain as such and retain their investment value over a long period of existence. According to Musa (2002), it denotes all actions carried-out on a building after completion to preserve it in its initial state, starting from the defects liability period of the building to its disposal. With appropriate maintenance, the building’s economic life is prolonged. However, a cursory look into some public buildings around reveals array of abandoned and epileptically functioning facilities. The malfunctioning of the facilities in most public buildings is a consequence of inadequate maintenance and/or poor management of the facilities. Adejimi (1998) posits that theories and hypotheses are postulated and propounded daily, but maintenance problems still remain adamantly unyielding and so unsolved and this is why there is a serious need to look at the problem from another perspective. He therefore opined that maintenance issues can be resolved together by professionals at the project inception and planning (i.e. project conception, design, construction to completion) stages through preventive rather than corrective or emergency approach against expected or avoidable facility failures.

Maintenance Typology
There is no general consensus among authors about the types of maintenance. While Wikipedia, 2011; Feilden, 1997; Onaro, 1997 and Chandler, 1991
classified maintenance into two major types thus preventive and corrective. Leong, 2009 and Cambridge City Council, 2011 added responsive maintenance. However, irrespective of the type the goal of maintenance remains the same

Corrective Maintenance
This is the simplest type of maintenance. It is often adopted where the element of the building is used until it breaks down. It is necessitated by deterioration of the materials and components of building(s) and its environment. This form of failure-based corrective maintenance according to Kenley et. al., (2009) can (in certain instances) be more expensive for two reasons:

i) Failure of an item can cause a large amount of consequential damage to other elements/parts of the building, and;
ii) Failure of an item can occur at a time, when it is inconvenient to both the user and the operator. Significant costs can be incurred obtaining emergency manpower and very often it is difficult to obtain spare parts at short notice.

Corrective maintenance will be applied to
- Non-significant items of works;
- Items of works whose conditions cannot be monitored and
- Which the cost of employing time-based preventive maintenance is more than the cost of employing corrective maintenance.

Preventive/Planned Maintenance
Preventive, Pre-Planned Maintenance is used to overcome the disadvantages of corrective maintenance, by reducing the probability of and likelihood of failure of an element. Preventive maintenance tasks are undertaken in accordance with a predetermined plan at regular but fixed intervals. The advantages of preventative maintenance over corrective maintenance according to Sai Kung District Council (2011) are:

i) Maintenance tasks can be planned ahead and performed when convenient to building user/operator;
ii) Maintenance costs can be reduced by avoiding the cost of consequential damage and use of emergency resources;
iii) ‘Down time’ (the time that an element of the building or whole building is out of service) can be minimised so the occupancy and income of the building is maintained and can be increased;
iv) Health and Safety of user and operator can be improved.

However, there are some disadvantages to consider with preventive maintenance:

i) Planned maintenance will be performed irrespective of the condition of the item/element (i.e. some tasks will be performed on elements that may have remained in a safe/acceptable operating condition for a longer period of time).
ii) Planned maintenance tasks can be more costly in terms of spare parts and labour costs if it is carried out without control or when not required.

Condition Based Maintenance
This form of maintenance is carried out in response to a significant deterioration of the item. This deterioration is indicated by a change in the monitored parameter of the condition and performance. Condition based maintenance is similar to Pre-Planned Maintenance in that regular inspections are made and the condition recorded however no work/replacement would be undertaken until there was a significant change in condition/performance of the item. Condition based maintenance will be applied to:

i) Health, Safety and significant items whose condition can be monitored and for which ‘on-line’ condition monitoring techniques are available and cost effective.
ii) Items whose condition can be monitored and for which the cost of applying condition-based maintenance is less than the cost of applying corrective or preventive maintenance.

Maintenance Strategy
The choice/selection of an appropriate maintenance method strategically depends on sound and informative investigation and initial appraisal. After the physical assessment of the building and identification of agents and degree of deterioration in the building, the next stage is the evaluation of means of implementing the maintenance works. According to Musa (2002), the choice of maintenance strategy is influenced by one or more of the following factors:

a) Age, character and prospective life of the building;
b) The physical condition of the building and its elements;
c) Environmental conditions;
d) Tenants (users) and clients requirements;
e) Government policy and
f) Financial requirements and available fund.

However, no matter the strategic choice adopted, Kwong (2005) opines that the maintenance works should:

i) Meet statutory obligations in relation to the maintenance of the building,
ii) Maximise the physical life of the building,
iii) Secure the well-being of its users/occupants,
iv) Protect and enhance the investment value of the building,
v) Achieve value for money for all expenditure
vi) Facilitate and encourage tenant participation in the maintenance operation and
vii) Cause minimum inconveniences to the occupants/users.

In view of these, Esenwa (1999) inferred that an optimum maintenance strategy will not only engender quality improvement and satisfy the needs of the occupants/users but also carried out promptly at most cost-efficient price with minimum inconveniences to the users/occupiers.

RESEARCH METHODOLOGY

The Study Area

The study area (Ibara housing estate) is owned by the government of Ogun State, Nigeria. It was built in anticipation of the creation of the State in 1976/77 to accommodate the Civil/Public servants transferred to and employed at the then emerging Ogun State Capital as staff quarters in Abeokuta. It was expected to be maintained and managed by the Housing Corporation established by the owner state. The corporation handles the routine maintenance and the management of the estate when it was used purely as staff quarters. Since its establishment till the present, there have been changes in the management of the estate at various times from the corporation statutorily established for the purpose to the Department of Public Buildings of the Ministry of Works and Housing and the Bureau of Governmental Service, Office of the Head of Service. There was also a brief period of involvement of private estate management consultants in the management of the estate. This idea could not be sustained as a result of political and policy changes. The management/control of the estate now resides with the Bureau of Governmental Service, Office of the Head of Service. The office does not have the expertise to carry out maintenance. From the foregoing, it is discernible that, in a bid to keep the estate in a healthy and safe state, different strategies had been adopted by the government for managing and maintaining the estate since its establishment in 1976. The object of this study therefore is to identify and evaluate these strategies with a view to evolving an effective and sustainable maintenance regime that is suitable for the estate in particular and others in general.

METHODOLOGY

Due to the nature of the study a questionnaire survey was conducted on purposefully selected ninety-five (95) occupants who had been residing in the estate for over twenty years. A total of eighty-five (85) questionnaires (representing 89.47% response rate) were retrieved and analysed. The respondents were asked to identify the maintenance strategies adopted for the maintenance of the estate since their tenure in the building. In addition they were asked to rate their expected as well as the actual quality (as perceived) of the maintenance works carried out when the identified strategies were adopted. The rating was based on five-point Likert’s scale. These scales are: very low (VL), Low (L), Average (A), High (H) and very High (VH) and were assigned a value of 1,2,3,4 and 5 respectively. The data obtained were analysed using Relative Quality Index (RQI). The five-point Likert Scale was transformed to Relative Quality Index for each determinant using numerical score. These were then analysed through SPSS version 17 using Wilcoxon-signed-rank test at 95% confidence level.

RESULTS AND DISCUSSION

Types of Residential Buildings and Maintenance Strategies Adopted

The respondents were asked to indicate the type of the buildings they occupied and strategies adopted by the government for their maintenance since their tenure. Their responses are as shown in Tables 1 and 2.

Table 1: Types of Residential Buildings Occupied

<table>
<thead>
<tr>
<th>S/N</th>
<th>TYPES OF BUILDINGS</th>
<th>DENSITY</th>
<th>NO. OF BLOCKS</th>
<th>NO. OF UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3- Bedroom Bungalow (Detached)</td>
<td>Low</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>3-Bedroom Flat (2 units /block)</td>
<td>Medium</td>
<td>32</td>
<td>64</td>
</tr>
<tr>
<td>3</td>
<td>4-flat block (of 2-wings,3 bedroom flat/floor)</td>
<td>High</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>50</td>
<td>85</td>
</tr>
</tbody>
</table>


Table 2: Strategies Adopted For The Maintenance Of The Buildings In The Estate

<table>
<thead>
<tr>
<th>S/No</th>
<th>Strategies</th>
<th>No.Of Buildings</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government Agency</td>
<td>85</td>
<td>100.0</td>
</tr>
<tr>
<td>2</td>
<td>Self/Tenants</td>
<td>85</td>
<td>100.0</td>
</tr>
<tr>
<td>3</td>
<td>Private Agents</td>
<td>85</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2011.

Tables 1 and 2 revealed that three major types of residential buildings exist in the estate. Coincidentally the same number of strategies is being adopted from time to time for the maintenance of the buildings. Table 2 further revealed that each of the strategies had been adopted at different times for maintenance works carried out on all of the buildings during the tenure of the respondents. Hence information obtained from them would be reliable and authentic. Obviously, the type of strategy adopted at a point in time has no correlation with the type of building.
Relative Quality Index of the Respondents’ Expected and Obtained Quality of Works When Each of the Maintenance Strategy is Adopted

The respondents were asked to rate the quality of the works expected and obtained from the maintenance works carried out on their residence for each of the strategies adopted during their tenure. Their responses were converted to relative significant index for each of the adopted strategy as indicated in Table 3.

Table 3 revealed that irrespective of the strategies adopted, the respondents expected very high quality from the maintenance works. Unfortunately, these expectations were not met through the adoption of these strategies, even though the obtained qualities were above average. The significance of the difference observed between the expected and the obtained quality was tested using Wilcoxon-signed rank test at 95% confidence level. The result of the test is presented in Tables 4 - 6

Table 4: Result of the Wilcoxon signed Rank Test on the Expected and Obtained Quality of works for Government Agency Maintenance Strategies

<table>
<thead>
<tr>
<th>S/N</th>
<th>Strategies</th>
<th>Expected Rqi</th>
<th>Obtained Rqi</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Z</th>
<th>ρ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Government Agency Maintenance Strategy</td>
<td>4.7</td>
<td>3.6</td>
<td>49</td>
<td>29.16</td>
<td>1429.00</td>
<td>-5.733</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>Self/ Tenants Maintenance Strategy</td>
<td>4.9</td>
<td>4.1</td>
<td>6</td>
<td>18.50</td>
<td>111.00</td>
<td>-3.322</td>
<td>.001</td>
</tr>
<tr>
<td>3</td>
<td>Private Agents Maintenance Strategy</td>
<td>4.8</td>
<td>4.2</td>
<td>30</td>
<td>18.50</td>
<td>111.00</td>
<td>-1.342</td>
<td>.180</td>
</tr>
</tbody>
</table>

Table 5: Result of the Wilcoxon Signed Rank Test on the Expected and Obtained Quality of works for Tenants Maintenance Strategies

<table>
<thead>
<tr>
<th>S/N</th>
<th>Strategies</th>
<th>Expected Rqi</th>
<th>Obtained Rqi</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Z</th>
<th>ρ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obtained Quality for Tenants Negative Ranks</td>
<td>34</td>
<td>27.21</td>
<td>925.00</td>
<td>-3.322</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Expected Quality for Tenants Maintenance Strategies - Positive Ranks</td>
<td>15</td>
<td>20.00</td>
<td>300.00</td>
<td>-3.322</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ties</td>
<td>36</td>
<td>20.00</td>
<td>300.00</td>
<td>-3.322</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Result of the Wilcoxon signed Rank Test on the Expected and Obtained Quality of Works for Private Agent Maintenance Strategies

<table>
<thead>
<tr>
<th>S/N</th>
<th>Strategies</th>
<th>Expected Rqi</th>
<th>Obtained Rqi</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Z</th>
<th>ρ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obtained Quality for Private Agent Negative Ranks</td>
<td>25</td>
<td>21.84</td>
<td>546.00</td>
<td>1.342</td>
<td>.180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Expected Quality for Private Agent Maintenance Strategies - Positive Ranks</td>
<td>17</td>
<td>21.00</td>
<td>357.00</td>
<td>1.342</td>
<td>.180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ties</td>
<td>43</td>
<td>21.00</td>
<td>357.00</td>
<td>1.342</td>
<td>.180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Total</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td></td>
</tr>
</tbody>
</table>

Tables 4 and 5 revealed that the differences observed between the quality standard expected from the maintenance works and the quality standard obtained when the state government adopted the strategies in which government agencies and tenants are responsible for the administration of the works were significant, $p < 0.05$ in each case. On the other hand, Table 6 revealed that there is no significant difference between the quality standard expected from the maintenance works and the quality standard obtained when the state government adopted the strategy in which private agents were commissioned to manage the works, $p > 0.05$. These results implied that only through the private agent maintenance strategy that
the expectations of the tenants from the maintenance works were met.

From the oral interview conducted on the respondents, the poor performances of the government agency and tenant maintenance strategies were attributed to lackadaisical attitude and corruption on the part of government employees responsible for the works and lack of proper supervision of the operatives involved in the maintenance works when tenants are responsible for the works respectively.

**SUMMARY OF FINDINGS AND DISCUSSION**

The case study carried on the buildings in the study area (Ibara Housing Estate – Phase I) revealed the followings:

i. The estate is owned by the government of Ogun State, Nigeria. It was built in anticipation of the creation of the State in 1976/77 to accommodate the Civil/Public servants shifting their respective services to the then emerging Ogun State Capital as staff quarters in Abeokuta. The provision of the estate as staff quarters was expected initially to serve as a form of incentive,

ii. The estate was built about 34 years ago, and was expected to be maintained and managed by the Housing Corporation.

iii. It was observed that the corporation handles the routine maintenance and the management of the estate when it was used purely as staff quarters.

iv. The tenants are senior civil/public servants and have been residents at an average family size and period of tenancy of 5 and 5 - 15 years respectively on rental basis.

v. Most of the buildings are in deplorable state of disrepair, especially in the areas of decaying and distorted timber frames, cabinets, fascia boards and roof-carcass; roof leakages, broken Louvre blades, faulty and rusty Louvre carriers; wall cracks, flaking of wall paints; growth on walls arising from precipitation due to the effects of moisture penetration and sunlight; damages/leakages in sanitary pipes in and around the buildings; partially collapsed septic tanks, soak-away-pits and inspection chambers and malfunctioning sanitary wares etc;

vi. There have been changes in the management of the estate at various times to the Department of Public Buildings of the Ministry of Works and Housing on one hand and the Bureau of Governmental Service, Office of the Head of Service on the other.

vii. There was also a brief period of involvement of private estate management consultants in the year 2000 by the corporation to manage the estate. This idea could not be sustained as a result of political and policy changes.

viii. The management/control of the estate now resides with the Bureau of Governmental Service, Office of the Head of Service, especially on the allocation of quarters and receipt of rents, where payments are realised mostly through direct deductions from the monthly salary sources of the tenants, who are either in the public/civil services of the Federal, State and/or Local governments. The trust of this is more on revenue collection. The office does not have the expertise to carry out maintenance.

ix. There is the absence of any definite and effective maintenance strategy put in place, in the estate by the owner (government/housing corporation), which led to their poor performance at carrying out the required maintenance of works on the buildings and its environment. However, a self-maintained type of strategy by tenants/occupants emerged and was predominantly adopted.

x. The frequency in the changes of the management/control organs of the estate, arising from policy and/or political changes of the government might have caused bottle-necks for coordination and effective management of the buildings in the estate and its environment.

xi. The past and current economic realities of the owner/corporation over time might be responsible for the inability of the owner/corporation to engage capable hands at ensuring the implementation and enforcement of a sustainable maintenance strategy.

xii. The poor performances of the government agency and tenant maintenance strategies were attributed to lackadaisical attitude and corruption on the part of government employees responsible for the works and lack of proper supervision of the operatives involved in the maintenance works when tenants are responsible for the works respectively.

xiii. That only through the private agent maintenance strategy that the expectations of the tenants from the maintenance works were met

**CONCLUSION**

The results obtained from the examined physical conditions of the selected buildings constructed not later than thirty years ago and its environment vis-a-vis the various strategies adopted in the past twenty years for their maintenance in Ibara Housing Estate Abeokuta, Ogun State, revealed that at 95% confidence level there were no significant differences in the original quality standard and environmental condition of the buildings maintained by all the three
identified groups (tenants/occupants, public agents and private agents) at the time of tenure and after the maintenance exercise. It further revealed that at 5% significant level, while the response period to maintenance/repair works by tenants/occupants was significantly shorter than that of private agents, the response period of public agents is significantly longer than that of the private one. This implies that the tenants/occupiers’ coordinated maintenance strategy is most effective, sustainable and therefore conclude that, it is a suitable maintenance strategy for the estate in particular and public residential estates in Nigeria.

REFERENCES


Leong, K. C (2009), Sustainable Housing and Community Development – Opposite Sides of the Same Coin. EAROPH 42nd Regional Seminar, Parliament House, Ulaanbaatar, Mongolia.


