MAINTENANCE CHALLENGES OF MULTI-OWNER MULTI-STOREY RESIDENTIAL BUILDINGS IN LAGOS, NIGERIA

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ABSTRACT
It is noted that in Nigeria**,** buildings begin to demand for maintenance almost immediately after completion and handing over to users. As a single building belongs to several owners, corporate decision is required in maintaining it. The process of arriving at a workable decision remains a problem in the maintenance of such buildings due to protracted consultation and individual differences. This paper analytically investigates the frequency of maintenance of multi storey buildings compared with single owned building within the area Lagos, Nigeria. This paper examines these processes, the challenges and possible resolution for meeting point of ideas in order to sustain the commonwealth without jeopardizing the interest of any through a field survey. Structured questionnaire and non-participant case study were adopted in collecting quantitative and qualitative data. This study adopted quantitative analysis in form of tables to evaluate the attitude of respondents towards the maintenance of external surface of buildings vis-à-vis painting in the area. Three hundred and eighty four structured questionnaires were administered in six randomly selected Local Government Areas within the study area in April-May, 2012. The findings show that buildings that belong to single owners are better maintained than buildings that belong to multi-owners due to sense of ownership and ability to take decision on maintenance issues swiftly. Multi ownership system requires some level of enlightenment and thorough education in the area. The primary culture of the people in the selected area supports the compound system which multi ownership denies.

Keywords: multi- storey, maintenance, multi-owner, residential building, materials, single owner.

1.0 INTRODUCTION

The sustainability of the building external walls is a precursor to obtaining optimal performance of the entire building (Mwasha *et al*, 2011; Horne and Hayles, 2008). The outer wall surfaces are the aspect of the building that are most seen by the people (Wood, 2009), which may lead to appreciation or rejection of the architect's work. Though the defects that may appear on external wall finish may not be significant to the structural stability or weather resistance performance of the entire building, yet the outward condition of the buildings defines the city-scape and dictates passers' by, visitors and users satisfaction. The design, methods of construction, materials colour, texture, detailing and finish categorically determine the behavior of building skin (Aosmohor, 2010). The decision on specification of a particular material goes a long way to determining the future cost of maintenance, quality, life-span and value of the building (Yiu, 2007) one of the most important function of the building skin is to protect the interior from the elements (Brock, 2005) utmost care must be given to its design (Low *et al*, 2008) and selection of materials (Carmody *et al*, 2007; Chua and Chou, 2010).

Some of the problems of external wall according to Wood (2009) are: spalling or delamination of surfaces, cracks, discolouration and staining, dampness and dislocation. Others are erosion of mortar, high level of penetrating damp, salt contamination on internal plaster, high level of mould and algae growth, spalling bricks and erosion of pointing joints. They also include peeling of paints, tiles and moisture accumulation. These problems extend endlessly depending on the materials used as external finish and the level of maintenance that is carried out in the buildings.

2.0 STUDY LOCATION AND RESEARCH METHODOLOGY

The study was carried out in Lagos, Southwest Nigeria. It lies between latitude 6°27′ and 6°45′ North of the Equator and on longitude 3°20′ and 3°39′ East of the Greenwich Meridian. As a conurbation, it inhabits the largest number of humans in Africa with a population of over 13.4million (http://geography.about.com)

The study focuses on residential buildings that are single owned and multi storey, multi-owner. The target respondents were home-owners and tenant-occupiers. The research adopted a multistage sampling method in selecting the sample size. Six Local Governments Areas (LGAs) were randomly selected out of the existing twenty Local Government Areas. The study area has a housing population of 1.07million (Oshodi, 2010). A sample size calculator developed by American Marketing Association (AMA) developed for 2007-2012 was used to determine the sample size.

This gave a sample size of 384 which was evenly distributed on the randomly selected Local Government Areas at 64 per LGAs. 162 respondents were targeted each for single and multi-owners owners of buildings each.160 single owners gave response while 143 multi-owners responded to the questionnaire. A total of 303 responses were collected. This forms 78.9 percent which is good for statistical analysis. Respondents were asked three major questions which are: 1) Age of building, 2) when last was the building painted? and 3) how often do you repaint the building?

3.0 LITERATURE REVIEW

3.1 Challenges of Multi-Storey Maintenance

There are challenges of maintaining the external surface of multi-storey buildings, ranging from the need of high-tech equipment, to efficient and well trained artisans. It also includes work space, environment friendly materials, expertise and ingenuity of the contractors in the area of coordination and administration and the design done by the architect. The possibility of accident, loss of equipment, loss of life and multiple litigations is also a reality.

While maintenance can go on unhindered in the interior spaces, the elements of weather such as rain, snow, sun and turbulent wind most often hinder the smooth running and schedule of works on the external surface. It requires proper planning with precise forecast of weather in most cases to avoid waste of materials, man-hour loss of profit and patronage due to unavoidable weather condition. The spaces provided in-between buildings in most urban cities as set back are usually inadequate for maintenance works. These constitute a serious hindrance to the maneuvering of needed equipment for maintaining the buildings particularly multistory buildings.

3.2 Challenges of Maintaining Multi-Storey, Multi-Owner Residential Buildings

Effective maintenance requires the participation of home-owners/users, facilities managers, estate agents contractors, developers, building industry professional and building materials manufacturers (Hua *et al*, 2005). In a multi-storey, multi-owner residential building, effort at satisfying the owners is an essential consideration (Government Malaysia PWD, 2009). This is as a result of divergent views, taste, status and background. Maintenance works Ali (2009) observed requires much information from the users that are more familiar with the building, their personal need and shortcomings of expected performance. The readiness of the users to cooperate with facilities managers go a long way to solving most of the perennial problems.

To achieve maximum cooperation, Ariff and Davies (2011) agree is a difficult task because of individual apartment owners have limited control on the entire property. However, a collective responsibility is inevitable (Ariff and Davies, 2009) this agrees with Yau (2011) who submit that collective action is needed for effective multi-owner, multi-storey building maintenance. Lack of cooperation has been identified as a source for breeding mismanagement of property (Ariff and Davies, 2009). Why resident-owners participate in maintenance issue, resident-tenants are usually unconcerned (Yau, 2011) and where they constitute the majority occupier in a residential building, greater problem ensues which will require a different approach to avoid building decay.

Reasons for home-owner participation according to Leung (2005) include:

- Sense of ownership
- Sharing similar values and belief
- Length of occupancy-stay
- Sense of community
- Mutual trust
- Marital status and age

Multi-ownership implies that each flat has a share of the buildings' utility parts, the cooperation and consent of all the co-owners are essential for the management of the communal, generally owned elements. Proffering solution to these challenges, Yau (2011) advocates the participation of residents, formation of home owners association, adoption of communitarian approach and enacting of statutory requirements while Ariff and Davies (2009) and Randolph (2006) recommend a possible reduction in frequent changes in occupancy. Reduction in tenant-occupiers mobility will increase their communal integration which may facilitate interest and effective participation.

3.3 Required Equipments for External Wall Maintenance

Zinzi and Agnoli (2011) identified the use of appropriate technology both at construction and maintenance period as factors that determine lifetime maintenance cost. To ensure a consistent performance of the building skin, several equipments are needed for the maintenance apart from a minimum requirement of work space round the building.

Some of the equipments are: roof eagle systems, motorized trolleys, rigging system, monorail system, cranes, hoists, ladders and gantry systems, fall arrest systems, access work platforms, industrial lifts, rail fastening systems, transfer cars and explosion equipment (MHE-Demag, 2011). All these equipment are needed to meet the challenges of multi-storey building maintenance. Some of the equipment are described below:

- **Roof Eagle Systems:** This is a dual active suspension rope system that can run on concrete eave of the roof. It is an improvement on the hoist system that requires daily attention for its rope. It prevents common rope jam. This equipment is 1.6m high with a safe working load of 240kg for 2 personnel's operation. Its maximum working height is 160m- average of 50 storey buildings. This can handle any building in Nigeria. The average lifting speed is 8.8m/min

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Figure 1a&b: Roof eagle system

- **Motorised Trolley:** this is a mechanically powered travelling suspension rigs. It can travel on concrete runways and parapet walls. It contains hydraulic cylinder, arm rotation and telescoping. It has a galvanised finish and comes in various colours.

Figure 2a&b: Motorized Trolley

- **Rigging** System: it requires a permanent installation of the sockets or the pedestals into the building's roof slab or reinforced concrete slab for usage. It requires planning and integration at the design stage. The design and installation of the sockets or pedestals depends on the cradle length of the gondola-cable car. It requires one (1) or two (2) davit arms- small cranes- for effective operation. A mono winch cradle requires one davit while double winch cradles operate on two davit arms which connect all the sockets within a monolithic roof by manual transfer. The size and weight of the davit arm is of importance to effective usage and prevention of accident.

Figure 3a&b: Rigging system

- **Monorail System:** This provides access to building facade through the running of a single track that runs along the exterior facade with compliance to the shape of the building. Smooth running trolleys mounted on the monorail track allows a suspended gondola to move along the building horizontally or at inclined angle without inhibition. Control can be manipulated manually or electrically along the monorail tracks. For a climbing monorail, a high performance climbing trolley runs along the inclined monorail to suspend and traverse a gondola cradle. It is capable of climbing any slope vertically with a load of 500kg.

Figure 4a&b: Monorail system

- **Crain and Hoist Systems:** These are machines used for moving objects from one level to the other by suspending them either vertically or horizontally. They are equipped with hoist wire ropes or chains and sheaves (Lancaster, 1999; Coulton, 1974). It is commonly used in building construction from time past. It was first invented by the ancient Greeks. It has however, developed into a household usage in the construction industry.

Figure 5a,b&c: Crane and hoist system

- **Ladder and Gantry Systems:** These are purpose built systems that can take any shape of the architecture of the building or surfaces that requires maintenance. It is usually fabricated with aluminium alloy, stainless and galvanised steel. There are various types of ladders such as telescopic, curved and rotating ladders. They are built with girders to prevent failure. Gantries are specially built for maintaining atrium, skylights and exteriors of towers with safety devices.


Figure 6a&b: Ladder and gantry system

- **Fall Arrest System:** A multi-storey building maintenance works require safety precautions. Working in height is fraught with danger, risk of injury and even death of persons (Salentine, 2011). Bresline (2011) affirms that fall from height have social and economical cost which impact negatively on the workers, the contractors, construction industry and the community at large. The fall arrest system provides a continuous protection throughout the time of carrying out maintenance works by a worker. It is meant to stop a free fall from heights. It can be installed both horizontally and vertically.


Figure 7a&b: Fall arrest system

- **Access Work Platforms:** These are safe temporary platforms for workers to stand on with their tools and equipment while working at heights. They are also referred to as elevating work platforms, boom lifts, cherry pickers and spiders .they are self balancing that prevent fall from heights.



Figure 8 a,b&c: Access work platform

4.0 DATA ANALYSIS, FINDINGS AND DISCUSSIONS

Frequencies analysis was carried out to measure the rate and the number of years that the buildings are repainted.

Table1: Age of building. Source: Researcher's field work, 2012

S/NO	Type of Ownership	Average age
1	Single Ownership	46
2	Multi Ownership	28

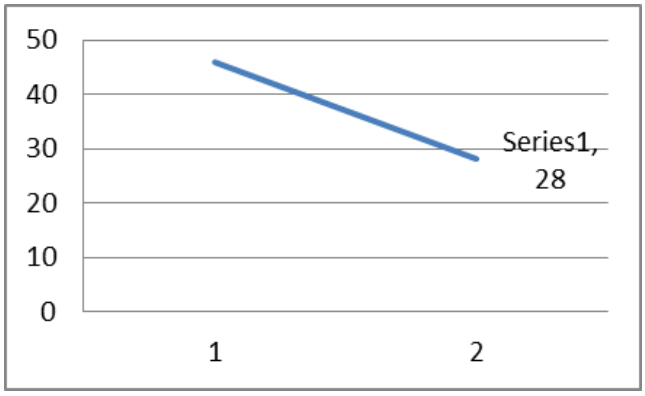

Figure. 9: Age of building

From Table1 and as illustrated in figure 9 above, the average age of single owned buildings in Lagos is 46years while the average age of buildings with multiple ownership is 29. This shows that the idea of multi-ownership of residential buildings is a recent development. Most of the multi owner buildings were built in 1983 by the regime of Lateef Jakande who served as the Governor of Lagos State between 1979 and 1984.

Table 2: Frequency of Repainting. Source: Researcher's field work, 2012

S/NO	Type of Ownership	Number of Years	Frequency
1	Single Ownership	2 - 5years	4years
2	Multi Ownership	10-15years	13years

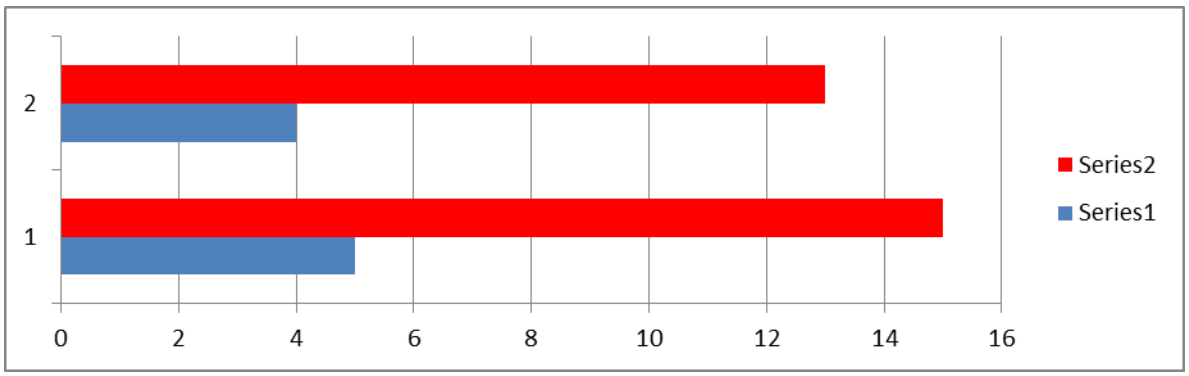

Figure 10: Graphical description of Table 2

From Table 2 and as illustrated in figure 10 above, the minimum number of years for repainting of buildings owned by single owners is 2years. Such buildings are repainted after every 5years at the most. However, the minimum number of years that multi owned buildings are repainted is 10years while it takes as much as 15years before some are ever repainted. This accounts for the poor vistas that abound in the area. Figure 11a below is an example of such near abandoned multi owned building in Lagos compared with Figure 11b which belongs to an individual.

It also shows the frequency of repainting for single owned buildings to be 4years while the frequency for multi owned building is 13years.

Figure 11a&b: Multi owned building and Single owned building. Source: Researchers field work, 2012

5.0 CONCLUSION

The study shows that multi owned buildings are not properly maintained in terms of repainting of the exterior in the study area. This is predicated on the reasons earlier identified such as inability to take decisions due to joint ownership, divergent views, taste, status and background Ali (2009). Most single owned buildings are regularly maintained while multi owned buildings maintenance are far between. This calls for a review of the practice of multi ownership in the study area if a decent city vista is a priority in the light of millennium goal. In order to improve the condition of the building, members of multi owned buildings should form a common platform through which decision can be easily taken this agree with Leung (2005); Ariff and Davies (2009) and Yau (2011) who jointly advocate the formation of home owners associations.

Policies on set-backs between buildings require a critical review. Maintenance cannot be carried out with ease in most of the cities due to lack of sufficient space between buildings which can lead to multiple problems. Owners of multi storeys should be enlightened on the need for maintenance to preserve their commonwealth.

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