**International Journal of Interdisciplinary Research in Medical and Health Sciences**
ISSN: 2837-9969 | Impact Factor : 6.55
Volume. 10, Number 1; January-March, 2023;
Published By: Scientific and Academic Development Institute (SADI)
8933 Willis Ave Los Angeles, California
https://sadipub.com/Journals/index.php/ijirmhs | editorial@sadipub.com

# IDENTIFYING EFFECTIVE MAINTENANCE MANAGEMENT PRACTICES FOR HIGH-RISE RESIDENTIAL BUILDINGS IN LAGOS STATE

**[1]Adenuga O.A, [2]Odusami, K.T and [3]Faremi, J.O**
[1]Department of Quantity Surveying, Lagos State Polytechnic, Ikorodu, Lagos
[2,3]Department of Quantity Surveying, Yaba College of Technology, Yaba, Lagos

**Abstract:** The maintenance management practices of high-rise residential buildings are crucial for ensuring the longevity and investment value of these buildings. This study aimed to identify efficient and effective maintenance practices to maintain high-rise residential buildings in Lagos State, Nigeria. Data was collected through structured interviews with maintenance and facility managers and questionnaires administered to occupants, owners, estate managers, and public administrators. The study revealed that emergency maintenance and routine maintenance are the most commonly practiced methods in maintaining high-rise residential buildings. Accessibility to the building posed the greatest challenge when carrying out maintenance activities, hindering the efficiency of maintenance practices. The study recommends implementing discernable maintenance cultures, budgeting for future maintenance requirements, and providing adequate funds for effective maintenance practices. These measures can improve the maintenance practices of high-rise residential buildings and ensure their longevity, safety, and investment value.

**Keywords:** Maintenance management practices, high-rise residential buildings, emergency maintenance, routine maintenance.

## Introduction

Building Maintenance is the process by which a building is kept usable at a predetermined standard for the use and benefit of its occupants or users. The standard may vary according to the function of a building. Maintenance practically begins the day the builder leaves the site. Design, materials, workmanship, function, use and their interrelationships, will determine the amount of maintenance required during the lifetime of a building. High-rise buildings face immediate burden to preserve existing building facilities within the precincts and enhance the capacity of their high-rise status to address growing demands of an increasing influx of the human populous and her activities. Ofide, Jimoh and Achuenu (2017) stated that, there is no doubt that dilapidated and unhealthy buildings in a decaying environment depresses the quality of life and contributes in some measure to antisocial behaviors'. High-rise buildings in most locations in Nigeria only receive top management attention when there is a problem. The purpose of maintaining a building is to preserve it in its initial state, as far as practicable while retaining, where appropriate, its investment value and presenting a

good appearance so that it effectively serve its purpose Chanter and Swallow (2007) Lack of proper maintenance can lead to dangerous situations like accidents and health problems. Therefore, an efficient maintenance management will produce a systematic and excellent maintenance management which will increase the operation, productivity and performance of the building whereas improper conduct decreases the performance of level and affect the life cycle of the building. An excellent practice of maintenance management is needed to increase the life cycle of the property and to minimize unexpected breakdowns and deterioration effects. Therefore the aim of this research was to appraise the maintenance management practices of high-rise residential buildings in Lagos State, Nigeria with the view of identifying the most efficient and effective maintenance management practices to be employed in maintenance of high-rise residential buildings. The objectives were to identify the maintenance management practices used in the maintainability of high-rise residential buildings and identify the challenges encountered when undertaking maintenance activities of high-rise buildings. Maintenance management is an orderly and systematic approach to planning, organizing, monitoring and evaluating maintenance activities and their costs (Technical Information Document (TID), 2000). A good maintenance management system coupled with knowledgeable and capable maintenance staff can prevent health and safety problems and environmental damage; yield longer assets life with fewer breakdowns and result in lower operating costs and higher quality of life for the occupants and users (Technical Information Document (TID), 2000). The performance of the maintenance management operations have to be continuously reviewed and analyzed in order to ascertain a high quality service, (Myeda and Nizam,2011) More importantly, the present prohibitive cost of new High-rise buildings has imposed on individuals, corporate bodies and the nation as a whole the need to invest more in maintenance. Though problem may not be lack of funds alone but also inadequate allocation of funds as a result of the general lack of appreciation of the need for maintenance and the low priority accorded it (Odediran, Opatunji and Eghenure, 2012)**.**

Housing maintenance becomes more difficult according to age of the structure and this depends on the quality of the original building coupled with the rate of maintenance of the structure. The condition and quality of buildings reflects public concern or indifference, the level of economic prosperity in an area as well as social values and behavior. Maintenance, in this sense, involves both preventive and corrective work including cyclical repairing, rewiring and servicing of mechanical and electrical equipment, and repair or replacement of defective part of the building. When there is lack of proper planning of maintenance work to be carried out, this can lead to failure of the building elements, or the building itself which can cause damage to life and other properties. According to (Adenuga, Odusami and Faremi 2007) the financial consequences of neglecting maintenance is often not only seen in terms of reduced asset life and premature replacement but also in increased operating cost and waste of related, natural and financial resources. In order to ensure sustainability, maintenance management practice is carried out as detailed in B.S 3811, cited by (Fagbenle, 2014) through the following strategies; Planned Maintenance: It is a proactive approach in which maintenance work is planned, directed, controlled and scheduled to be carried out at pre-determined intervals on various building components and elements to ensure that the building is operating correctly and to therefore avoid any unscheduled breakdown or failure.

Corrective Maintenance: This can be described as the maintenance task carried out after failure of an element or component is detected and isolated and is aimed at restoring an item to a condition in which it can perform its intended function.

Preventive Maintenance: This involves the systematic inspection and servicing of an item in satisfactory operating condition where potential problems are detected and corrected either before they occur or before they develop into major defects in order to prevent failure of such item.

Periodic Maintenance: This is also called time based maintenance. It is the significant tasks carried out regularly (according to predetermined schedule) to maintain the condition or operational status of a building, building components or elements.

Emergency Maintenance: This are maintenance task carried out when a situation requires immediate attention because of failure that could cause significant damage to the building, building components or systems and pose a threat to the life, health, security of the occupants of the building.

Routine Maintenance: simple, small-scale task carried out (usually requiring only minimal skills) for the regular (daily, weekly, monthly, etc) upkeep of a building necessary to prevent normal wear and tear or the failure of critical of critical and non-critical building systems.

In Nigeria, the culture of maintenance is very poor except in emergency situations when it might have become too late and even costly to achieve the desired results (Olanrewaju, Sharafadeen and Ojo 2015) The users do not always make use of the property and the services in good condition, often users do not obey the information contained in the maintenance manual of the building if it exists at all, (Siyanbola, Ogunmakinde and Akinola, 2013).Maintenance work is considered waste of money and time by most property owners, funds are usually directed towards new buildings rather than the upkeep of existing ones. To each resident, it is required to pay service charge with regard to the services given (that is, maintenance of the building). Unfortunately, to collect this fee is no easy task (Olanrewaju, Sharafadeen and Ojo, 2015) (Olarenwaju, 2008) revealed in a study, that there is a huge backlog of building maintenance in Malaysia even though expenditure on maintenance is on the increase. Certainly, the maintenance backlog will continue to increase, as buildings require maintenance to be functional. Buildings require effective maintenance; otherwise they become a burden to clients, users, and the general public. Building maintenance management should be extended beyond the current condition, based on the availability of funds. According to (Yahya and Ibrahim 2012) the fundamental aspect in building management is to develop communication system between maintenance management and building occupants in order to support value aspect in the building. (Clowes, 2000) stated that lack of information is a significant factor that contributes to miscommunication in operation and maintenance processes. According to (Ali, Sun, Petley and Barrett 2002) a lack of knowledge sharing and poor communication between maintenance management teams and building occupants had caused main problems specifically on technical and documentation aspect. As (Lee and Wordsworth, 2000) noted, poor communication between maintenance management group and building occupants is one of the factors that affect working efficiency and is a reason for the relatively low productivity of the building maintenance.

Based on a study determining the problems faced by property managers in managing high-rise condominiums in Malaysia, it was concluded that the most frequent complaints lodged by the tenants were defects not being attended to within the time specified, poor workmanship, and services and facilities not being in good condition even when taking over the building from the developers (Noraziah, 2006). Accessibility plays a vital role in the maintenance of high-rise buildings, because provision for easy access for the various building elements such as the external wall, roof, lift, basement and services can make maintenance more efficient (Nayanthara, 2013). For instance, some complex shapes of the external façade, embedded services, and insufficient spaces provided may hinder the easy accessibility for the maintenance activities, this in turn increases the maintenance cost by hiring special access system or due to the escalating number of defects created under these circumstances.

As there are different challenges faced by owners, occupants, maintenance management professionals in the maintenance of the buildings, the fundamental aim of building maintenance management remains to enhance the productivity, satisfaction, and efficiency of activities taking place in and around the building, (Lateef

2008). In other words, it is a proactive procedure that is used to achieve efficient maintenance activities in a building by minimizing the expenditure and optimizing the value derived. Therefore, there is need to address the issues of the different maintenance management practices and the challenges inherent in maintenance of high-rise residential buildings in Lagos State, Nigeria.

**Methodology**

The Simple Random sampling technique was adopted for this research, it is a systematic empirical inquiry used to create sample as per ease of access, readiness to be a part of the sample, availability at a given time slot or any other practical specifications of a particular element. A sample size of 28 high-rise residential buildings from the, Eti-osa, Local government area of Lagos State, Nigeria, was selected out of a population of 86 high-rise residential buildings within the Area. In determining the number of buildings, purposive sampling was used. This is a non-probability sampling procedure which is usually used in qualitative research that has to do with selecting the respondents based on the researcher's knowledge on the appropriateness and typicality of the sample selected (Cohen, Manion and Morrison, 2005). The focus on this Area was based on its commercial/economic status and concentration of high-rise buildings, professionals and good representation of the population.The reliability and validity of the data collected stem from the fact that the tests conducted using Statistical Package for Social Sciences (SPSS 19) showed that, cronbach alpha > 0.6 and the correlation value is > r table respectively, it is concluded that the data is reliable and valid**.**

**Results and Discussion**

The data collected for the study was processed using descriptive statistics method; percentages, mean, and Relative Significant Index (RSI) was determined.

Bakhary (2005) gave an equation that was used in determining the Relative Significant Index (RSI)

The Relative Important Index is expressed $= \sum w = \frac{5\,n5+4\,n4+3\,n3+2\,n2+1\,n1}{5N \qquad 5N}$

Where, $n_1$ = Number of respondents who answered the negative option, $n_2$ = Number of respondents who answered for less negative option, $n_3$ = Number of respondents who answered for neutral option, $n_4$ = Number of respondents who answered for less positive option, $n_5$ = Number of respondents who answered for most positive option, A is the highest weight and N

= Number of Respondents. The relative importance index ranges from is 0 to 1 (Tam and Le, 2006)

The demographic features of the respondents as shown on Table 1 reveal that 24.6% of the respondents are home owners, 45.9% are occupants, 13.1% are maintenance managers, 11.5% are facility managers and 4.9% are public administrators. The study also showed that 31.1% are female while 68.9% are male. The years of occupancy/ownership shows that 72.1% are above 5 years. 19.7% of the respondents are builders, 13.1% are estate managers, 4.9% are maintenance managers, 8.2% are civil/structural engineers, 6.6% are services engineers, 13.1% are property managers/developers and other professional backgrounds are 34.4%.

**Table 1:** The background and demographic features of the respondents

| S/N | Demographic Characteristics | Frequency | Percentage | Total % |
|---|---|---|---|---|
| 1 | **Gender (N = 122)** | | | |
| | Male | 84 | 68.9 | |
| | Female | 3831.1 | | |
| 2 | **Type of Respondent (N = 122)** | | | |

| | | | |
|---|---|---|---|
| | Home Owners | 30 | 24.6 |
| | Occupants | 56 | 45.9 |
| | Maintenance Managers | 16 | 13.1 |
| | Facility Managers | 14 | 11.5 |
| | Public Administrator | 6 | 5 |
| 3 | **Years of occupancy/Owner (N = 122)** | | |
| | Less than 5years | 34 | 28 |
| | 6-10years | 54 | 44 |
| | 11-15years | 18 | 15 |
| | 15-20years | 12 | 10 |
| | Above 20years | 4 | 3 |
| 4 | **Professional background (N = 122)** | | |
| | Business men and women | 60 | 49 |
| | Civil servants | 17 | 14 |
| | Professionals | 45 | 37 |

**Table 2:** Identified maintenance management systems

| S/N | Maintenance Management System/Practices | 1 | 2 | Total | % | RSI | Rank |
|---|---|---|---|---|---|---|---|
| 1 | Planned Maintenance | 82 | 40 | 122 | 67.21 | 0.66 | 2 |
| 2 | Corrective Maintenance | 116 | 6 | 122 | 95.08 | 0.52 | 5 |
| 3 | Preventive Maintenance | 76 | 46 | 122 | 62.29 | 0.69 | 1 |
| 4 | Periodic Maintenance | 76 | 46 | 122 | 62.29 | 0.69 | 1 |
| 5 | Emergency Maintenance | 108 | 14 | 122 | 88.52 | 0.56 | 3 |
| 6 | Routine maintenance | 112 | 10 | 122 | 91.80 | 0.54 | 4 |

Table 2 shows that out of 122 respondents, 62.29% identified that preventive and periodic maintenance is been practiced which ranked 1st with a Relative Significant Index of 0.69. This shows that most of the occupants are knowledgeable about the adequate working conditions of the various building elements; which enable identified problems to be detected and corrected before they occur or before they develop into major defects.

67.21% identified that planned maintenance is been practiced which ranked 2ndwith a Relative Significant Index of 0.66 and 88.52% identified that routine maintenance is been practiced which ranked 3rdwith a Relative Significant Index of 0.56.

**Table 3:** Level of usage of the Identified Maintenance Management Practices.

| S/N | Maintenance Management Practices | Level of Usage | | | | | Total | RSI | Rank |
|---|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | **5** | | | |
| 1 | Planned Maintenance | 19 | 24 | 6 | 5 | 7 | 61 | 0.46 | 6 |
| 2 | Corrective Maintenance | 4 | 3 | 11 | 31 | 12 | 61 | 0.74 | 3 |
| 3 | Preventive Maintenance | 14 | 23 | 11 | 6 | 7 | 61 | 0.50 | 4 |
| 4 | Periodic Maintenance | 18 | 15 | 14 | 11 | 3 | 61 | 0.49 | 5 |
| 5 | Routine maintenance | 3 | 5 | 5 | 17 | 31 | 61 | 0.82 | 2 |
| 6 | Emergency Maintenance | 1 | 4 | 4 | 14 | 38 | 61 | 0.88 | 1 |

From Table 3 above, it shows that emergency maintenance was ranked 1st with a Relative Significant Index of 0.88, meaning that emergency maintenance is frequently practiced. This implies that urgency or quick response is usually attached to maintenance related issues here as any deal could lead to damage to the building element or pose threat to life or security of the occupants of the building, it is followed by routine maintenance which was ranked 2nd with a Relative Significant Index of 0.82 and corrective maintenance which ranked 3rd with a Relative

Significant Index of 0.74, in the level of usage of maintenance management practices

**Table 4:** Maintenance Work

| S/N | MAINTENANCE WORK | 1 | 2 | 3 | TOTAL | % | RSI | RANK |
|---|---|---|---|---|---|---|---|---|
| 1 | Day to day mopping/Sweeping and cleaning of the building | 28 | 26 | 68 | 122 | 57.73 | 0.78 | 1 |
| 2 | Mechanical cleanup | 30 | 22 | 70 | 122 | 57.38 | 0.778 | 1 |
| 3 | Services cleanup, repair and replacement | 46 | 34 | 42 | 122 | 34.43 | 0.66 | 3 |
| 4 | Elemental (ceiling, door, window, roof, etc) replacement | 42 | 34 | 46 | 122 | 37.70 | 0.68 | 2 |
| 5 | Re-painting | 54 | 24 | 44 | 122 | 35.07 | 0.64 | 4 |
| 6 | All of the above | 64 | 46 | 12 | 122 | 9.84 | 0.52 | 5 |

From table 4 above, it described the nature and types of maintenance works often carried out by users of the residential buildings. The result showed that 122 respondents, 57.73% carried out daily mopping/sweeping and cleaning of the building, 57.38% carried out mechanical clean up, 34.43% carried out services clean up, repair and replacement, 37.7% carried out elemental (ceiling, door, window, roof, etc) replacement, 35.07% carried out repainting and 9.87% showed that they carry out all the maintenance work indicated above.

**Table 5:** Operational period

| S/N | Operational Activities | 1 | 2 | 3 | 4 | 5 | TOTAL | RSI | RANK |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Daily | 38 | 14 | 6 | 24 | 40 | 122 | 0.62295 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Weekly | 36 | 6 | 6 | 58 | 16 | 122 | 0.619672 | 3 |
| 3 | Monthly | 30 | 32 | 14 | 30 | 16 | 122 | 0.55082 | 5 |
| 4 | Quarterly | 26 | 10 | 44 | 24 | 18 | 122 | 0.596721 | 4 |
| 5 | Yearly | 24 | 4 | 24 | 38 | 32 | 122 | 0.681967 | 1 |

From table 5 above, the respondents were also asked how often they carry out maintenance work on the building. Out of 122 respondents, 40 carry out maintenance work daily which ranked 2nd with a relative significant index of 0.623, this shows that the most of the occupants believe in maintaining a clean surrounding, while 16 carry out maintenance work weekly which ranked 3rd with a relative significant index of 0.619, also 16 carry out maintenance work monthly which ranked 5th with a relative significant index of 0.55, another 18 carry out maintenance work quarterly which ranked 4th with a relative significant index of 0.597, and 32 carry out maintenance work yearly which ranked 1st with a relative significant index of 0.682.

**Table 6:** Level of Responsiveness to Maintenance Work

| S/N | Variables | Level Of Responsiveness | | | | Total | RSI | Rank |
|---|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** | | | |
| 1 | Owners | 10 | 56 | 38 | 18 | 122 | 0.63 | 4 |
| 2 | Occupants | 2 | 14 | 62 | 44 | 122 | 0.80 | 3 |
| 3 | Maintenance managers | 0 | 2 | 56 | 64 | 122 | 0.88 | 1 |
| 4 | Estate managers | 32 | 32 | 42 | 16 | 122 | 0.59 | 5 |
| 5 | Facility Managers | 2 | 8 | 70 | 42 | 122 | 0.81 | 2 |

From the table6 above, it was discovered that maintenance managers which ranked 1st with a Relative Significant index of 0.88 which means that they respond to maintenance work very well, this can be attributed to the fact that most of the maintenance managers are usually on duty in the residents, followed by facility managers ranked 2nd with a Relative Significant index of 0.81, followed by occupants which ranked 3rd with a Relative Significant index of 0.80, followed by owners which ranked 4th with a Relative Significant index of 0.63, followed by estate managers which ranked 5th with a Relative Significant index of 0.59.

**Table 7:** Challenges Encountered When Undertaking Maintenance Work in High-rise Residential Buildings.

| S/N | CHALLENGES | 1 | 2 | 3 | 4 | 5 | TOTAL | RSI | RANK |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Lack of discernible maintenance culture | 8 | 4 | 6 | 44 | 60 | 122 | 0.836 | 5 |
| 2 | Improper management of the facilities | 4 | 18 | 4 | 54 | 42 | 122 | 0.784 | 9 |
| 3 | Absence of a form of planned maintenance programs | 8 | 4 | 2 | 48 | 60 | 122 | 0.843 | 3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | Attitude of users towards maintenance and misuse of the building | 4 | 2 | 2 | 66 | 48 | 122 | 0.849 | 2 |
| 5 | Difficulty in procurement of spare parts due to unavailable funds | 6 | 60 | 52 | 88 | 32 | 122 | 0.656 | 14 |
| 6 | Lack of communication between users and maintenance managers/personnel | 4 | 6 | 4 | 70 | 38 | 122 | 0.816 | 7 |
| 7 | Natural deterioration due to age and environment | 6 | 22 | 18 | 54 | 22 | 122 | 0.705 | 12 |
| 8 | Lack of skilled personnel in maintenance department | 8 | 18 | 8 | 66 | 22 | 122 | 0.725 | 11 |
| 9 | Lack of skilled manpower to maintain works in buildings designed and constructed by expatriates | 10 | 14 | 8 | 68 | 22 | 122 | 0.728 | 10 |
| 10 | No long-term arrangements made for the supply of essential parts for replacements | 9 | 32 | 24 | 46 | 14 | 122 | 0.649 | 15 |
| 11 | Use of poor quality components and materials | 4 | 12 | 0 | 50 | 56 | 122 | 0.833 | 6 |
| 12 | Complexity of design and noninvolvement of maintenance experts during design stage | 0 | 4 | 18 | 66 | 34 | 122 | 0.813 | 7 |
| 13 | Level of technology, cultural background and environment not been considered | 2 | 4 | 8 | 62 | 46 | 122 | 0.839 | 4 |
| 14 | Inflation of cost of maintenance by the operatives | 16 | 32 | 16 | 40 | 18 | 122 | 0.620 | 16 |
| 15 | Frequent shortage of materials and spare parts due to absence of efficient inventory system | 6 | 34 | 14 | 44 | 24 | 122 | 0.675 | 13 |
| 16 | Lack of consideration for future Maintenance requirement and budget | 24 | 28 | 20 | 34 | 16 | 122 | 0.584 | 17 |
| 17 | Accessibility to the building | 10 | 0 | 2 | 30 | 80 | 122 | 0.879 | 1 |

Table 7 showed the challenges encountered when carrying out maintenance work in high-rise residential buildings. Accessibility to the building ranked 1st with RSI value of 0.879, this account for why loss of lives and properties are often recorded, when accessibility to high-rise buildings become difficult during emergency or hazard, Absence of a form of planned maintenance programs ranked 2nd with RSI value of 0.849, Attitude of users towards maintenance and misuse of the building ranked 3rd with RSI value of 0.843, Frequent shortage of materials and spare parts due to absence of efficient inventory system ranked 4th with RSI value of 0.839,

Lack of communication between users and maintenance managers/personnel ranked 5th with RSI value of 0.836.

**Table 8:** Solutions for the Identified Challenges

| S/N | SOLUTIONS | 1 | 2 | 3 | 4 | 5 | TOTAL | RSI | RANK |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Awareness of discernable maintenance culture to users | 0 | 0 | 0 | 32 | 90 | 122 | 0.947 | 1 |
| 2 | Proper management of the facility | 0 | 18 | 4 | 36 | 64 | 122 | 0.839 | 8 |
| 3 | Consideration for future maintenance requirement and budget | 0 | 0 | 0 | 34 | 88 | 122 | 0.944 | 2 |
| 4 | Use of good quality components and materials | 0 | 0 | 0 | 38 | 84 | 122 | 0.938 | 4 |
| 5 | Availability of planned maintenance programs | 0 | 0 | 2 | 32 | 88 | 122 | 0.941 | 3 |
| 6 | Involvement of maintenance experts during design stage | 2 | 10 | 0 | 50 | 60 | 122 | 0.856 | 7 |
| 7 | Good response towards maintenance by users | 0 | 2 | 2 | 58 | 60 | 122 | 0.889 | 6 |
| 8 | Availability of skilled manpower to maintain works in buildings designed and constructed by expatriates | 2 | 0 | 0 | 60 | 60 | 122 | 0.889 | 6 |
| 9 | Proper communication between users and maintenance managers/personnel | 0 | 0 | 0 | 38 | 84 | 122 | 0.938 | 4 |
| 10 | Long-term arrangements made for the supply of essential parts for replacements | 0 | 14 | 16 | 42 | 50 | 122 | 0.810 | 9 |
| 11 | Consideration towards level of technology, cultural background and environment | 0 | 2 | 2 | 48 | 70 | 122 | 0.905 | 5 |

Table 8 suggested solutions that that can further improve the maintenance management practices of high-rise residential buildings. Awareness of discernable maintenance culture to users ranked 1st with RSI value of 0.947, Consideration for future maintenance requirement and budget ranked 2nd with RSI value of 0.944, Availability of planned maintenance programs ranked 3rd with RSI value of 0.941, Frequent Use of good quality components and materials and Proper communication between users and maintenance managers/personnel ranked 4th with RSI value of 0.938, Consideration towards level of technology, cultural background and environment ranked 5th with RSI value of 0.836.

The study revealed that most of the respondents carry out one form of maintenance activities or the other. The findings of this research show that emergency maintenance was ranked 1st with a Relative Significant Index of 0.88, meaning that emergency maintenance is frequently or mostly used or practiced, The finding of this

study validates (Olanrewaju, Sharafadeen and Ojo 2015) that in Nigeria, the culture of maintenance is very poor except in emergency situations when it might have become too late and even costly to achieve the desired results. On operational period, carrying out maintenance work yearly which ranked 1st with a relative significant index of 0.682, justifies (Olarenwaju, 2008) who revealed in a study, that there is a huge backlog of building maintenance in Malaysia even though expenditure on maintenance is on the increase. With more number of users carrying out daily maintenance work, the findings of Ofide, Jimoh and Achuenu (2017) that stated, there is no doubt that dilapidated and unhealthy buildings in a decaying environment depresses the quality of life and contributes in some measure to antisocial behaviours would be mitigated. On the level of responsiveness to maintenance work, maintenance managers ranked indicating that they respond to maintenance work splendidly as one of the parties involved towards the maintainability of high-rise buildings. This can be attributed to their near or ever presence within high-rise buildings. The most encountered challenge facing the Maintenance managers and the workers was identified as accessibility to the property. This authenticates (Nayanthara, 2013) who stated, that accessibility plays a vital role in the maintenance of high-rise buildings. Loss of lives and properties are often recorded, when accessibility to high-rise buildings become difficult during emergency or hazardous situations. Other challenges include attitude of users towards maintenance and misuse of building, absence of a form of planned maintenance programs. Solutions were, thus proposed in order to mitigate the challenges encountered and to further improve the maintenance management practices of high-rise residential buildings, which includes, Awareness to discernable maintenance culture, consideration for future maintenance requirements and budget, frequent use of good quality components and materials and proper communication between users and maintenance managers/personnel

**Conclusion**

The overall objectives of this research was to identify and assess the maintenance management practices used in maintainability of high-rise residential buildings in Lagos State and finally to identify and assess the challenges or problems encountered in the maintenance of the building. This research has given an insight to users, building management professionals, as well as public administrators on the need for maintenance on a building. The study showed that emergency maintenances practices are mostly used and accessibility to the building as the most Challenge encountered when carrying out maintenance work on high-rise residential buildings. Based on the findings of this research, it is recommended that, to improve the maintenance management practices of residential high-rise buildings, awareness of discernable maintenance culture to users, consideration for future maintenance requirement and adequate funds should be provided for effective maintenance practices. Also allocating balanced budgets in every maintenance task, participation of tenants and residents in housing maintenance works, including educating tenants and residents on the need for maintenance should be put in place by the maintenance stakeholders. The maintenance team should ensure that there are precautions to be taken to guaranty quality of materials when they are purchased for maintenance work and also carry out regular inspections of the existing buildings and not to wait until structure needs repairs. They should maintain and repair as urgent as timely any tasks, before further defects occurs. The is a need to develop a standard building maintenance policy to be enforced legally by the appropriate agency, in order to ensure quality, safety and good service of the building and ensure adaption to planned maintenance practice. The implication of this research is that stakeholders in the maintenance practice are now aware of solutions that will be employed to further improve the maintenance management practices of high-rise residential buildings.

This study was limited to Eti-osa Local government area of Lagos State, Nigeria in the South west geopolitical zone of the Country due to its high concentration of high-rise residential and office buildings, further studies can be carried out on other areas of same dwelling concerns.

**References**

Adejimi, A. (2005): Poor Building Maintenance in Nigeria: Are Architects free from Blames? Being paper presented at the ENHR International conference on "Housing: New Challenges and Innovation in Tomorrow's Cities" in Iceland.

Adenuga, O.A, Odusami, K.T, Faremi, J.O (2007). Assessment of Factors Affecting Maintenance Management of Public Hospital Buildings in Lagos State, Nigeria. Department of Building, Faculty of Environmental Science, University of Lagos, Nigeria.

Azlan-Shah Ali, Syahrul-Nizam Kamaruzzanman, Raha Sulieman and Yong Cheong Peng, (2010). Factors Affecting Housing Maintenance Cost in Malaysia. Journal of Facility Management Vol. 8 No. 4. pp 285-298.

Banful, E (2004) *A Stitch in Time Saves Nine; Cultivating a Maintenance Culture in Ghana,* An Article Presented at a Seminar on Maintenance Culture in Ghana. March 16, 1 – 2. [5] Chuan, O.K. (The Minister of Housing and Local Government) (2008) Call for check on buildings: architects push for inspection every five years, *The Star*, 9th May, 2008, p. N33. [6] Clowes, A. (2000). Barriers to Information Sharing in the Construction Supply Chain, in

Then, D.S.S. (Eds), proceedings of the Brisbane 2000 CIB W70 International Symposium On Facility Management and Maintenance, School of Construction Management and Property, Queensland University of technology, Brisbane, pp. 153-160.

Cohen, L., Manion, L., & Morrison, K. (2005). *Research methods in education* (5th ed.). London: Taylor & Francis e-library.

El-Haram, M.A. and Horner, M.W. (2002), Factors Affecting Housing Maintenance Cost, Journal of Quality in Maintenance Engineering, Vol. 8. No. 2, pp. 115-23.

Fagbenle, (2014). Maintenance Technology study pack, Caleb University, Imota, Lagos.

Farinloye, Ogunsanmi and Adenuga, (2011). Assessment of Maintenance Practices on Public Buildings**:** A case-study of correctional institutions. Proceedings 6th Built Environment Conference. JHB, South Africa.

Ikupolati, A.O, Komolafe, A. & Dawam, J.D. (2014). Appraisal of Maintenance Management Systems for Residential Quarters in Kaduna Polytechnic. Department of Quantity Surveying, Kaduna Polytechic, Kaduna. International Policy Brief Series - Education & Science Journal Vol. 4 No 1,

Lee, R., Wordsworth, P. (2000), building Maintenance Management, 4th ed., Blackwell Science, Malden, MA.

Mohamad Ridzuan Yahya & MdNajib Ibrahim, (2012). Building Maintenance Achievement in High-rise Commercial Building: A Study in Klang Valley, Malaysia. Ontario International Development Agency ISSN: 1923-6654 (print). ISSN 1923-6662 (online).

NikElyna Myeda & Dr. Syahrul Nizam Kamaruzzaman (n.d). Performance Measurement of Office Buildings Maintenance Management. Department of Building Surveying, Faculty of the Built Environment, University of Malaya, 50603 Kuala Lumpur, Malaysia.

Okebisi, P.A (2017) the appraisal of maintenance management practices of high-rise residential building in Nigeria Unpublished *Dissertation, Department of Quantity Surveying, Lagos State Polytechnic Ikorodu, Lagos.*

Olarewaju Abdul Lateef (2008). Building maintenance management in Malaysia Procurement and System Research Delivery Group, Kulliyah of Architecture and Environmental Design, International Islamic University Malaysia, Kuala Lumpur 531000, Malaysia;

Olanrewaju Ashola Abdul Lateef, MohdFaris Khamidi and AraziIdrus, (2010). Appraisal of the building maintenance management practices of Malaysian universities. Department of Civil Engineering, Universiti Teknologi PETRONAS, Bandar Seri Iskandar 31750 Tronoh,

Perak Darul Ridzuan, Malaysia. © 2011 Macmillan Publishers Ltd. 1742–8262. Journal of Building Appraisal Vol. 6, 3 /

Olanrewaju, Sharafadeen Babatunde Owolabi and Anifowose, Ojo Segun (2015). "Challenges of building maintenance in Nigeria: (a case study of Ekiti State)". European Journal of Educational and Development Psychology Vol.3, No.2, pp.30-39.

Sunday Julius Odediran, Oladele Ayinde Opatunji & Frank O. Eghenure (2012): Maintenance of Residential Buildings: Users' Practices in Nigeria. Journal of Emerging Trends in Economics and Management Sciences (JETEMS) 3(3): 261-265

Technical Information Document (2000). Maintenance management systems.RPS for INAC. Retrieved from, http://publications.gc.ca/collections/Collection/P25-5-2-2000E.pdf

Mohamad Ridzuan Yahya and MdNajib Ibrahim, (2012). Effective Communication System Between Building Occupants and Maintenance Management: A Study in High-rise Office Buildings, Klang Valley, Malaysia. International Journal of Sustainable Development. [22] Yung Yau & Daniel Chi Wing Ho (2008): The effects of building management practices on residential property prices in Hong Kong. Department of Public and Social Administration, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong