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## An Investigation into Building Functional Failures in Nigeria (A Case Study of Ibadan, Oyo State Capital)

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### A B S T R A C T

#### Keywords:

failure,  
Industry,  
Owner & Agents  
Qualified  
Professionals  
and Artisans.

*This paper presents the results of a study on 100 commissioned residential buildings in Ibadan with costs ranging from 3 – 30 million Naira. The study has identified factors influencing building functional failures. While others factors are more visible, building functional failures remain undetected problems for building owners and the industry. Owners and Real Estate Agents concerned do not notice the amount of money being wasted each year on maintenance of their buildings. The data used for this study was collected through the use of questionnaires. All questionnaires were sent to the Real Estate managers and building owners. The findings showed that none of the buildings investigated function as expected. The study has highlighted the hidden problems of building industry in Ibadan. The analysis of the study showed that Artisans in Ibadan are not professionally skilled to handle professional jobs. Therefore the study recommends that Artisans in Ibadan be retrained to be able to handle professional jobs.*

### 1. Introduction

The scenery of building functional failures is not a topic that most engineers, builders and building contractors aspire to acknowledge or discuss. In building and construction industry, building functional failures is a physical reality and possibility. The complexity and fragmented nature of the industry and its highly casual employment of labour makes it sensitive to building functional failures. Building and construction industry is unique in characteristics, the uniqueness of the industry kept this problem under the red carpet. Moreover, it has created a continuous serviceable maintenance economic glitch which the industry and building owners cannot manage and at the same time the industry stakeholders do not know how to document the problem of building functional failure for future reference. Mistakes of a lawyer or Doctors can be covered up but problems created by an engineer cannot be covered up; they would be seen as National and International tragedy, a professional failure blemish the reputation of the industry and engineering professions. Considering the line of previous studies, building functional failure is associated with building collapsing, risk factors and project costs and time frame. In citation of previous studies, little attention is being paid to building functional failure factors. The impact of building functional failure factors have long been existing without being recognized. Building functional failures can be described as economic taxing imposed on building owners by the industry or contractors.

In this context, the study will attempt to define, investigate and identify the roles of artisans and other professionals' contribution to building functional failures in Ibadan, Oyo State.

#### 1.2 Building Deficiency and Failure

Lee (1987) showed that building defects can occur in one or more of the three subdivisions of a building, foundation, wall and roof. According to this author construction industry defect is inherent in the building and construction industry. In reality building and construction industry accommodate mistakes when visible, it becomes human error and it can be corrected. Roddis (1993) described building failure as imperfection, deficiency or fault found in a building element or component which adversely affects its functional performance or appearance. Fakoalde (1994) investigated building failures factors. He found that the major factor influencing building failures were inability of engineers' failure to make right engineering decisions and judgment. Normally the aim of most engineers is that faults and defect will be found before a project is completed. If detected will be evident at the completion of the contract, if not, will be revealed sometime after completion (latent defects). Latent defects can be categorized into two ways the products and the process of design and construction Building Functional failure is worse than latent defects. Building Functional failure is more related to performance failures, crime committee under building and construction contracts which are not binding under any legislative building codes. Failure to make engineering decision does not create building functional failures. Building functional failure is being created by their inability to control the work of Artisans. Dov kaminetzky (1991) indicated that the great liability the engineers compared to men of other profession is that

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they perform their responsibilities in the open construction site where all men can see them. He/she cannot argue their failures into thin air or blame judges like lawyers; also he/she cannot cover his/her failures with trees and vines like the architects, also cannot screen his shortcomings by blaming his opponents and hope the people will forget like the politicians. Engineers cannot simply deny his/her action regarding his or her tasks. Building functional failures is being created and transferred to building owners, Estate Agents and their tenants by local subcontractors or Artisans supervised by engineers. Engineers cannot walkway it is their duty to control Artisan's work.

### 1.2.1 Causes of Failures

Failure is a human act and is defined as omission of occurrence or performance, lack of success, non-performance, insufficiency, loss of strength and cessation of proper functioning of performance. The four essential elements of a construction project include concept, design, performance and use of a successful project. These elements are essentially defined as Knowledgeable (Training and Education), Competence (Experience) and Care (Control). Nearly all construction failures are traceable to human errors; which are unintended deviations from correct and acceptable practice and thus are avoidable. Human errors are associated with Errors of performance (carelessness and negligence), Errors of intent (greed) and Errors of knowledge (ignorance). Carelessness and negligence includes errors in calculations and detailing, incorrect reading of drawings and specifications and defective construction. There are other errors like execution and lack of care. Greed is another error committed where the offender deliberately use Worn-out and sub-standard material, equipment and tools for construction just to reduce cost, taking short cuts and risk; accepting work of poor standard to accelerate construction work. Ignorance is often the result of insufficient educations, training and experience; lack of communication is another form of ignorance. Ignorance is also evidence when we use bold new designs on large-scale projects without thorough preparation, study and testing.

### 1.2.2 Maintenance of Building Functional Failures

The Building and Construction Industry in Ibadan has no statistically valid and proven method that accurately assessing the actual cost of maintenance relating to building functional failures. A conservative estimate of maintenance cost imposed on the building owners, Estate Agents and Occupiers on an annual basis may be run over to be more than a billion of Naira. Building functional failure is not under legislative building code, hard data not available the extent of costs of building functional failures cannot be analyzed or estimated by mere observation. Building functional Failure has become a problem for the industry, building owners, Restate Agents and occupiers. The purpose of this study is to create awareness to alert building Industry and suggest new guidelines for future documentations of agreements between/among contractual parties (Owners, Builders/Artisans, Designers and Project Managers). Also to devise effective systems to deliver quality projects on time and within budget to meet owner's needs.

### 1.2.3 Overview of Major Causes of Building Function Failure

Thirty two variables were developed, investigated and analyzed. The analysis showed that only 13 variables were cleared to be majorly responsible for building functional failures in Ibadan Oyo State. All variables identified are listed in Table 1 blow and none of these variables scored less than 50% and except Door which scored 48%. Moreover, other variables that are not included in the Table scored less than 40%, this indicates that all variables identified are equally very important and significantly important.

## 2.0 Research Approach

The study is limited to Ibadan Metropolis Business districts where its commercial/residential buildings were investigated. 100 questionnaires were mailed/ delivered by hand to commercial/residential buildings owners and Real Estate Agents in Ibadan Metropolis in which 70 responses were collected and

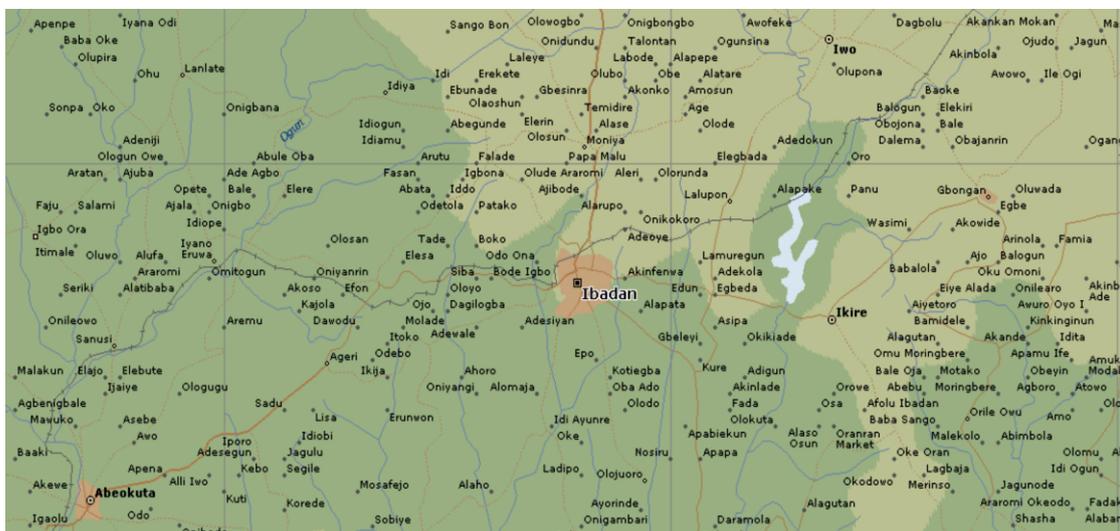


Plate 1a: Map of Ibadan



Plate 1b: Picture of Ibadan

analyzed using Microsoft Excel. Mail questionnaires were selected as a means of data collection because of financial constraint and problems of distribution and follow up questionnaires, harassments at the security post is very common in this area.

2.1 Background

Ibadan Metropolitan (Oyo State)

Ibadan, City in South western Nigeria, capital of Oyo State, located about 110 km north east of Lagos State. Ibadan is major transit point between the Coast and areas to the North. The city is on the rail road line linking Lagos with Kano and as well connected by road to other cities in the region. It is a center of trade for a farming area, producing cacao, palm oil, yams, cassava, corn and fruit. Industries include the processing of agricultural products, brewing, vehicle assembly and the manufacture of cigarettes.

Higher Institutions include Universities (UI etc.) and several major Research Institutes (Cocoa etc.). Most of Nigeria leading Publishing companies are based in Ibadan. Inhabited mainly by Yoruba people and the population 2007 was 3, 570,000.

3.0` Data Analysis/ Results

Table 1 shows the relative weight of 13 major factors identified in this study. Clearly these are the most significant factors responsible for building functional failures in Ibadan. Of these factors there are other factors not included in this table and they are equally significant? However, the analysis of these factors reveals other category of building functional failures.

Figure 1-13 present the variable Pie Charts. The Figure1 shows the total percentage of respondents participated in the study. There were different views among building owners and Real Estate Agents respondents (Very Important 4-to not important1). However, the Figure 1 shows that 72% of the Building Owners and Real Estate Agent participants have indicated that Building Materials contributed to the Building Functional Failures in Ibadan.

Table 1: Factors of Functional Failures

Building Materials 72%	Lack of Fund 67%	Unforeseen problems 65%	Borehole 62%	Cracks 60%
Ineffective contractor 59%	Plumbing 56%	Roof Deformation 55.3%	Timber Defective 54%	Pest 53%
Incorrect Design 55.56%	Windows 51.0%	Doors 48%		

According to them most of these buildings investigated are newly completed buildings, yet they complained about functional failures. Most of building owners complained about the skill and the quality of Artisans available in the job market during the time of the study. Nearly 50% of participants complained about skill problems and commented that is creating problems for building and construction industry in the area. This problem is a nationwide problem, not be limited to Ibadan in Oyo State.

4. Results

Figure 1-13 present the percentage of respondents' views on each factor identified. Figure 1 below shows the total number of respondents who responded to the question related variable (Building Materials). The result communicates the different opinion among the building owners and Real Estate Agents. The majority of building owners and Real Estate Agent see themselves as silent victims of building functional failures glitches transferred on them by their contractors without being aware. Figure 1 below shows that 72% of participants' underlined poor quality materials below specification. As can be seen in the figure 1 there is significance in percentage scores indicating that the problem is spread over Ibadan Metropolis.

Figure 2 below shows that 67% of respondents indicate that their building is experiencing lack of Fund related glitches. Both Owners and Real Estate Agents have signposted that lack of fund

as a factor of building functional failures in Ibadan. This indicates that majority of building owners depend on financial resources available to them. It means majority of building owners could not afford to buy quality materials or employed qualified professional contractors.

Figure 3 illustrates that about 62% of building owners participated in the study did not consider unforeseen problems as glitches at the time they were planning to build. They did not consider this as a factor because of the information available to them at that time of project implementation. It may be worthwhile for building owners to seek professional advice before taking decision to erect a building.

Figure 4 hows that about 62% of both building owners and real Estate Agents in Ibadan participated highlighted the problems of boreholes related. The analysis indicated that the problem may be associated with weather, building locations or borehole contractors.

However, those professional boreholes contractors are not available for interview /comment to find out their opinions.

Figure 5 below shows that 54 % of both building owners and Real estate Agents participants highlighted Timbers a major factor of building functional failure. As can be seen from the figure about 54.1% of respondents commented on the poor quality wood available in the market at that time they were carrying out their buildings projects, according to them most of these timbers were defective.

Figure 6, indicates that 57% of the building owners and Real Estate Agents respondents indicated that cracks as a major factor responsible for building functional failures in Ibadan. The categories of Cracks observed in most of the building examined were not limited to the age of those buildings. Cracks are regarded as critical problems.

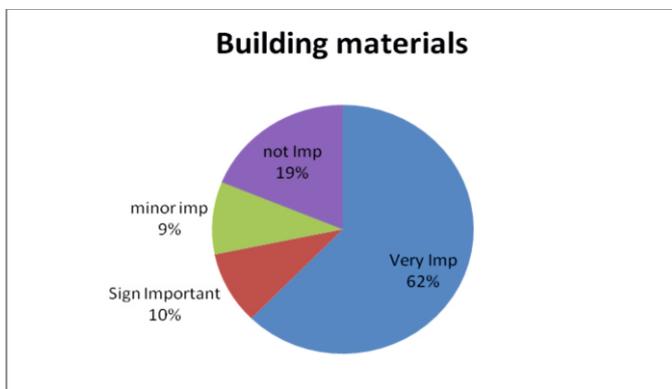


Figure 1 Building Materials

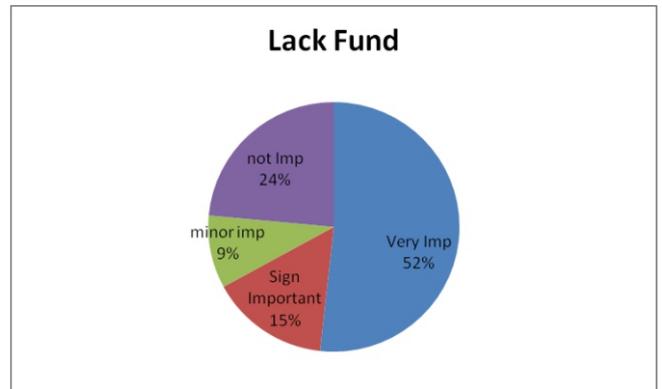


Figure 2: Lack of Funds

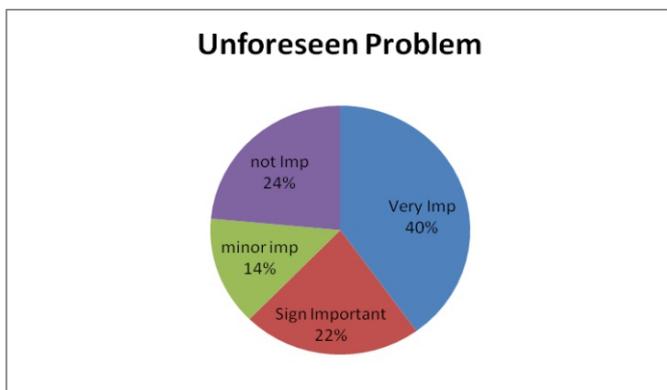


Figure 3: Unforeseen problems

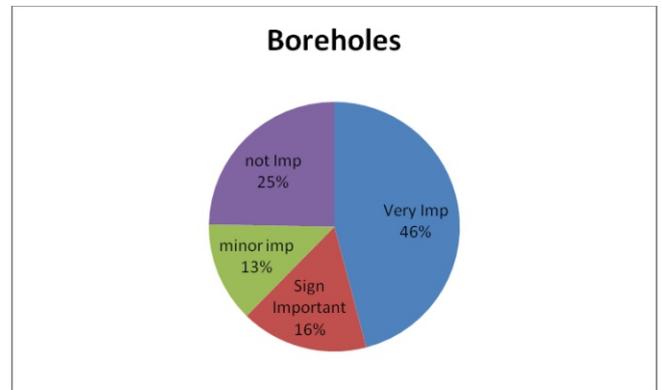


Figure 4: Borehole

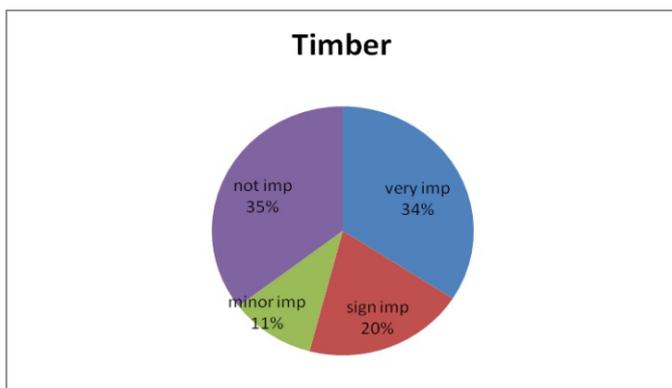


Figure 5: Timber Defective

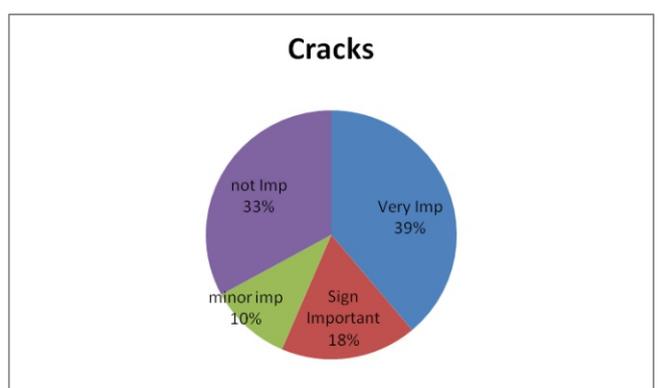


Figure 6: Cracks

Figure 7 below shows 59% of building owners and Real Estate Agents participated in the study underlined ineffective contractor as a major building functional failures factor. Ineffective contractors in Nigeria are a common all over Nigeria is not limited only to Ibadan. The common reason for this is that building owners and Real Estate Agents would prefer to use available Artisans in their local community (Bricklayers) instead of using professional qualified Engineers or Builders outside their communities. Local Artisans are cheaper and they are always available in every community in Nigeria.

Figure 8 indicates that plumbing is a factor that contributes to building functional failures. Out of the population of Building Owners and Real Estate Agents participated in the study, 53% revealed that plumbing is a key factor causing building functional failures. The rest 47% represent newly completed buildings or recently commissioned are not facing plumbing problems at present.

Figure 9 shows that 55% of building owners and Real Estate Agents participated in the study highlighted roof as one of the major factors building functional failures. Mostly flat roof failed because of poor quality materials and Artisans specifically contractors involved. Roofs in general failed due poor quality materials and the contractor handled the roof construction work. This problem is not only associated with old buildings also new buildings are experiencing roofs functional failures.

Figure 10 shows that only 53% of respondents in the study indicated that pests contributed immensely to building functional failures. It shows that most of their buildings are experiencing pest problems. As can be seen this problem is not associated with the age of building, newly completed building are also experiencing the same problems.

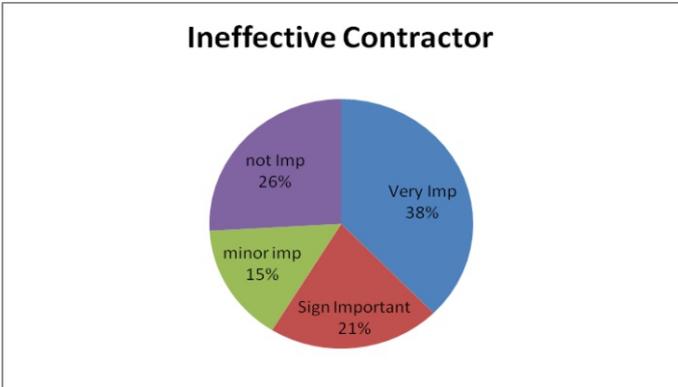


Figure 7: Ineffective Contractors

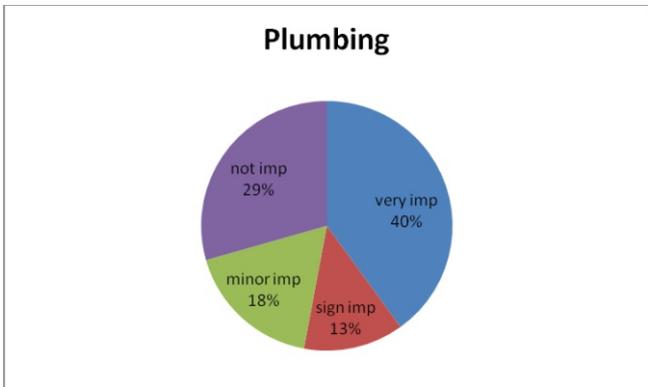


Figure 8: Plumbing

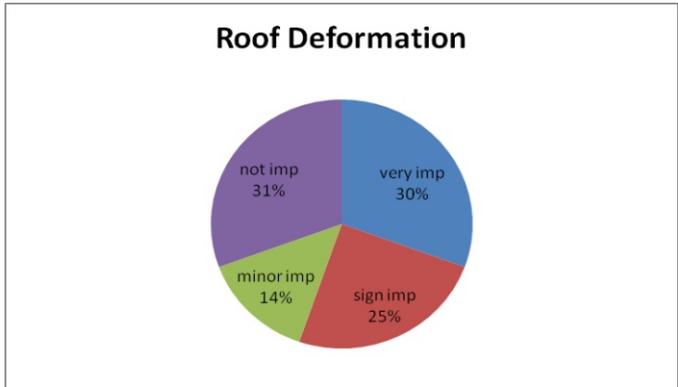


Figure 9: Roof Failure

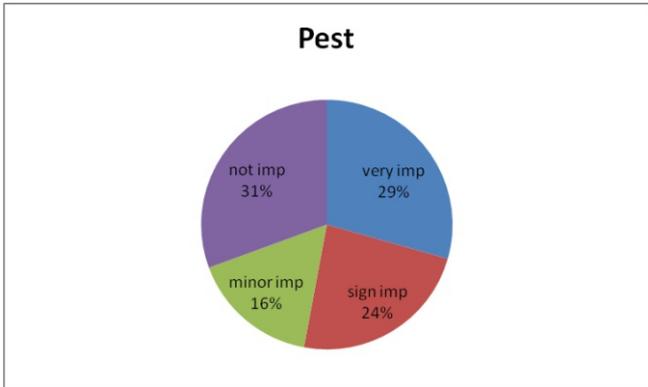


Figure 10: Pest problem

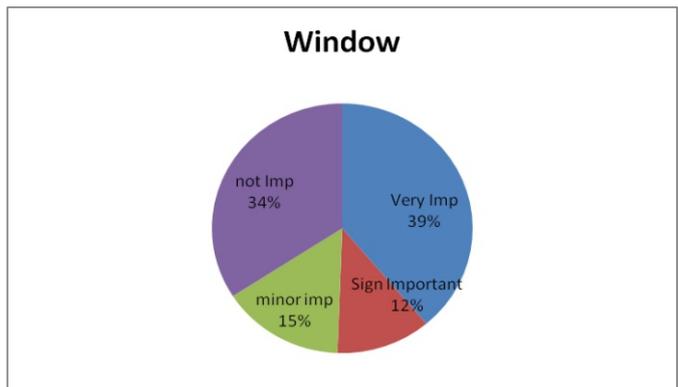


Figure 11: Windows



Figure 12: Doors

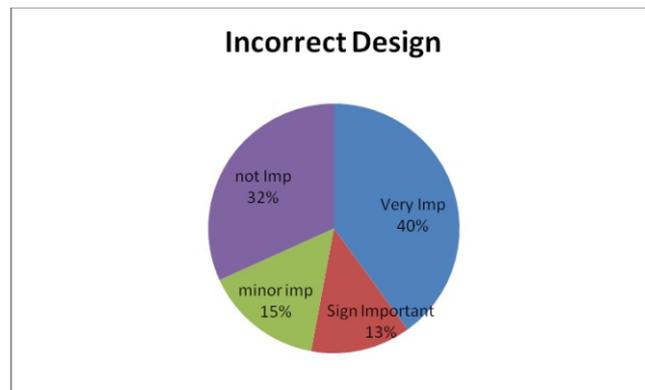


Figure 13: Incorrect Design



Plate 1: Building cracks



Plate 2 plumbing problem



Plate 3: Roof failure

Figure 11 shows that 51% of building owners and Real Estate Agents respondents underlined windows a factor contributing to building functional failures. However, those buildings that have window problems may be associated with weather, the age of their buildings and also faults might have risen from subcontractors or Artisans who have failed to execute their jobs properly.

Figure 12 shows that only 48% of respondents indicated that doors contribute to building functional failures. Those buildings affected may or not be associated with the age of the building because newly built building also are experiencing the same problem. However, this problem may be associated with the Artisans, materials and weather.

Figure 13 indicates that only 53% of respondents underlined

incorrect design as a major building functional failure. However, those building owners did not indicate whether it was architectural design or structural design whatever be the case, this is seen as professional negligence.

### 1.7 The Findings

The gap between research and practice is long-standing. Most of the researchers who have addressed this gap have advocated a linking of inquiry and application. In the building and construction industry in Nigeria, this problem has not been addressed. Moreover, the problem with the industry is that conclusions are not viewed in the same way by the different Building Owners and Real Estate Agents. Problems drawn from the analysis of this study can be divided into the following categories: failures, ineffective contractors and Skilled

and Unskilled Artisans, including role of stress. Building Owners and Real Estate Agents views are highly considered and analyzed critically the results showed that none of the buildings investigated were found free of building functional failures. The role of failure is associated with the behavior of contractors and unskilled artisans. Artisan's attitude towards their work responsibilities can be described as unprofessional ethics; as a result there is an overlap in their ways of conducting their professional work or duties. The study identified the following:

1. Building owners face different problems. Their related reasons towards these problems are not uniform especially concerning ineffective contractors and Para-professionals.
2. Para-professionals are not skilled enough to implement craft work without proper supervision.
3. The industry lack Artisan skills.
4. Skill problems are not viewed as industry problem
5. Building Functional Failures are not guided by written rules, policies and issues

#### 5. Conclusion and Recommendation.

The Building and Construction Industry, although a field of practice throughout history, is a young field of study that has

experienced ups and downs in research since the World War II. The narration of that unfolding knowledge base can be traced in Nigeria through the work of our four fathers and colonial masters. The tradition of providing research overview for the industry has just begun in Nigeria. The expansion of research will continue to occur. Therefore, the study recommends that Artisans in Ibadan be retrained and building functional failures be incorporated into building rules and regulations. New contract policy should be developed to restrain unqualified contractor from executing professional jobs.

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