AN EVALUATION OF THE CAUSE, IMPACTS AND FREQUENCY OF BUILDING COLLAPSE IN NIGERIA

(A CASE STUDY OF LAGOS STATE)

BY

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BEING A RESEARCH WORK SUBMITTED TO THE DEPARTMENT OF BUILDING TECHNOLOGY, INSTITUTE OF ENVIRONMENTAL STUDIES (IES) KWARA STATE POLYTECHNIC, ILORIN

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CERTIFICATION

This is to certify that this project has been read and approved as meeting the requirement of the Award of Higher National Diploma (HND) in Building Technology, Institute of Environmental Studies (IES) Kwara State Polytechnic, Ilorin.

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DEDICATION

This project is dedicated to Almighty Allah, the beneficent and the most merciful, all praise belong to him. He has been the one protecting me from my childhood till the present moment. And also to my lovely parents, Mr. and Mrs. Adediran for their full support financially and mentally, you are the best in the world, may Almighty Allah continue to bless you and make you reap the fruit of your labour.

ACKNOWLEDGEMENT

I want to acknowledge Almighty Allah, the giver of wisdom who has given me the wisdom to write this "project" successfully may his name be forever praised

I acknowledge Mr. Atolagbe Victor for his fatherly love and advice to make my HND program a successful one. And also for his role as my project supervisor I really appreciate you sir. I will forever grateful to you sir and also to other lecturer in this great department, I am indeed grateful.

I want to thank my Parents, Mr. and Mrs. Adediran for their support financially, spiritually and her and advice throughout my academic year in the school. May you to live long and eat the fruit of your labor (Amen)

I appreciate my mate, friend, brother, mother, sister in school and everyone who made this program a success. God bless you all.

ABSTRACT

The reoccurrence incidences of defects and failures in government buildings concerning leaking pipes and ceiling collapse, including a leaking roof in the Parliament building, are an embarrassment and far too serious to be ignored. If this situation is left unanswered and untreated, it will lead to more serious problems in the future upcoming construction projects in Malaysia. Furthermore, if these problems continue, those who are working in the construction industry also will be facing numerous procedures and regulation before being awarded a construction project. Therefore, it is essential to identify common contribution factors of structural defects and failures in construction project especially in Penang area in order to minimize the effect to building and indirectly it will prolong the life span of the building. Unsurprisingly, faults are one of the major causes of dispute and construction litigation. Dealing with construction failures requires various degrees of familiarity with law, building technology and practice. The objective are to identify and assess the causes of poor workmanship, to also assess why we have so much faulty building, to also investigate who or what is responsible for faulty construction in building projects, the study, furthermore the study will involve visit to medium and small building sites, collecting data concerning corporate and individual opinion and expression, no accident and its control in the industry, the population of any research work refers to the total number of people the research is being carried on and from which conclusion will be drawn, in a situation where the total number of your workers in construction is about hundred, a sample of total construction firm which are reliable regarded as a zone, representatives of the total number that will be used to gather the needed information, having carried out due analysis and interpretation of data gathered from both primary and secondary sources, the following are recommended; the developers should not be in a hurry and also keep enough funds for development and deal directly with professionals with good track records and credibility, building professionals should ensure to carryout proper and efficient supervision of works on site as well as thorough inspect of materials to be used for the construction from sub-structure to superstructure, at total of 60 questionnaires were distributed, a total of 55 questionnaire were returned and rightly filled, while 3 was badly filled and 2 not returned.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The reoccurrence incidences of defects and failures in government buildings concerning leaking pipes and ceiling collapse, including a leaking roof in the Parliament building, are an embarrassment and far too serious to be ignored. If this situation is left unanswered and untreated, it will lead to more serious problems in the future upcoming construction projects in Lagos. Furthermore, if these problems continue, those who are working in the construction industry also will be facing numerous procedures and regulation before being awarded a construction project. Therefore, it is essential to identify common contribution factors of structural defects and failures in construction project especially in Penang area in order to minimize the effect to building and indirectly it will prolong the life span of the building. Abdullah (2012).

Nigeria is a developing country with huge capital with huge capital resources. Development goes on in every aspect of life and human activity. This creates is corresponding demand for construction of new building or renovation or rehabilitation of older structure. Often, it is most economical to alter the functional spaces of an existing building to accommodate a new uses. Whatever the type, an existing building to accommodate a functional spaces of an existing building to accommodates a new users . whatever the type , an important functional requirement of all building is the provision of shelter, exclusion of weather and other external instruction. From the simplest to the most sophisticated and complex building today. Especially those that have maintenance problems arising from effect of poor workmanship, which has become an area of great concern of researchers. It is impossible to produce building which are maintenance free but maintenance work can-be minimized by good design and proper workmanship carried out by skilled experts or competent craftsman using suitable codes installation requite a properly educated and trained workforce involving good management as well as suitably trained craftsmen. Brennan, B. (2000)

The main function of a building is to protect the occupants and contents from the weather, mainly rain, wind and extremes of temperature. It is most important to provide the basic needs which will achieve all of these functions. Features such as windows, pipe, air conditioning system and finishes are only additional. Obviously a building must be structurally safe in order to survive, and the floors must be capable of resisting any normal imposed loads. Building Defects; According to Webster’s Dictionary, defect is defined as

lack of something necessary for completeness; shortcoming. It is also defined as an imperfection; fault; blemish. Another term for defect is deficiency. Webster's Dictionary defines the word deficiency as a state or quality of being deficient or a shortage; deficit. As for deficient, it is defined as to be wanting, lacking in some quality necessary for completeness; defective and one that is deficient. Defect is "the nonconformity of a component with a standard of specified characteristic" [2]. A building defect may include any problem that reduces the value of a home, condominium, or building. Building defects can be the result of design error by the architect, a manufacturing flaw, defective materials, improper use or installation of materials, lack of adherence to the design by the contractor, or any combination of them. Common types of building defects include: structural defects resulting in cracks or collapse; defective or faulty electrical wiring and/or lighting; defective or faulty plumbing; inadequate or faulty drainage systems; inadequate or faulty ventilation, cooling or heating systems; inadequate insulation or sound proofing; and inadequate fire protection/suppression systems. Additionally, dry rot, wood rot, mold, fungus, or termite or vermin infestation may also be the result of a building defect. A building defect may also include damage caused by land movement or earth settlement. Brennan, B. (2000)

Proving a building defect commonly requires the hiring and testimony of a highly trained and experienced expert. An expert, such as an engineer or architect will be able to determine whether a construction problem is the result of improper design, material, or workmanship. Building Failures ; According to dictionary by Farlex, failure is defined as the condition or fact of not achieving the desired end or ends. Failure is "an unacceptable difference between expected and observed performance; also the termination of the ability of an item or system to perform an intended or required function". Failure mechanism is "an identifiable phenomenon that describe the process or defects by which an item or system suffers a particular type of failure" Failure mode is "a description of the general type of failure experienced by a system" [1]. Structural failures such as foundation failure and structural instability are the result of over-stressing, that is, the imposition of loads in excess of the capacity of the structural components. Collapse is the ultimate and most serious result of structure failures, but overstressing is also evident at earlier stages through the development of deformation and fractures. If a structure is correctly designed and constructed in accordance with the design, over-stressing indicates some other failure, such as the use of an unsuitable material. However, still suitable materials may be inadequate in some conditions or because they have been altered in some other way. (Webster's Dictionary 2015).

1.2 STATEMENT OF PROBLEM

Building collapse has become a recurring and alarming phenomenon in Lagos State, Nigeria, posing a serious threat to human lives, property, and the environment. Despite numerous interventions by regulatory bodies and professional associations, incidents of structural failure continue to occur with distressing frequency. Reports indicate that Lagos accounts for more than half of all building collapse cases recorded in Nigeria, underlining the critical nature of the problem.

Several studies have attributed these collapses to a combination of factors, including poor construction practices, non-compliance with building regulations, use of substandard materials, and weak enforcement mechanisms. Additionally, environmental factors such as land subsidence and flooding have further exacerbated the risk of structural failures in certain parts of Lagos.

The socio-economic impacts of these incidents are profound, ranging from loss of lives and injuries to displacement, loss of investments, and disruption of economic activities. The repeated occurrence of building collapse erodes public confidence in the construction industry and highlights deficiencies in governance, urban planning, and disaster risk management.

However, despite the gravity of the situation, there is a gap in comprehensive, localized research that evaluates the specific causes, patterns, and impacts of building collapse in Lagos State. Addressing this gap is essential
for formulating effective preventive strategies and ensuring the safety and sustainability of the built environment.

This research, therefore, seeks to critically evaluate the causes, frequency, and impacts of building collapse in Lagos State, with a view to identifying sustainable solutions to mitigate the menace.

1.3 AIM OF THE STUDY

The aim of this is to evaluate the causes and those responsible for faulty construction in building projects

1.4 OBJECTIVES OF THE STUDY

The objective for this research include the following

- To identify and assess the causes of building collapse in Nigeria
- To also assess the impact of building collapse generally.
- To also effect remedy to curb issues of building collapse.

1.5 RESEARCH QUESTION

1. What are the factors responsible for frequently building collapse in construction of building projects?
2. How does defects occur in building construction site?
3. What are the method adopted in control of faulty and those responsible for such building in construction site?

1.6 SCOPE OF STUDY

Building collapse in construction firm is wide in scope, but for this study it will only cover activities of who are the causes and those responsible for faulty construction in building projects on and off constructions site. Due to time constraints finances and other factors, the study will only be limited to Lagos State.

1.7 SIGNIFICANT OF THE STUDY

Every new buildings will have issue regarding the defects that occurring inside it. All these issues have brought negative effect to the building.

For example, honeycomb which is often to be seen, hairline cracks occur at the joint of the columns and beams, dampness and etc. Therefore, the significant of this study is to find out the major causes of defects that occurring in the new buildings and determine a possible solution in order to minimize the defects. Other than that, the reason why I select this topic for my research study is because I personally interest in understanding the problems in a deeper manner and want to gain more knowledge and also experience so that it would be useful for me.

1.8 DEFINITION OF TERMS

Construction Work: Work to erect, construct, extend, alter, fit out, commission, renovate, repair, refurbish, disassemble or decommission a structure or part of a structure

Building Collapse: is a sudden structural failure that causes a building, or part of it, to fall or become unstable.

Construction: The action of building something, typically a large structure

Building: A structure with a roof and walls, such as a houses or factory

Building Material Substances used in the construction and repair of buildings and structures

Facility: Facility can be defined as something that is build, installed or established to serve a particular purpose or something that makes action operational or complement an action.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1. CONCEPTUAL FRAMEWORK

BUILDING CONSTRUCTION

A building is constructed to provide shelter to carry out normal (day and night) activities for mankind.

Mankind has advanced in providing safe and more conducive shelter for continuous human existence. The essential principle of building design is to produce a building that meets a client's requirements and be fit for purpose. Although owner's requirements are the term of reference, standards in terms of architectural considerations, building services requirements, structural provisions and safety issues must be fully considered, Abdullah (2012).

Therefore, the most economically safe, functional, and aesthetic building is expected; and to produce these, three major professionals are involved: Architect, Structural/Services Engineers and Contractors. Architect is the first professional who get involve with a client, drafting building design from a client's brief (needs and requirements). He/she is responsible from inception of design, architectural materials' quality control and physical look for both structural and services elements. In a nutshell, the Architect is responsible for the building to finally be faithful to the original design, hence trends to lead the design-construction team, Brennan, B. (2000).

`The structural engineer is a professional that works based on the architect's layout and provisions to make sure the building stands, and be safe both at ultimate and serviceability limit states with the most economical structural members . The structural stability of a building is fully dependent on in-depth design and construction of the following structural elements: Slabs, Beams, Columns, walls and Foundations. The design process must be thorough, starting with analysis (to calculate bending moments and shear forces) of the structural elements; to the design (at ultimate state) for sections and reinforcements required considering the adopted code of practice (BS 8110 in the UK). Several checks are done at serviceability limit states; and often structural performance simulations are also done. Therefore, to achieve sound structural carcass of a building, proper design and implementation (at construction stage) of structural element must be achieved. These include specification of materials (i.e. reinforcement steel, concrete aggregate, cement, structural steel etc.) and adequate site supervision. Sound design and proper implementation (at construction stage) of the design from all angles is the role of the structural engineer and anything short of that, is a potential risk to building stability. Building Services engineers, also known as Mechanical, electrical and plumbing (MEP) engineers are responsible for design of services

in a building, such as heating/cooling systems, electrical and communication installations, fire suspensions safety etc. They are much inclined to the provision of services that aid functionality as well as mitigating equipment against disaster in a building. Hence, have no responsibility to ensuring building structural. A succinct definition of a contractor and their under role is provided by the UK Health and Safety, (Webster's Dictionary 2015).

Executive (HSE) under the Construction Design Management (CDM) regulations as follows: A contractor is anyone who directly employs or engages construction workers or manages construction work. Contractors include sub-contractors, any individual self-employed worker or business that carries out, manages or controls construction work. They must have the skills, knowledge, experience and, where relevant, the organisational capability to carry out the work safely and without risk to health. Delivering a construction project of any scale requires not only expertise and experience but most critically an ethical responsibility to the client, design team and society as a whole. Beyond the professional and legal requirement, all of which are enshrined into Law as well as professional codes of conduct, a building must be completed to design specifications, established standards and rules of health and safety during construction and throughout the building life cycle. Supervision and quality control (materials, workmanship, performance, testing etc.) are key the process of construction, a role normally shared between the relevant design team members and main contractor as defined in contract and the relevant legislation, Brennan, B. (2000).

2.2. NIGERIAN CONSTRUCTION INDUSTRY

Construction is considered amongst the world's biggest industries, and is estimated to account about 13% of world output, while about 15% is estimated to be the global gross domestic product of the construction industry by 2020. Similarly, by the end of 2011, the Nigerian construction industry contributed about 2% (1.99%) to the country's Gross Domestic Products (GDP), which is statistically low compared to its record in 1981 of 5.8% (a difference of 3.81% in 30 years [1]). Moreover, the Central Bank of Nigeria's financial report of first quarter of 2015 revealed that the construction industry contributed only 0.45% of the country's GDP; it could be justifiable to connect this with the industry's inefficiency and lack of competency. The construction industry is amongst the important industries that contribute toward a nation's socio-economic development, particularly in developing countries. The nature of the Nigerian construction industry is disjointed [11], exclusive and complex, and continuously facing lingering problems such as project time overrun (late delivery of projects), project cost overrun, and risk/safety management issues. National public sectors are the major or nearly the only client for major construction works in Nigeria, and typically procure construction works using a "traditional" contract type,

whereas the procurement routes that promote integration or collaboration are Design and Build (integrated), Management and Co-operative contract types. However, for over a decade housing sector development has proven contrary, where private production arrangement continues to supply the majority of housing to the populace [21]. Furthermore, statistics show that the majority of urban housing units for rent in Nigeria are provided by moderate private property-owners.

2.3 CONTRIBUTION FACTORS TO BUILDING DEFECTS AND FAILURES

Climatic Conditions; It is important to consider the climatic conditions of Malaysia and the effect to building materials. Like many other tropical countries, Malaysia has heavy rainfall and warm sunshine all Contribution Factors to Building Defects and Failures Climatic Conditions; It is important to consider the climatic conditions of Malaysia and the effect to building materials. Like many other tropical countries, Nigerian has heavy rainfall and warm sunshine all year round. This implies that buildings in the country tend to weather rapidly, particularly in respect to external building materials which are exposed to external causes such as rain, wind, solar radiation including ultra-violet light; and atmospheric pollution. Fungal stain, harmful growth, peeling paint, erosion of mortar joints and defective plastered rendering are a few examples associated with this factor. Itopa M. (2009).

Location of Building; Buildings that are located near the sea or rivers tend to have common building defects. This is because the water coming from the ground causes dampness penetration and structural instability. In addition, soluble salt which comes from sea and together with the presence of a polluted atmosphere can cause damage to the exterior surface of the buildings. Construction Materials; Most buildings use building materials which are easily available locally. Such building materials include timber, stone, brick and plaster. In the materials management of buildings, understanding the nature of the building materials and accurate diagnosis of defects is most important. This is because buildings are, like older people, vulnerable to all sorts of diseases. Therefore, in order to tackle the diseases, architects, contractors, engineers and those involved in building management should be familiar with the building materials in common use and have deeper understanding into the proper techniques of preservation of the materials and structures. Building Type and Change in Use; Buildings that change their use and spaces should consider the effect of the new use on the existing structure. This is because some buildings were built to only hold certain loads and sometimes may not withstand additional loads. Where buildings which have been converted into either commercial or office purposes, the need to install air-conditioning systems to meet modern building requirements seems necessary. It has been found that in a few cases the air-conditioning units were placed improperly. This not only affects the appearance of the buildings but intervenes with the existing fabric, particularly when ducts

are running in full view on the ceiling. Maintenance of Building; Building maintenance prepared through an accurate programme of repeated maintenance plays a major role in preventing building defects. Buildings that neglect building maintenance may fall into several defects which may lead to structural failures. Any inspections carried out by either architects or surveyors should include checking for any signs of abnormal deterioration, cleaning out gutters of leaves or harmful growth, checking lighting conductors, cleaning out all voids and spaces; and changing tap washers, Griffith, (2015).

To secure the general structural stability and life of a building, it is important to regularly inspect not only the main structural elements including foundations, walls and roofs; but other common building problems. It is important that buildings continue to be properly maintained to ensure that they can function as efficiently and effectively as possible in supporting the delivery of a wide range of services. At the same time, the deterioration of buildings due to the lack of maintenance could lead to future financial burdens, pose legal and other industrial relations issues and affect the delivery of services.

Therefore, the maintenance of buildings is critical to the proper management of physical assets and the overall management of capital to achieve agency outputs and institutional outcomes.

1. **Faulty Design**; A common design error is often made, usually in an effort to save initial construction costs. Project cost plays an important role in designing buildings. Reducing the size of columns, the size of reinforcement bars and foundations are the common design error in construction. This situation will lead to uncertainty situation in the future where the structure cannot withstand the load and finally fails. Sometimes faulty design is also a result of misjudgment, leading to assumptions or decisions that are not consistent with the actual behavior of the structure
2. **Faulty Construction** ; According to the experts, faulty construction had mainly caused collapse of the buildings but legal action against the offenders through proper investigation is abandon due to various factors like reluctant mood of a section of official's concerned and strong lobby by the vested groups. In Malaysian construction industry, faulty construction is also the main causes for building defects and failure cases. The contractors responsible to construct

2.4 DESIGN AND BUILD METHOD

The design and build method of procurement is also referred to as integrated procurement approach in which a contracting firm takes obligation for all aspects of the project. Rowlinson outlines the features of design and build contract as:

1. A contract that is signed before the building has been defined by full documents;

2. A contract in which design is not fully completed before construction commences;
3. A contract where bill of quantities is not normally prepared so variations are priced according to a schedule.

The continues growth of the design and build (integrated) method in the UK and elsewhere as an alternative procurement method to the traditional method is as a result of the new paradigm shift from fragmented method to integrated system as well as the belief pointing to integrating the design and construction. Despite all the claimed potential benefits of time and cost overrun, reduction of errors and omissions, less misunderstanding, rapid reaction to scope changes, as well as production of buildable designs, the client has reduced his professional representation and also tend to have fewer checks on cost and quality and therefore quality assurance in all aspect could be compromised. Griffith, (2015)

2.5 BUILDING FAILURE IN NIGERIA

Thirty-seven (37) year records of building collapse in Nigeria show that most of the structures affected happened to be privately owned (more than 80%) and commonly more than 50% were residential buildings. This menace happened to be mostly with private residential buildings built by local contractors. The compiled history of building failure in Nigeria by Tanko et al, found that quackery recorded the highest frequency against poor supervision as minimum occurrence. However, it was not clear where the quackery resides, was it with engineers or architects or contractors? Furthermore, is the collapse of buildings caused by structural failure noticed in the documented building designs or happened due to faults at the construction stage. It was noticed that buildings of 2 to 4 floors are common to building collapse in Nigeria; this may be attributed to less attention given at approval and supervision stages. Building collapse in Nigeria has often been associated with structural failure. Besides, no structure can stand without fulfilling conditions of structural stability. For a building to be safe and fully stand, all its structural members must be certified okay at ultimate (collapse) and serviceability (deflection, cracking and vibration) limit states. Tanko et.al, 2019.

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maintenance of buildings is critical to the proper management of physical assets and the overall management of capital to achieve agency outputs and institutional outcomes.

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Faulty Construction; According to the experts, faulty construction had mainly caused collapse of the buildings but legal action against the offenders through proper investigation is abandon due to various factors like reluctant mood of a section of official's concerned and strong lobby by the vested groups. In Malaysian construction industry, faulty construction is also the main causes for building defects and failure cases. The contractors responsible to construct manage to use lower grades materials, concrete, and method that are not according to the specification without the permission or without the client and consultant awareness.

Corruption; Corruption within the construction industry is a complex and sensitive issue. It is generally assumed that it occurs but the form and scale of corruption is by its nature difficult to establish. Corruption can occur during any phase of a construction project such as project identification, financing, designing, tendering and execution, noting that in each phase corruption may involve the project owners, funding agencies, consultants, contractors, sub-contractors, joint venture partners and agents. Corruption may lead to projects being authorized questionably because there could be bribery and fraud in the selection of contractors, project prices could be grossly inflated and the end product could thus be defective or dangerous.

Lack of Supervision; The quality of site supervision has a major influence on the overall performance and efficiency of construction projects. Inadequate supervision is believed to be one of the major causes of rework. Therefore, experienced and well-trained supervisors have an important role in minimizing the amount of rework due to construction defects. The quality of site supervision has a major influence on the overall performance and efficiency of construction projects. The performance of supervisors depends on skilled communication with individual workers, and planning and directing the work. Sidwell, A.C. (2015).

2.7 Thematic Review of Causes

Technical and Engineering Failures

Studies such as Olajumoke et al. (2009) emphasize that poor structural analysis and faulty design parameters are primary technical causes. Load miscalculations, poor foundation design, and inappropriate structural detailing often lead to integrity failure under stress.

- **Example**: Ede (2010) links many failures to the inability of designers to properly account for load-bearing capacity and environmental loads such as wind and flood.

Substandard Materials and Procurement Practices

According to Aiyetan et al. (2012), many Nigerian contractors use materials that fail to meet national standards due to high costs or poor supervision. Cement adulteration, use of low-grade reinforcement steel, and poor-quality blocks are recurring issues.

- **Findings**: Amusan et al. (2015) suggest that 40–50% of building failures are linked to the use of substandard materials, often purchased from unregulated markets.

Incompetent Workforce and Poor Construction Practices

- **Unskilled Labor**: Many artisans and site supervisors lack formal training. Oke et al. (2009) reveal that only about 25% of artisans in urban centers have certified training.
- **Lack of Professional Supervision**: Professionals like structural engineers are often sidelined due to cost-cutting.

Regulatory Failure and Policy Weakness

- **Non-enforcement of Codes**: The Nigerian National Building Code (2006) is rarely enforced. Akande et al. (2016) report that most local government authorities lack the capacity or will to enforce compliance.
- **Corruption in Planning Approvals**: Contractors often secure permits without fulfilling structural and architectural requirements through bribery (Olusola et al., 2014).

Urban Planning and Land Use Violations

- **Informal Settlements**: Rapid urbanization without corresponding infrastructure has led to unregulated constructions in unsafe areas (Ibem & Aduwo, 2013).
- **Overloading of Structures**: Change of use (e.g., residential to commercial) without reinforcement leads to overloading and failure.

Environmental and Geotechnical Factors

- **Poor Soil Testing**: Many buildings are constructed without geotechnical surveys. Adebayo (2015) notes that collapses in coastal cities like Lagos are often due to weak soils.
- **Climate Impact**: Climate change-induced flooding exacerbates foundation failure.

In summary, Building collapse in Nigeria is a multifaceted problem rooted in systemic failures, from policy and regulation to technical execution and urban governance. The literature consistently points to preventable causes and emphasizes the need for a holistic approach involving legal enforcement, professional discipline, material regulation, and public accountability. Without urgent and coordinated reforms, the social and economic toll of building collapse will continue to rise.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 INTRODUCTION

The methodology to be employed in the study includes extensive examination of relevant literature and other papers in order to crown the existing facts as regards to the study.

The study will involve visit to medium and small building sites, collecting data concerning corporate and individual opinion and expression, no accident and its control in the industry.

The data presentation will be used to compare accident n medium and small construction firms with a view to identify differences in accident in each category. Through this method adopted by the researcher in the cause of the study, the method of data analyses, with the use of characteristic of respondents among many others. It will shed understanding of the whole issue.

The analysis will compare the involvement of the firm management is to the labour force in each firm varied in order to use the best method that can be adopted to prevent accident construction site.

3.2 QUESTIONABLE DESIGN

The aim of these questionnaires was to make the respondents given their opinion and experience about accident which have occurred in the firms and the way they have prevented anticipated accidents. The question is distributed to category of firms such as medium and small construction firms so that the situation in these two categories will be examined sixty questionnaire were sent out randomly to firms for the purpose of this research.

Thirty questionnaires were administered to medium construction firms and thirty questionnaires for small construction firms, fifty-five questionnaire which were duely completed and referred.

The questionnaires were distributed to the respondents of various categories of people, classes and professionals within the construction firm both medium and small construction with the study.

Questions asked by the researcher can be grouped into categorical questions multi-questions and open-ended question.

B. Categorical Questions

This method of question is a way of eliciting only categorical answer. The respondent is therefore expected to adopt any one of the three answers. "Yes, No, No idea" in this case, the respondent is required to tick his supposedly correct answer.

Multi-Choice question

In this way a number of alternative answer are provided to a particular question from which the respondent consider his most appropriate answer. The form of question is less-open to be as respondent chooses his response from alternative provided.

C. Open-ended question

In this case category, possible answers are not suggested. The respondent is therefore free to respond to the question in any way the answer can fit question.

In other to gather necessary information to address the question being studies the researcher uses interview, and also investigation along as to aid or buttress the point of the respondents.

This involve personal contact and interaction was used to monitor answer to question with a view of refusing or eliminating as it may be in the completion of the question.

The interview means is very important since the questions also goes to skilled but uneducated operative, who can neither read nor write. The researcher has adopted the use of interview in which the researcher is accompanied by a questionnaire from which question are used.

3.3 CONSTRAINTS ENCOUNTERED

A lot of problems were encountered during the research exercise. Some respondents do not take the question as important thing.

Respondents are suspicious of the fact that the information given may be used in victimizing them by the management, due to this fact some respondent refused to talk or feel reluctant to talk.

There were a lot of times wasted in seeking audience with the caliber of the respondents needed in the chosen company.

3.4 POPULATION OF THE STUDY

Population is referred to as the totality of any group or object that possess a specific characteristics. The target population of this study include 10 builders, l0 architects, 10 wood millers and 10 structural engineers.

3.5 SAMPLE AND SAMPLING TECHNIQUES

According to Alighuo (2009) "A sample is the optimal number of sampling units element" that should be sampled or those that can be used for in the study in the determination of the sample size, the researcher made use of Taro Yamane's formula.

$$\frac{N}{1+N\,(e)^2}$$

Where n= desired sample size
N= population size
E = Margin errors
40
5% or 0.5

$$\frac{40}{1+ 100\ (0.05)^2}$$

$$\frac{50}{1+ 0.25}$$

In order to get to precision, forty percent of the total population is drawn (40) as sample size to provide relevant information on the subject matter. Simple Random sampling techniques will be used.

3.6 DATA COLLECTION

This study made use of the questionnaires survey method, because, I felts it was the quickest and easiest way of obtaining data from respondent in the civil engineering construction industry concerning the causes and control of accident on construction site.

The questionnaire is for both technical personnel and the operative. The reason for design is to know if the facilities provide is what the worker (Operative) agree to enjoy.

The data collection based on this research work is grouped in to two namely:

A. Primary Data

B. Secondary Data

A. Primary Data

This involves gathering fresh information that will help in solving the research problem, collection of primary data can be through observation, experimentation and personal interview.

In this research, the researcher only makes use of personal interview just to buttress the fact that they gathered from secondary data.

B. Secondary Data

This consists of existing information, which may be useful for the purpose of this survey method. In conducting research both internal source where the researcher made use of journals and for the external source, relevant textbook on causes and control accident on construction site in civil engineering industries.

CHAPTER FOUR

4.0 DATA ANALYSIS AND PRESENTATION

4.1 INTRODUCTION

Presentation and data analysis was done using tables, percentiles, and demographic, representation of the respondents. Effort is made to present data, analyze the data, testing of hypothesis and discussion of findings using tables to depict the demographic data, frequency and percentile of the respondents used in the study.

This chapter is prepared to collaborate and expatiate the information (data) gotten from respondents of the Estate Surveyor, Bureau of Land, Developer in respect to the topic of the research work. "Investigating into the causes and those responsible for faulty construction in building projects".

The information contain in this research work was acquired through the use of a combination of research instrument or method of collecting data.

4.2 PRESENTATION OF DATA

The data presentation and its analyses are as follows: Total questionnaire returned and rightly filled was 55, while 3 was not badly filled and 2 not returned.

Table 1: Sex of the respondent

Responses	Frequency	Percentage (%)
Male	35	63.6
Female	20	36.4
Total	**55**	**100**

Source; Research Field Survey 2025

Table 1 shows that out of 55 respondents, 35 were male representing 63.6%, while 20 were female representing 36.4%.

Table 2: Age of the respondent

Responses	Frequency	Percentage (%)
20-30	30	54.5
31-40	15	27.2
41-50	10	18.3
Total	**55**	**100**

Source; Research Field Survey 2025

Age presentation shows that 30 (54.5) were between 20-30 years of age 31-40, 41-50 were 15, 10, representing 27.2%, 18.3% respectively

Table 3: Occupation of the respondent

Responses	Frequency	Percentage (%)
Civil Servant	15	27.2
Public Servant	10	18.3
Self Employed	20	36.4
Others	10	18.3
Total	**55**	**100**

Source; Research Field Survey 2025

Above table shows that 15 were Civil Servants representing 27.2%, Public Servants were 10 with 18.3%, Self employed were 20 showing 36.4%, others 10 (18.3%) respectively.

Table 4: Job Position of the respondent

Responses	Frequency	Percentage (%)
Builder	15	27.2
Architect	10	18.3
Civil Engineer	20	36.4
Quantity Surveyor	10	18.3
Total	**55**	**100**

Source; Research Field Survey 2025

From table above, shows 15 respondents representing 27.2% are Builders, 10 respondents are Architect while 20 respondents representing 36.4% are Civil engineer which constitute majority of the respondents also 10 respondents are quantity surveyor represented by 18.3% in total.

Table 5: Working Experience of the respondent

Responses	Frequency	Percentage (%)
1-5 years	13	23.6
6-10 years	27	49.1
11-15 Years	10	18.2
16-20 years	5	9.1
Total	**55**	**100**

Source; Research Field Survey 2025

The table above showed that 13 respondent representing 23.6% has nothing less than 1-5 years experience, 49.1% constituted 6-10 years of experience, 18.2% were of the opinion that they had 11-15 years of experience, while 5 respondents agreed on 16-20 years experience which constitute 9.1%.

Table 6: Educational Qualification of the respondent

Responses	Frequency	Percentage (%)
SSCE	15	27.2
ND/NCE	10	18.3
HND/B.SC	20	36.4
PGD/M.SC	10	18.3
Total	**55**	**100**

Source; Research Field Survey 2025

Above table shows that 15 are SSCE certificate holders with (27.2%), ND/NCE holders are 10 with 18.3%, HND/B.SC are 20 showing 36.4%, the PGD/M.SC 10 (18.3%).

Table 7: Critical building elements to building collapse

Responses	Frequency	Percentage (%)
Foundation	10	18.18
Column	10	18.18
Beam	5	9.09
Slab	5	9.09
Wall	20	36.3
Roof	5	9.09
Total	**55**	**100**

Source; Research Field Survey 2025

The table above indicates that critical building elements to building collapse which is mostly represented by respondents that it wall with 5 (9.09), some foundation and column with 10, (18.18%) respectively while same accuracy of respondents chose beam, slab and roof which is duly represented by 5 (9.09%) individually.

Table 8: Impact of Building Collapse

Responses	Frequency	Percentage (%)
Insignificant	10	18.2
Minor	10	18.2
Major	20	36.4
Catastrophic	15	27.2
Total	**55**	**100**

Source; Research Field Survey 2025

The table above indicates the impact of building collapse, 18.2% of the respondents said its insignificant same percentage of respondents also chose minor. Majority of our respondents which is represented by 20 (36.4%) said its impact is major, also catastrophic is represented by 27.2%.

Table 9: Frequency of building fail & faulty construction

Responses	Frequency	Percentage (%)
Never	5	9.1
Often	10	18.2
Sometimes	10	18.2
Rare	25	45.4
Always	5	9.1
Total	**55**	**100**

Source; Research Field Survey 2025

The table above shows frequency of building fail & faulty construction in the case study are rare with 25 respondents represent by 45.4% attesting to the said question, while 10 (18.2%) indicated that it happens sometimes and often respectively, while 5 (9.1%) said it happens often and rare respectively.

Table 10: Professionals responsible for faulty building

Responses	Frequency	Percentage (%)
Developer	10	18.2
Architect	15	27.2
Building	15	27.2
Civil/Structural Engineer	10	18.2
Quantity Surveyor	5	9.2
Others	-	-
Total	**55**	**100**

Source; Research Field Survey 2025

The table above indicates that Professionals responsible for faulty building are Architect and Building Engineer has indicated by 15 (27.2%) each on one of the respondents, while 10 (18.2%) indicated its developer, civil/structural engineer are represented by 10 (18.2%), quantity surveyor 5 (9.2%).

Table 11: Rating to causes of building failure

Responses	Frequency	Percentage (%)
Contract Supervision	10	18.2
Monitoring/enforcement	15	27.2
Construction Process	20	36.3
Design Process	5	9.2
Design Supervision	5	9.2
Total	**55**	**100**

Source; Research Field Survey 2025

The table above shows the rating to causes of building failure: Construction Process has the highest response of 20 (36.3%), Monitoring/enforcement 15 (27.2%), Contract Supervision 10 (18.2%) as indicted by the response received also design process and its supervision 5 (9.2%) respectively.

Table 12: Direct causes of defects in design, production management and workmanship:

Responses	Frequency	Percentage (%)
Lack of Knowledge	5	9.1
Lack of Information	10	18.2
Lack of Motivation	10	18.2
Stress, Shortage of Time	25	45.4
Risk	5	9.1
Total	**55**	**100**

Source; Research Field Survey 2025

The table above shows Direct causes of defects in design, production management and workmanship in the case study are rare with 25 respondents represent by 45.4% attesting to the said question, while 10 (18.2%) indicated lack of motivation and lack of information respectively, while 5 (9.1%) said risk and lack of knowledge respectively.

Table 13: How does most Developers contribute to Building Collapse:

Responses	Frequency	Percentage (%)
Personal Greed	5	9.1
Lack of Maintenance	10	18.2
Lack of Funds	10	18.2
Dealing with Quacks	30	54.5
Total	**55**	**100**

Source; Research Field Survey 2025

The table above shows How does most Developers contribute to Building Collapse in the case study are rare with 30 respondents represent by 54.5% attesting to the said question, while 10 (18.2%) indicated lack of maintenance and lack of fund respectively, while 5 (9.1%) said personal greed of knowledge respectively.

Table 14: Rate the effects of building collapse on Human Lives:

Responses	Frequency	Percentage (%)
Very High	10	18.2
High	30	54.5
Fair	15	27.3
Undecided	-	-
Total	**55**	**100**

Source; Research Field Survey 2025

The table above shows the effects of building collapse has on Human Lives: according to the response above majority of the response received indicated that it has a high effect on human while 10 (18.2%) choose very high, 15 (27.3%) fair.

Table 15: Developers contribute to faulty building constructions

Responses	Frequency	Percentage%
Strongly Agreed	5	9.1
Agreed	20	36.3
Undecided	10	18.2
Disagree	15	27.3
Strongly Disagree	5	9.1
Total	55	100

Source: Research field survey 2025

From the table above, it is indicated that 9.1% strongly agreed to the statement, while 36.3% choose agreed, 18.2 response was undecided, 27.3% disagree while 9.1% of responses received decline and it shows strongly disagree to the statement in the treble above.

Table 16: Government Decisions are mostly responsible for faulty constructions in building projects

Responses	Frequency	Percentage%
Strongly Agreed	15	27.3
Agreed	5	9.1
Undecided	5	9.1
Disagree	20	36.3
Strongly Disagree	10	18.2
Total	55	100

Source: Research field survey 2025

From the table above, it is indicated that 27.3% strongly agreed to the statement, while 9.1% choose strongly agreed, 9.1% response was undecided, 36.3% disagree while 18.2% of responses strongly disagree to the statement in the treble above that government decision are mostly responsible for faulty constructions in building projects

Table 17: Sub-standard material & Poor workmanship positively influence faulty construction in building projects

Responses	Frequency	Percentage%
Strongly Agreed	5	9.1
Agreed	20	36.3
Undecided	10	18.2
Disagree	15	27.3
Strongly Disagree	5	9.1
Total	55	100

Source: Research field survey 2025

From the table above, it is indicated that 9.1% strongly agreed to the statement, while 36.3% choose agreed, 18.2 response was undecided, 27.3% disagree while 9.1% of responses received decline and it shows strongly disagree to the statement in the table above that Sub-standard material & Poor workmanship positively influence faulty construction in building projects .

Table 18: Defects that occur in building projects basically leads to lack of trust on the company and even on the contractor.

Responses	Frequency	Percentage%
Strongly Agreed	5	9.1
Agreed	20	36.3
Undecided	10	18.2
Disagree	15	27.3
Strongly Disagree	5	9.1
Total	55	100

Source: Research field survey 2025

From the table above, it is indicated that 9.1% strongly agreed to the statement, while 36.3% choose agreed, 18.2 response was undecided, 27.3% disagree while 9.1% of responses received decline and it shows strongly disagree to the statement in the table above which says defects that occur in building projects basically leads to lack of trust on the company and even on the contractor.

Table 20: Faulty construction in building projects has a detrimental effect on both the employer and employee on or off site

Responses	Frequency	Percentage%
Strongly Agreed	5	9.1
Agreed	20	36.3
Undecided	10	18.2
Disagree	15	27.3
Strongly Disagree	5	9.1
Total	55	100

Source: Research field survey 2025

From the table above, it is indicated that 9.1% strongly agreed to the statement, while 36.3% choose agreed, 18.2 response was undecided, 27.3% disagree while 9.1% of responses received decline and it shows strongly disagree to the statement in the table above which says Faulty construction in building projects has a detrimental effect on both the employer and employee on or off site

4.3 DISCUSSION OF FINDINGS

From the perception of the Architect‘s hiring unqualified designers seem to be the most severe defects caused by faulty design while the Builders agreed on inadequate structural design such as foundation the most severe defects caused by faulty design on maintenance. Insufficient concrete covers were both agreed by the Architects and Builders to be the most severe defect caused by faulty construction on maintenance. Speedy completion of work, inexperience workmen and lack of motivation were both agreed to because by contractor administrations and staff by the Architects and Builders. The architects believes misjudgment of climatic condition is most severe defects caused by consultant administration and staff while the Builders rank incomplete implementation as the most severe defects caused by the consultant firm and administration staff.

Perceived roles of project participants in ensuring quality of construction projects control on faulty construction and minimal cost of maintenance reveals that majority of the responsibilities lies between the architects, builders and civil engineers. Their responsibilities are closely related that each one rely on each other to achieve results, these responsibilities should not only be confined on the architects, builders and civil engineers but also from the client to the contractors, consultant and manufacturers of building materials, all must work together to avoid the issue of faulty construction and unnecessary expenditure on building maintenance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

1. The three categories of respondents agreed that the major causes of building collapse are the use of sub-standard materials and poor workmanship. Also, they agreed that defects in building leads to building collapse.
2. Both the government, developers and professionals are contributing in one way or the other to the causes of building collapse in Abuja, and making efforts to eradicate occurrence of building collapse in Abuja due to its rampancy.
3. The incidents of building collapse calls for serious site works and also to investigate the quality of materials, craftsmen and the nature of contractors involve in the construction on sites.

Therefore, recommendations given by the research and respondents should be taken with serious attention and it will proffer lasting solution to the causes of building collapse in Abuja and Nigeria at large.

5.2 CONCLUSION

From the above findings, the study concludes that ensuring defects free construction, the construction process is dependent on teamwork rather than personal competitiveness which will enhance a quality building and minimal cost of maintenance in the future. According to assaf etal(1995) quality assurance QA/QC should be implemented during the design and construction stage to avoid defects and mistake, hence quality of building should not be limited only to a particular person but the responsibilities of all parties involved in construction. Also, the performance of contractors on a project should be monitored to avoid spot inspection" due to is busy schedule in supervising other construction projects, these contributes to the speedy completion of work which usually have a serious effects on the building and maintenance. On the contractor's experienced workmen should be deployed to work on construction site to avoid abuse of standard and a substantial loss of resources through future maintenance.

Finally, contractor should endeavor to always comply with the specification to avoid cases where concrete cover will be inadequate or insufficient.

5.3 RECOMMENDATION

Having carried out due analysis and interpretation of data gathered from both primary and secondary sources, the following are recommended;

1. The developers should not be in a hurry and also keep enough funds for development and deal directly with professionals with good track records and credibility.

2. Building professionals should ensure to carryout proper and efficient supervision of works on site as well as thorough inspect of materials to be used for the construction from sub-structure to superstructure.

3. The government and professional team involve in building construction ought to enlighten each other on how to embrace good and quality professional practice as well as enlightening the general public from time to time on the best professional to approach whenever the decision to go into development is made. Also, to warn them that if the right channel is not pass or using the right people, the end result could be disastrous.

4. Government should enact a Law that will aim to curbing the use of sub-standard materials and making sure that high quality material prices are subsidised so that all income level can afford it. Hence, if all these recommendations can be taken seriously, it would provide a lasting situation to the menace of collapsed building and the psychological traumas it causes on its victims.

5. Government should ensure that before any work commence on site, the materials to be used must be stamped by various professionals working on the site.

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APPENDIX I

SECTION A

Department of Building Technology,

Institute of Environmental Studies,

Kwara Polytechnic,

Ilorin.

Dear Respondent,

I am student of the Department of Building Technology, Studying for Higher National Diploma (HND) at the above named institution are conducting a research study on topic "An Evaluation of the cause, impacts and frequency of building collapse in Nigeria (A case Study of Lagos State)".

This exercise is purely for academic purposes. Your responses will be treated with utmost confidence and your anonymity is highly guaranteed.

Thanks for your anticipating cooperation

Yours faithfully,

Adeniran Soliat Omobolanle

HND/23/BLD/FT/0078

APPENDIX II
QUESTIONNAIRE

Respondent Demography

1. Sex: Male ( ) female ( )
2. Occupation: a. Civic Servant ( ) b. Public Servant ( ) c. Self-employed ( )
3. Age distribution a. 20-30 ( ) b. 31-40 ( ) c. 41-50 ( )
4. Job position a. builder ( ) b. architect ( ) c. civil engineering ( ) d. Quantity surveyor ( )
5. Working experience a. 1-5 ( ) b. 6-10 ( ) c. 11-15 ( ) d. 16-20 ( )
6. Academic qualifications a. OND ( ) b. HND ( ) c. Bsc ( ) d. Msc ( ) other ( )

Section B

7. Critical building elements to building collapse: a. Foundation ( ) b. Column c. Beam ( ) d. Slab ( ) e. wall ( ) f. Roof ( )
8. Impact of building collapse: Insignificant ( ) Minor ( ) moderate ( ) major ( ) catastrophic ( )
9. Frequency of building fail & faulty construction: Never ( ) Often ( ) Sometimes ( ) Rare ( ) Always ( )
10. Professionals responsible for faulty building: Developer ( ) Architect ( ) Building Engineer ( ) Civil/structural Engineer ( ) Quantity Surveyor ( ) ( ) Building Engineer ( ) others ( )
11. Rating to causes of building failure: Contract Supervision ( ) Construction Process ( ) Monitoring/enforcement ( ) Design Supervision ( ) Design Process ( )
12. Direct causes of defects in design, production management and workmanship: Lack of Knowledge ( ) Lack of Information ( ) Lack of Motivation ( ) Stress, Shortage of Time ( ) Risk ( )
13. How does most Developers contribute to Building Collapse: Personal Greed ( ) Lack of Maintenance ( ) Lack of Funds ( ) Dealing with Quacks ( )
14. Rate the effects of building collapse on Human Lives: Very High ( ) High ( ) Fair ( ) Undecided ( )

SECTION C

Note: Key words, strongly Agreed [SA], Agreed {A}, Undecided [U], Disagree [D], Strongly disagreed

RESPONSES	**SA**	**A**	**U**	**D**	**SD**
Developers contribute to faulty building constructions					
Government Decisions are mostly responsible for faulty constructions in building projects					
Sub-standard material & Poor workmanship positively influence faulty construction in building projects					
Defects that occur in building projects basically leads to lack of trust on the company and even on the contractor					
Faulty construction in building projects has a detrimental effect on both the employer and employee on or off site					