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# Incessant Building Collapse in Nigeria: A Framework for Post-Development Management Control

*Olayinka C. Oloke[1], Abiodun S. Oni[1], Ayodeji Ogunde[2], Opeyemi Josuha[2] and Daniel O. Babalola[3]

1. Department of Estate Management, College of Science and Technology, Covenant University, Km 10, Idiroko Road, Canaanland,Ota, Ogun State, Nigeria
2. Department of Building Technology, College of Science and Technology, Covenant University, Km 10, Idiroko Road, Canaanland, Ota, Ogun State, Nigeria
3. Department of Architecture, College of Science and Technology, Covenant University, Km 10, Idiroko Road, Canaanland, Ota, Ogun State, Nigeria

**Abstract**

This study investigates post-development management approach of properties and how it could be improved to stem the tide of building collapse in Nigeria. Extant literatures were reviewed and primary data collected with the use of structured questionnaires administered on occupants of one hundred and fifty residential and seventy-five commercial properties across Lagos State, Nigeria. Data was analysed with basic descriptive tools such as frequency, percentage, Likert scale and weighted mean score. Findings reveal abuse of property management functions by property owners and non-professionals alike in the management of various properties. Findings also show a high level of dissatisfaction with the services provided mostly by the non-professionals and that integrity assessment is rarely carried out by the professionals and non-professionals alike. The study therefore recommends that post development property management services become an exclusive preserve of professional property managers. The study further recommends that properties must be subjected to mandatory integrity assessment and subsequently, recommended for similar exercise based on the report of routine management inspection. The proposed framework for carrying out the structural integrity assessment and appropriate recommendations for the outcome of routine inspection or integrity assessment is a key contribution of this study to existing literatures on building collapse in the country.

**Keywords:** Building collapse, Post-Development, Property Management, Framework, Structural Integrity

## 1. Introduction

The hazard of building collapse in Nigeria is not abating, restricted or selective and has led stakeholders into an unending search for solution. A survey of incidence of building collapse reveals that occupied buildings are more affected than those under construction or newly completed. According to Ayedun, Durodola and Akinjare, (2012), out of the fifty-six cases of building collapse surveyed, only 4% were under construction while the remaining 96% were in use before the failure occurred. Chendo and Obi, (2015) listed ten cases of building collapse in Nigeria between 1974 and 2013 of which 40% were under construction or uncompleted while the remaining 60% were already in use. Ebehikhalu and Dawam (2014) made a comprehensive list of one hundred and thirty-nine cases of building collapse in Nigeria between 1974 and 2012. The study showed that 12% were under construction, 5% were uncompleted, 12% were unidentified while the remaining 71% were already occupied for the various purposes ranging from residential, educational, religious, administrative, commercial and hospitality facilities. Fagbenle and Oluwunmi (2010) listing sixty-one cases of building collapse in Nigeria between 1974 and 2010 revealed that 20% were under construction, 6% uncompleted while 74% were already in use. Windapo and Rotimi (2012) also surveyed cases of building collapse in Nigeria between 1974 and 2010 and came up with ninety-one cases. Out of this figure, 19% are under construction, 6% are uncompleted, 1% is fence wall while the remaining 67 (74%) were in use. This invariably implies that building collapse is more rampant among existing and occupied buildings than those under construction.

The painful destruction of personal properties and loss of lives that accompany the collapse could have been significantly reduced if the maintenance steps taken had included mandatory, periodic or conditional structural integrity assessment. Interestingly, many of the causes of building collapse are attributed to structural defect, bad design, violation of building codes, use of substandard construction materials, poor workmanship and corruption. In fact, Ayinnuola and Olalusi (2004) specifically stated that building failure in Nigeria is attributed to 50% design fault, 40% construction fault and 10% product failure. Ede (2010) and Olagunju (2011) emphasized the

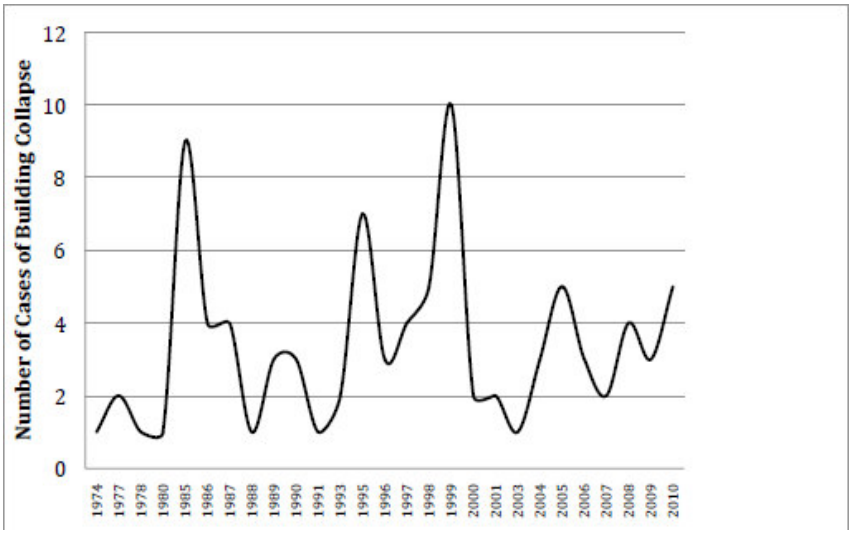
 

importance of post-construction maintenance of building and that lack of proper maintenance culture contributes to the crisis of building collapse in Nigeria. Also identifying lack of proper maintenance as a cause of building collapse include Fagbenle and Oluwunmi 2010, Olagunju, Aremu and Oladele (2013) and Babalola (2015). Given that 60% and above of cases of building collapse across the country involve buildings that are already in use, maintenance approach cannot be overlooked and the significance of structural integrity test at before and during the use of the property cannot be over-emphasized. Structural integrity assessment is expected to identify the problem before it degenerates and recommend necessary action to prevent the losses.

## 2.0 Trend, Causes and Consequences of Building Collapse in Nigeria

The consequences of building collapse cannot be underestimated. A bungalow that collapse on the occupant cannot be regarded as a small loss neither will a multi-storey building that collapse with no human casualty be regarded as no loss. In fact, Ayedun, Durodola and Akinjare, (2012) submitted that owners and stakeholders in failed structure often die of high blood pressure. This is why every case of building collapse generates serious reactions from the public and that new incidence easily assume cumulative case thereby making it difficult to expressly admit an increasing or declining trend of occurrence of building failure over the years. Moreso that the loss is estimated based on the prevailing economic condition at the time of the incidence. However, according to Windapo and Rotimi (2012), there were over 112 cases of building collapse in Lagos State alone between December 1978 and April 2008. The authors, using data obtained from existing studies of Chinnokwu (2000), Windapo (2006) and Fagbenle and Oluwunmi (2010), presented a graphical depiction of incidences of building collapse in Nigeria between 1974 and 2010. This is presented in Figure 1. The graph revealed spikes in the reported cases of building collapse in Nigeria in 1985, 1995, 1999 and 2005 as well as an upward trend in the number of cases in 2010 (Windapo and Rotimi, 2012). Corroborating this trend, The Punch of March 11th, 2016 stated that there has been a spike in the number of building collapses in the country with over 20 cases reported over the last ten years.

Olagunju, Aremu and Ogundele (2013) highlight causes of building collapse thus; bad design, faulty construction, poor quality of materials and construction methods, foundation failure, fire outbreak, natural phenomenon and inadequate maintenance. Windapo and Rotimi (2012), further listed structural failure, poor workmanship, carelessness, excessive loading, illegal conversion, hasty construction, obstruction of water course as other causes. Fakere, Fadairo and Fakere (2012) also identified different causes of building failure. These include inadequate preliminary works, adoption of wrong foundation, poor concrete mix ratio, improper walling, lack of approved structural design, poor building material specification, ineffective supervision, lack of quality maintenance, fire disaster, illegal conversion and climate or natural phenomenon.




Source: Windapo and Rotimi (2012)
Figure I: Cases of Building Collapse in Nigeria between 1974 and 2010

Consequences of building collapse include loss of physical properties, destruction of movable properties, injury

and loss of life. Beyond this, building collapse always has far reaching economic, financial, psychological and sociological implications. Resources like capital, time, materials and labour inputs are wasted when building collapses. Investment ideas are frustrated and those who have a stake in it become temporarily or permanently destabilized or frustrated Ede (2010). Furthermore, the collapse may lead to bankruptcy where there is no alternative plan to recover the capital. Also the loss of job with its far-reaching effect on the people and financial pressure it caused on occupants that got injured or lost their belongings to the collapse. Decapitation, injuries and death are fatalities recorded in building collapse which cannot be estimated, replaced or restored. The shock, trauma and anxiety experienced by escapees, witnesses and rescue agents in the aftermath of a building collapse are better imagined. Ede (2010) summarizing the impact stated that each case of building collapse carries along with it tremendous effects that cannot be easily forgotten by the victims. Presented in Table 1 are cases of building collapse and possible cause in Nigeria between 1996 and 2016.

Table 1: Cases of Building Collapse in Nigeria between 1996 and 2016

| S/ No. | Property Description | Location | Status | Date of collapse | Possible Cause | Casualty |
|---|---|---|---|---|---|---|
| 1 | A Storey building (Church building) | Olowokere Str. Oshodi, Lagos | Under construction | May, 1996 | Structural failure | 7 |
| 2 | 6-Storey classroom building | Ijagbemi Str. Pedro, Lagos | Under construction | October, 1996 | Poor workmanship, structural failure | 1 |
| 3 | Residential building | Adedayo Adeniran Str. Amukoko, Lagos | In use | March, 1997 | undecided | Nil |
| 4 | 2-Storey commercial building | Amu Street, Mushin, Lagos | In use | June, 1997 | Substandard materials, Structural failure | Nil |
| 5 | Duplex building | Gwarimpa Area, Abuja | In use | 1998 | Structural failure | 2 |
| 6 | 3-Storey residential building | Ibadan, Oyo State | In use | 1998 | Faulty design, poor supervision | Several people |
| 7 | 4-Storey Church building | Akure, Ondo State | Under construction | October 1, 1998 | Structural failure, poor supervision | 8 |
| 8 | 2-Storey residential building | Funbi Street, Abeokuta, Ogun State | In use | November, 1998 | Use of poor material, structural failure | Nil |
| 9 | 3-Storey residential building | Ojuelegba, Lagos | In use | April, 1999 | Carelessness, substandard materials | 4 |
| 10 | 3-Storey building | New Oko-Oba Agege, Lagos | In use | June, 1999 | Structural failure | None |
| 11 | 3-Storey residential building | Iju-Isaga, Lagos | In use | August, 1999 | Structural failure, Rainstorm | 35 |
| 12 | 2-Storey residential building | Dawodu Street, Ifo, Ogun State | In use | October, 1999 | Rainstorm | 20 |
| 13 | A Storey residential building | Adeola Odeku, Lagos | In use | 1999 | Rainstorm | N/A |
| 14 | Residential Storey building | Idi-Oro Mushin, Lagos | In use | 2000 | Faulty design, carelessness | N/A |
| 15 | 3-Storey residential building | Eleganza Estate, Ajah, Lagos State | In use | April, 2000 | Incompetence, structural failure | 5 |
| 16 | St. Dennis Catholic Church building | Bariga, Lagos | In use | 2000 | Structural failure | 3 |
| 17 | State High School building | Alimosho, Lagos | In use | 2000 | Crowd pressure, overloading | 1 death 2 injured |
| 18 | Building on 10/12, Suenu Str, Lagos | Lagos Island, Lagos | In use | 2000 | Deteriorated slab | 2 |
| 19 | Building at Isako | Lagos State | In use | 2000 | Structural failure | 5 |

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|---|---|---|---|---|---|---|
| | village, off Lekki-Epe Express | | | | | |
| 20 | 2-Storey mosque building | Buhari Street, Mushin, Lagos | In use | April, 2001 | Unauthorized conversion | 7 |
| 21 | A Storey residential building | Iwoye-Ijesha, Osun State | Under construction | 2001 | Structural failure, use of quacks for supervision | 7 |
| 22 | 2-Storey residential building | 10, Elias Street, Lagos | In use | 2004 | Dilapidated structure | N/A |
| 23 | Building on 3 floors | Makinde str. Ebute-Meta, Lagos | In use | 2004 | Not disclosed | N/A |
| 24 | Building on 2 floors | Solola str. Agege, Lagos | In use | 2004 | Not disclosed | N/A |
| 25 | Commercial building on 2 floors | Market str. Somolu Lagos | In use | 2005 | Not disclosed | N/A |
| 26 | 3-Floor commercial building | 3, Princess str. Lagos | In use | July, 2005 | Not disclosed | 1 |
| 27 | Commercial building on 4 floors | Mushin, Lagos | In use | 2005 | Not disclosed | 1 |
| 28 | 4-Floor residential/ commercial building | 53, Cemetry Rd, Amukoko, Lagos | In use | January, 2006 | Ignorance, greedy landlord | 7 |
| 29 | 21-Storey Bank of Industry building | Broad str. Lagos Island, Lagos State | In use | March, 2006 | Aftermath of fire, heavy wind and rain | 2 dead 23 injured |
| 30 | 4-Storey Block of 36 Flats known as “Titanic” Building | Ebute Meta, Lagos | In use | July, 2006 | Faulty construction | 28 |
| 31 | 2-Floor school building | Ikpoba-Okha LG, Edo State | In use | April, 2006 | undisclosed | 2 |
| 32 | 3-Floor Building housing offices and church | Abuja | In use | June, 2006 | undecided | Nil |
| 33 | Multi-Storey commercial and Residential building | Ebute Meta, Lagos | In use | 2007 | Unauthorized conversion, poor supervision, use of poor quality materials | Several people |
| 34 | Multi-Storey building | Kano | In use | 2007 | Faulty design, structural failure | Several people |
| 35 | Building used as nursery and primary school | Olomi Area, Ibadan, Oyo State | In use | March, 2008 | Use of poor materials, carelessness | 13 |
| 36 | 5-Storey shopping complex | Wuse Area, Abuja | Under construction | August, 2008 | Structural failure, incompetence, bad workmanship | 2 injured, 100 trapped |
| 37 | 2-Storey residential building | Asero, Abeokuta, Ogun State | Under construction | August, 2008 | Violates planning approval, substandard materials | 2 |
| 38 | 6-Storey LAUTECH Teaching Hospital Complex | Ogbomoso, Oyo State | Under construction | February, 2009 | Use of substandard material, poor workmanship/ supervision | 5 |
| 39 | A Fence wall | Aghaji Crescent, GRA Enugu | In use | August, 2009 | No proper drainage | 1 |
| 40 | Uncompleted building | Oke Padre Str. | Un- | October, | Substandard | 3 dead, |

 

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|---|---|---|---|---|---|---|
| | | Ita-morin Abeokuta | completed | 2009 | materials, hasty construction | 11 injured |
| 41 | Building under construction | Isopakodowo str. Cairo, Oshodi, Lagos | Under construction | April, 2010 | Use of substandard materials | 4 death, 12 injured |
| 42 | Uncompleted Storey Building | Adenike Street, Off New Market, Oniru Estate, Lagos | Un-completed | June 2010 | Substandard materials, non-compliance with approved building plans and weak structure | 1 dead, 2 injured |
| 43 | Uncompleted 3-Storey Building | Ikole street, Area 11, Abuja | Un-completed | August, 2010 | Undisclosed | 5 dead 40 trapped |
| 44 | 4-storey Building | 24, Alli Street, Victoria Island, Lagos | In use | September 2010 | Structural Defects/ overloading | 3 |
| 45 | 2-Storey Zenith Bank Building | Mararaba, Abuja | In use | 2011 | N/A | N/A |
| 46 | 4-Storey Hospital Building | Pape, Abuja | Not ascertained | 2011 | N/A | N/A |
| 47 | 5-Storey Office Complex with a pent house | 11, Aderibigbe Str. Maryland, Lagos | In use | 2011 | Structural failure, gross serviceability limit violation | Nil |
| 48 | 5-Storey Hotel building | Adenubi Close, Ikeja, Lagos | In use | 2011 | N/A | N/A |
| 49 | 3-Storey Block of Flats | 16 Nnobi str. Enugu, Enugu State | In use | 2012 | Structural defects | N/A |
| 50 | One-Storey residential building | Awka, Anambra State, Nigeria | Un-completed | 2012 | Defective materials | N/A |
| 51 | 3-storey Block of Flats in a water logged area of Owerri. | Owerri, Imo State, Nigeria | Un-completed | 2012 | Flooding | N/A |
| 52 | Four-storey Block of Flats at Agbama Estate, Umuahia | Agbama Estate Umuahia, Abia State, Nigeria | Under construction | 2012 | Non-adherence to building Regulation that permits only 2 floors in the area. | Undisclosed number of squatters perished |
| 53 | Four-storey commercial Building collapsed during a downpour | Abanye Str. Onitsha, Anambra State Nigeria | In use | 2013 | Heavy Rainfall flooding | N/A |
| 54 | 2-Storey School building | Bukuru, Jos South Local Government | In use | September, 2013 | Structural failure, violation of original approved plan | 10 |
| 55 | 3-Storey building | Oloto Str. Ebute Meta, Lagos | In use | July, 2013 | Dilapidated structure | 7 dead |
| | Old 3-Storey building | House No. 12, Hadeja Road, Kaduna | In use | July, 2013 | Old and dilapidated | 3 dead |
| 56 | 6-Storey Guest house building | Ikotun Egbe, Lagos | In use | September, 2014 | Structural failure | 116 dead, 100 injured |
| 57 | 3-Storey building | Ebute Meta, Lagos | In use | July, 2015 | Weak Structure | Nil |

 

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|---|---|---|---|---|---|---|
| 58 | Residential Building of Senior Politician | Dolphin Estate, Ikoyi, Lagos | In use | July, 2015 | Gas Explosion | 3 injured |
| 59 | 5-Storey building | Lekki Gardens, Lekki Phase 1, Lagos State | Under construction | March, 2016 | Violation of approved number of floors | 34 dead |
| 60 | 4-Storey shopping plaza | Itoku Market, Abeokuta, Ogun State | Under construction | May, 2016 | Under investigation | 1 dead |

**2.1 Post Development Management**

Post development management is a three pronged task involving lease or tenancy administration, space management and building maintenance. The scope of post construction responsibilities of a property manager is presented in the Table 2.

**2.2 Structural Integrity Assessment**

Structural integrity according to Alam (2005) is the science and technology of determining between safety and disaster while structural integrity assessment is a process of determining how reliable an existing structure is able to carry current and future loads and fulfill the tasks for a given time period (Rucker et al 2006). Alam futher emphasized that proper evaluation of structural integrity and remaining life of structures is important to ensure public safety, environmental protection and economic consideration of building new structures, maintaining and rehabilitating existing ones. Structural integrity assessment is an exercise that covers a wide range of task depending on the infrastructure involved. This notwithstanding, Olaniyi, Ogunseye and Lagunju (2014) stated that consistent inspections must be carried out on most structures to ensure that they do possess adequate structural integrity. Structural integrity is conduct to assess the state of all critical areas and identify the weak point for necessary action. An aspect of structural integrity assessment is non-destructive test (NDT) which according to Olaniyi, Ogunseye and Lagunju (2014) provide a relatively swift and inexpensive means to establish whether a structure is still in a serviceable condition or not without impairing parts or the entire structure. Non-destructive test does not destroy the object and make use of different technologies to analyze materials for inherent flaws or damage from use. Ede (2008) suggested that visual inspection may be combined with Non-Destructive Testing techniques to assess internal defects and make maintenance meaningful.

Table 2: Scope of Post-Construction Responsibilities of a Property Manager

| Space Management | Lease Administration | Property Maintenance |
|---|---|---|
| Statutory space maintenance e.g. setback, right of way etc. | Tenancy agreement execution | Periodic structural integrity test |
| space configuration, allocation, organization | Rent collection | Electrical services efficiency test |
| Common space maintenance | Finance and budget planning | Mechanical services efficiency test |
| Advert space management | Caution fee administration | Ceiling and roofing integrity test |
| Parking space administration | Service charge administration | Cracks and dilapidation assessment |
| Muster point management | Arbitration | Wall and floor finishes condition assessment |
| Space capacity re-evaluation | Insurance payment | Fixtures and fittings' fitness assessment |
| Space use regulation | Utilities bill payment | Driveway and walkway condition assessment |
| Greens and blues Management | Development and property tax payment | Daily cleaning, drainages clearing and waste disposal |
| | Land use charge administration | Fence wall and outbuilding integrity test |
| | Routine management inspection | Waterworks efficiency test and quality assessment |
| | Security provision | Power generator efficiency test |
| | Records and accounting | Soak pit and bore hole condition assessment |
| | Service providers' contract management | Gas pipe and duct integrity/efficiency test |
| | | Health, safety devices and environment condition assessment |

**3.0 Empirical Studies**

Ede (2010) examined the trend and casualty of building collapse in Nigeria between 2000 and 2010 by analysing historical data on building collapse in Nigeria in the last 3 decades and on field observations. Simple linear regression analysis was used for the analysis of the data as to hypothesize a probabilistic relationship between the rate of casualties and the height of the collapsed building. Pearson product moment correlation coefficient was calculated to further test the extent of linear relationship between the rate casualties. It was found that apart from the general causes such as design flaws, ageing, material fatigue, extreme operational and environmental conditions, accidents, terrorist attacks and natural hazards, the Nigerian factor which manifest in the form of corruption, lawlessness and "Jack of all trade" mentality of various professionals in the construction industry, has gained much prominence among the factors leading to eventual collapse of building structure. The study further revealed that the number of casualty increases as the number of floor increase. The study recommends seminar and safety awareness creation for users of high rise building. Ede (2011) examined measures to reduce the high incidence of structural failures in Nigeria. The study aptly attributed causes of structure failure to flaws or lapses committed during the three basic stages of building construction which are conception-design stage, construction-supervision stage, and post construction-service stage. Aside the fact that incidence of building collapse has been on the increase, absence of standardized training programs for the craftsmen in the building industry was found to be one of the fundamental causes of defects in our structures which often culminate to collapse. The study mentioned that Visual inspection may be combined with Non-Destructive Testing techniques to assess internal defects and make maintenance meaningful.

Ehoirobo and Okovido (2013) undertook an assessment of Structural Integrity of an In-service School Building at Risk Using Geotechnical Measurement Parameters in Benin City, Nigeria. Visual inspection of the building concerned was carried out to reveal the state of dilapidation while soil samples were also collected from different locations around the buildings for laboratory analysis to determine if the foundation were responsible for the problems observed. Dutch Cone Penetrometer Tests (CPT) were also conducted. The results of the tests showed that the depositional pattern at the location ranged from clay to sandy soils. Particle size distribution results showed that the clay content vary from between 40 and 60%. The results from the Cone Penetrometer Tests indicate that the soil consolidates from a depth of 4m below ground level. However, the foundation depth of the building is 2.1m below ground floor. This indicates that the foundation of the building is located at 2m above the foundation soils. From the studies, it was observed that the isolated foundation footings are conducting relatively high bearing pressure in a consolidating soil resulting in high differential settlement. In order to remedy the situation, a raft foundation slab is proposed to replace the existing ground floor of the building. This study emphasized the need for structural integrity assessment for the case study to ascertain the cause of cracks and settlement observed on the building. The study however did not elaborate on how to detect other causes such as use of substandard materials and failed to incorporate structural integrity assessment into routine management inspection.

Babalola (2015) examined Building Collapse, Causes and Policy Direction in Nigeria. The study identified several cases and causes of building collapse from 1970 till date. The study reviewed several past studies that identified causes of building collapse to include sub-standard materials, adding load that differ from the original design and non-compliance on the professional ethics, faulty design, construction site fault, faulty execution, poor maintenance, lapses in supervision and poor workmanship. The study recommended that government policies guiding building construction in the country should be reviewed and properly implemented. The failed to look at post development management of property in an elaborate manner. Chendo and Obi (2015) in a similar study examined the causes, effect, consequences and remedies to building collapse in Nigeria. The Authors identified cases of building collapse in Nigeria and other countries as far back as 226AD till recent years across the Globe. No adherence of building plans, lack of government permits, corruption, engagement of inexperienced personnel, incompetent contractors, illegal conversion, undue interference, foundation failure, fire outbreak etc. as well as other factors earlier listed. The study outlines different measures to curb the menace amongst which is the observance urban and regional planning decree 88, of 1992 and as in section 13 of National Building Code 2006. Similar studies on the cases, causes and remedies to building collapse are Ebehikhalu and Dawam (2014), Fagbenle and Oluwunmi, (2010), Fakere A.A. Fadare G. and Fakere R.A. (2012) listed in addition to the causes of building collapse already identified, inadequate preliminary work, adoption of wrong foundation, poor concrete mix, improper walling and climate.

Arising from the previous studies on building collapse in Nigeria, it was observed that none of the study placed emphasis or examined in detail the post development approach to property management and how this could control building collapse. Ede (2011) mentioned proper post construction service and the need for physical inspection to be combined with non-destructive test, while Ehoirobo and Okovido (2013) described the use of

structural integrity test to assess the strength and suitability or otherwise of the subject property to continue to serve the purpose, neither of these study actually outline how the structural integrity test combine with physical inspection in such a way that flaws committed during design and construction stages are detected early. It was further observed that neither of the studies made highlighted the possible outcome of the structural integrity assessment and make suitable recommendation based on the result. This study therefore contributed to researches on building collapse by recommending a framework that incorporate structural integrity test (non-destructive test) into routine management inspection of property managers. The framework further suggest schedules for structural integrity assessment of buildings which would detect flaws committed during design and construction stages as well as those that the property was exposed to during the occupation stage either naturally, wear and tear or passage of time. This framework also identifies parties and their distinct roles in implementing the programme and make appropriate recommendation for outcome of each routine inspection or structural integrity assessment carried out.

## 4.0 Research Methods

Lagos State has the highest number of building collapse in the country. Table 2 reveals that thirty-five (58.3%) out of the sixty cases between 1996 and 2016 occurred in Lagos State alone. Mba (2014) citing Windapo and Rotimi (2012) showed that Lagos State alone account for 51.6% of building collapse in Nigeria between 1974 and 2010 while other States in South-West Nigeria account for 18.7%. Abuja and States in the remaining geo-political zones account for the rest. Based on its strategic economic importance, population density, cases of building collapse and vatality, Lagos State was selected. Primary data were collected with structured questionnaires administered on occupants of 225 residential and commercial buildings randomly selected across the State. Three different neighbourhoods were targeted by the study, depicting the high class, middle class and low class neighbhourhoods. Seventy-five questionnaires were taken to each of the neighbourhoods. Two-third was distributed to occupants of residential properties and one-third to users of commercial properties. Data were analysed in percentages, five-point Likert scale and mean score analysis. The mean score of was subsequently assessed on an adapted scale devised by Morenikeji (2006) for interpreting results of Likert scale analysis. The questionnaire was used to elicit data on the approach to post-construction property management and the level of satisfaction of occupants with the management services they got from the service providers. Consequently, a framework was proposed for improving the practice of post-development property management in order to curb the frequent collapse of building.

## 4.0 Results and Discussion

### 4.1 Response Rate Analysis

A total of 150 administered to occupants of residential properties and 75 to users of commercial properties across the high, middle and low class neighbourhoods. The rate of response is presented in Table 3. The analysis showed an overall average response rate of 88%. This rate is deemed sufficient for subsequent analysis.

Table 3: Questionnaire Administration and Rate of Response

| Respondents | Property Type | No. Distr. | High Class | Middle Class | Low Class | Total | Rate of Response |
|---|---|---|---|---|---|---|---|
| Property Owners | Residential | 150 | 39 | 43 | 46 | 128 | 85% |
| | Commercial | 75 | 21 | 24 | 25 | 70 | 93% |
| | Sub-total | 225 | 60 | 67 | 71 | 198 | 88% |

### 4.2 Socio-economic Characteristics of Respondents

The socio-economic characteristics of respondents are presented in Table 4. The analysis revealed among others that majority of the respondents are male (62%) and that 79% are 31years old and above. This suggests that these are active working class set of people. Further, with 72% having at least first degree, the respondents are literate enough to understand and provide reliable responses. In addition, the tenure of the occupants also showed that 76% are tenants and 24% are owners. The predominance of tenants attest to the high expectation of the performance of the post development services providers. The respondent group was purposely selected because, being the occupant/user of the building, their perspective of performance of their management service provider is deemed reliable. Furthermore, the analysis showed that 18% of the properties are owner occupied, 10% are co-occupied while the remaining 72% are fully tenanted. This implies daily usage pressure on the facility which necessitates prompt and adequate response from the service provider in order to prolong the life of the property. Finally, respondents, who are occupants of the sampled property, were requested to indicate the post development service providers of the building. Analysis showed that 74% of the properties are actually managed by non-professionals such as the owner, agent/caretaker and in some extreme cases, the tenant themselves. It was also found that many property owners handed over the management of their properties to non-professional agents. The quality of the property manager will determine the quality of management services received by the

occupants as this will show in their approach and handling of the various challenges emanating from the use of the property.

**4.3 Scope of Post Development Management**

The scope of post-development management services as well as the level of satisfaction derived by the occupants with the services is provided in Table 4. Respondents were requested the service received from their post development management service providers and response were expressed in percentage. The level of satisfaction is assessed on a 5-Point Likert scale and the mean score determined. The mean score is interpreted by adapting a tool devised by Morenikeji (2006) stipulating the following cut-off points for the scales

- 1 – 1.5 Not Satisfied
- 1.51 – 2.49 Less Satisfied
- 2.50 – 3.49 Unsure
- 3.50 – 4.49 Satisfied
- 4.5 – 5.0 Very Satisfied

Table 4: Socio-economic characteristics of respondents

| Characters | Variables | Frequency | Percentage (%) |
|---|---|---|---|
| Sex | Male | 123 | 62 |
| | Female | 75 | 38 |
| | Total | 198 | 100 |
| Age | Below 20 | - | - |
| | 21 – 30 | 41 | 21 |
| | 31 – 40 | 85 | 43 |
| | Above 41 | 72 | 36 |
| | Total | 198 | 100 |
| Education | Secondary | - | - |
| | Diploma | 56 | 28 |
| | First Degree | 79 | 40 |
| | Second Degree | 63 | 32 |
| | Total | 198 | 100 |
| Tenure | Tenant | 151 | 76 |
| | Owner | 47 | 24 |
| | Licensee | - | - |
| | Total | 198 | 100 |
| Accommodation occupation status | Owner-occupied | 36 | 18 |
| | Co-occupied | 19 | 10 |
| | Fully Tenanted | 143 | 72 |
| | Total | 198 | 100 |
| Post-Development Management Services Provider | Property Owner | 41 | 21 |
| | Tenants | 15 | 8 |
| | Agents | 89 | 45 |
| | Professional Estate Manager | 53 | 26 |
| | Total | 198 | 100 |

Table 5: Scope and level of satisfaction with the post development management services

| Scope of post-development management services | Owner | | | Tenants | | | Agents | | | Professional Property Managers | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | MS | Yes | No | MS | Yes | No | MS | Yes | No | MS |
| Space organization and management | 32 | 68 | 2.6 | 0 | 0 0 | 1.3 | 35 | 65 | 1.7 | 59 | 41 | 3.8 |
| Lease agreement | 100 | 0 | 2.7 | 0 | 0 | - | 73 | 27 | 3.6 | 100 | 0 | 4.3 |
| Service charge administration | 29 | 71 | 1.9 | 0 | 0 | - | 46 | 54 | 3.2 | 69 | 21 | 3.6 |
| Security provision | 31 | 69 | 2.4 | 0 | 0 | - | 47 | 53 | 2.9 | 61 | 39 | 3.5 |
| Insurance | 21 | 79 | 2.7 | 0 | 0 | - | 33 | 67 | 2.8 | 59 | 41 | 2.8 |
| Mandatory, periodic or conditional structural integrity assessment | 0 | 0 | - | 0 | 0 | - | 0 | 0 | - | 0 | 0 | - |
| Mechanical and electrical services maintenance | 28 | 72 | 2.8 | 61 | 39 | 2.7 | 78 | 22 | 3.6 | 90 | 10 | 3.9 |
| Regular maintenance of finishes | 32 | 68 | 3.2 | 0 | 0 | - | 41 | 59 | 3.3 | 60 | 40 | 3.4 |
| Maintenance of fixtures and fittings | 32 | 68 | 3.2 | 0 | 0 | - | 53 | 47 | 3.6 | 77 | 23 | 3.8 |
| Maintenance of driveway and walkway | 28 | 72 | 2.4 | 0 | 0 | - | 57 | 43 | 3.4 | 83 | 17 | 3.6 |
| Drainage clearance and waste management | 92 | 10 | 3.6 | 63 | 37 | 2.3 | 53 | 47 | 3.5 | 87 | 13 | 3.8 |
| Maintenance of fence wall and outbuildings | 56 | 46 | 3.4 | 12 | 88 | 1.3 | 34 | 66 | 3.3 | 73 | 27 | 3.5 |
| Maintenance of independent water supply system | 50 | 50 | 3.5 | 10 | 90 | 2.9 | 45 | 55 | 3.2 | 61 | 39 | 3.7 |
| Maintenance of independent power supply system | 46 | 64 | 3.6 | 12 | 88 | 2.9 | 59 | 41 | 3.4 | 51 | 45 | 3.5 |
| Condition assessment and maintenance of sewer system | 74 | 26 | 3.7 | 23 | 77 | 3.0 | 69 | 31 | 3.6 | 83 | 17 | 3.8 |
| Fitness assessment of pipes and ducts | 12 | 88 | 3.5 | 0 | 0 | - | 37 | 63 | 2.3 | 44 | 56 | 3.9 |
| Fitness test of health and safety devices | 18 | 82 | 2.9 | 0 | 0 | - | 39 | 61 | 1.9 | 43 | 57 | 3.1 |
| Maintenance of pool, pond and lawn | 34 | 66 | 1.8 | 17 | 83 | 2.3 | 38 | 62 | 3.3 | 70 | 30 | 3.6 |
| Execution of capital project on improvement works | 45 | 55 | 3.6 | 0 | 0 | - | 35 | 65 | 2.8 | 60 | 40 | 3.5 |

Table 5 revealed that occupants do not receive adequate services from property owners as frequency of disapproval response are significantly above average. It also showed that generally, occupants are either less satisfied with most of the services provided by these owners. It is evident from the analysis that the owner does not carry out structural integrity assessment of the building prior to or during occupation. A similar but more disturbing trend was observed from the perspective of tenants who take care of the property they occupy. Most services are not provided and occupants show generally, high level of dissatisfaction. Analysis of the services of agents reveals the approval rates of their performance generally are less satisfactory. The post-development management services provided by professional property managers showed that they perform satisfactorily in providing majority of the services. It was however noted from the responses of the occupants that structural integrity assessment was covered by any of the service providers. The high rate of discontentment with the services of non-professionals could be attributed to the fact that they are not adept in providing such services.

**5.0 Proposed Framework for Post-Development Management Services**

Figure 2 showed the proposed framework for post development property management. The framework is a multi-party task involving activities such as structural integrity assessment, routine management and recommended remedial actions aimed at curbing the catastrophic consequences of building collapse. Thus the network of functions, factors, conditions and recommendations and the presumed relationship are explained.

The framework proposed that every structure upon completion is subjected to structural integrity test prior to use and during occupation and issued certificate of fitness by the government. It further suggests that the owner

appoints professional property manager to handle the management of the property. The mandatory structural integrity assessment helps to detect those challenges that escaped design and construction stages and may activate or accelerate building collapse soon after the use commenced. These include faulty design, poor workmanship and poor supervision, use of substandard building materials, inappropriate substructure, arbitrary alteration, faulty construction and excessive loading. If it fails the test, it is certified unfit and recommended for controlled demolition and reconstruction. If it passes the test, certificate of fitness is issued for use. The professional property manager immediately commences the tasks of lease administration, space management and property maintenance.

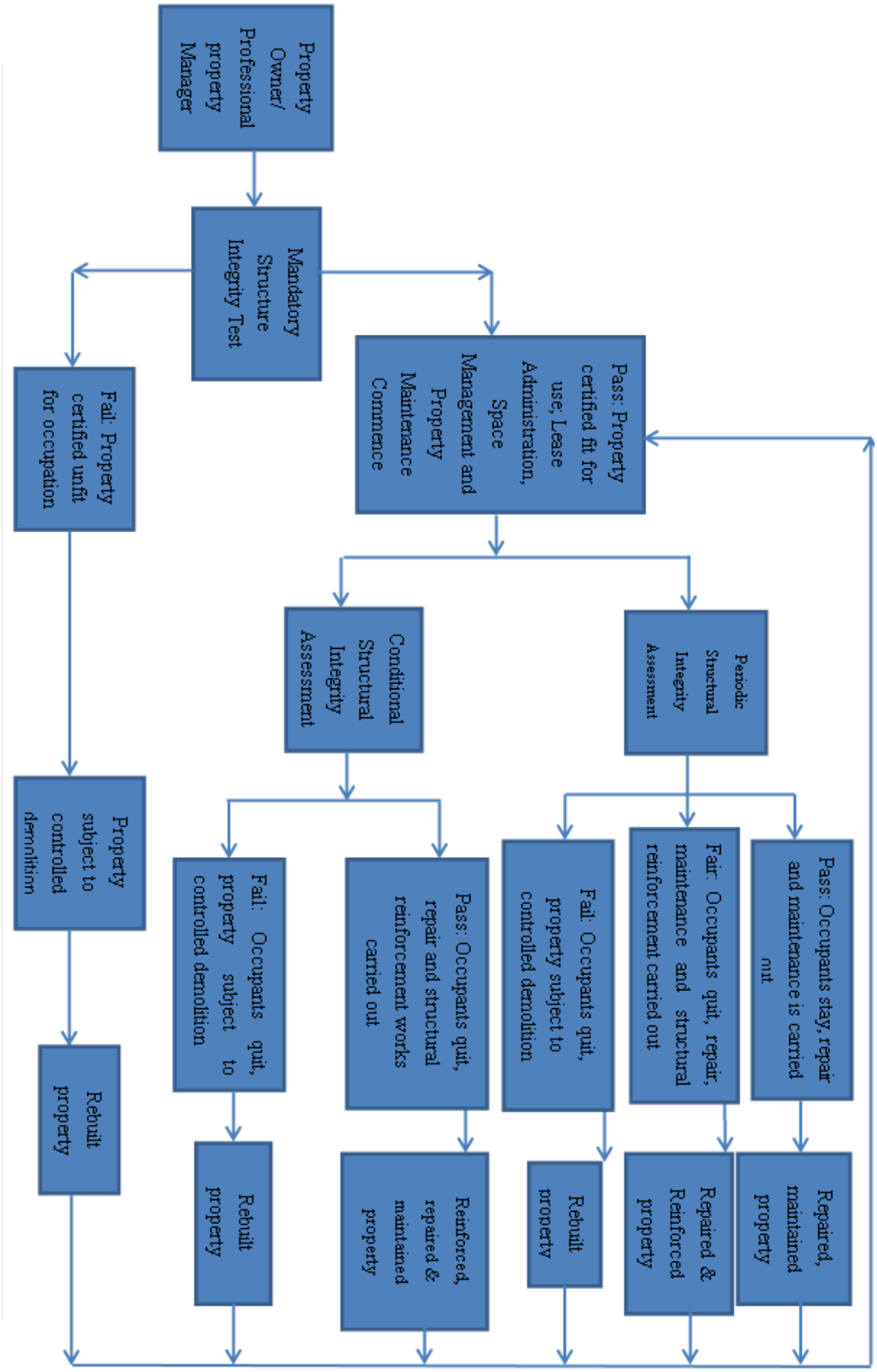
Routine inspection is carried out to assess the impact and symptoms of passage of time, wear and tear on building structure and component's life-span. This is remedied by schedule of repair and maintenance. Notwithstanding, periodic or conditional structural integrity assessment shall be carried out (as statutory exercise) consequent upon the report of routine management inspection. Where report only shows lack of adequate maintenance, passage of time, wear and tear on building structure and component life span, the property undergo routine repair and maintenance and scheduled for periodic structural integrity assessment. Where the exercise shows alarming level of dilapidation e.g. extensive vertical or lateral cracks, excessive deflection, removal of bonds and plaster, blown roof, prolonged floor or wall dampness, settlement and any other manifestations occasioned by flooding, fire, heavy wind, faulty or damaged plumbing, overloading, overcrowding, illegal conversion/alteration, landslide, mudslide, expanding gorge/gully or sinkhole that threaten the property, then the report recommends conditional structural integrity assessment.

The periodic or conditional structural integrity assessment is carried out in collaboration with building and structural engineers appointed by the government. Where the subject property passes the periodic structural integrity assessment, maintenance is carried out without necessarily ejecting the occupants. Where the result is fair, the occupants quit and the property undergo structural reinforcement, repair and maintenance. Where the property fails the test, the occupants quit and the property recommended for controlled demolition and reconstruction. In the case of conditional structural integrity assessment, if the property passes the test, the occupants are asked to quit while the property undergo structural reinforcement, repair and maintenance. In the event of failure, the occupants quit and the property undergoes controlled demolition and reconstruction. Thus the end product of each course of action is the repaired, reinforced or reconstructed property. The repaired, reinforced or rebuilt property is then referred to the designated government agency to certify fit and approved for occupation. Once the approval is granted, the professional manager in charge commences the tasks of lease administration, space management and property maintenance and the cycle continues. Depending on the size and intensity of use, multi-storey and large structure such as stadium, theater galleria and others in this category are recommended for periodic structural integrity assessment at every five year interval while for smaller structures such as residential apartments that have already passed the initial mandatory structure integrity test could be schedule based on report and recommendation of routine management inspection.

## 5.0 Conclusion

Early detection and discovery of the causes of building collapse via the mandatory, periodic or conditional structural integrity assessment go a long way in preventing incessant building collapse and eliminate the attendant loss of life and other properties. This exercise is often missed out in post development property management practices and had over the years rendered property management incapable of effectively controlling or curbing the catastrophe. The mere fact that if the subject property failed the mandatory structural integrity test, it would be demolished would compel the client, the builder and the contractors to do their job right. In order to ensure implementation and compliance with the framework, the structural integrity assessment report must be backed up by law, making it a statutory requirement before and after occupation. The law must also recommend that every property, whether private or public property and for any purpose must be managed by professional property manager, that is, the estate surveyors and valuers.


Property Owner/ Professional property Manager
Mandatory Structure Integrity Test
Fail: Property certified unfit for occupation
Property subject to controlled demolition
Rebuilt property
Pass: Property certified fit for use; Lease Administration, Space Management and Property Maintenance Commence
Conditional Structural Integrity Assessment
Fail: Occupants quit, property subject to controlled demolition
Rebuilt property
Pass: Occupants quit, repair and structural reinforcement works carried out
Reinforced, repaired & maintained property
Periodic Structural Integrity Assessment
Fail: Occupants quit, property subject to controlled demolition
Rebuilt property
Fair: Occupants quit, repair, maintenance and structural reinforcement carried out
Repaired & Reinforced property
Pass: Occupants stay, repair and maintenance is carried out
Repaired, maintained property

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