

Builder's View on The Incessant Building Failures And Collapse In Nigeria: A Call For An Effective National Building Code

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ABSTRACT : This study highlighted importance and the need for an effective national building code in Nigeria for smooth operation, quality, safety and proficiency in the building industry. It also reviewed past and current literatures on building failures and collapse in Nigeria in order to generalize or summarize the major causes of incessant building failures and collapse with the aim to providing a lasting solution to the problem. This situation has raised much fear and worry about the safety of lives and property in the country. The study revealed man-made factors to be the cause of building failures and collapse, also identified some possible sources of the problems. And because is a man-made factor, the author strongly believed that it can be avoided or managed in a system that works. The study however revealed the fundamental possible causes of incessant building failures and collapse in Nigeria which include non-regulatory arm of the building production, lack of respect and negligence in the use of some key professionals in the building industry, design work by non-professionals and untrained persons are being used for construction of buildings, buildability and maintainability analysis are not often carried out on production drawings, lack of effective National Building Code and Unprofessional and unqualified personnel (quacks) manage building production. Suggestions and recommendations were made in order to make a positive impact in the Nigerian construction industry.

KEYWORDS: *Builder's View, Building Failures, Building Collapse, National, Building Code, Nigeria.*

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I. INTRODUCTION

Building is one of the most valuable assets of mankind and for that it needs to be properly structured. The incidence of building failures and collapse that are associated with man-made factors has become a major issue of concern in Nigeria's states. It has become a regular occurrence for residential and commercial buildings to collapse as if the stakeholders and the building industry are ignorant of the phenomenon. Some of these buildings collapse under construction and many others being occupied by the users which has resulted in lost of lives, properties, money and time. And these man-made factors which was as a result of human errors within the whole processes of building delivery can be avoided with a good system in place. The National Building Code we know today was crafted and agreed by all the stakeholder in the Nigerian Built environment in 2006, with the aim to set minimum standard on building Pre-design, Designs, Pre-construction, Construction and Post Construction stages with a view to ensuring quality, safety and proficiency in the building industry. Twelve years after, this publication in the industry still remain very fragmented and operating in 'Business-as-usual'. It is for these reasons that the study tends to achieve the following objectives:

1. To identify and examine carefully the fundamental possible causes of incessant building failures and collapse in Nigeria, with a view to suggesting lasting solutions to solve the problems.
2. To establish the need for an effective National Building Code as an instrument for curbing irregularities that causes building failures and collapse in Nigeria.

II. LITERATURE REVIEW

2.1. Building Failures and Collapse

Building is one of the most valuable assets of mankind and for that it needs to be properly structured. Building failures and collapse are as a result poorly structured or planned. Which is in line with the saying that if you fail to plan then you plan to fail. Also, if a building or its component fails to perform the purpose which it is designed for, then that building has failed. Secondly, building collapse occur when the structural elements or

substantial parts of the building structure loses its ability to withstand the load is carrying. Generally, there are two major classifications of building collapse, which are natural and artificial. The natural causes can be due to earthquake, hurricane, and the like while the artificial or man-made causes can be due to human errors and others similar to it.

In present times, building collapse in Nigeria has become so rampant that one has practically lost count of the number in quantitative terms and its geographical spread of the phenomenon suggests a high occurrence in the following major cities of the South; Lagos, Port Harcourt, Abuja and Enugu including commercial towns like Onitsha and Awka in Anambra state [24]. According to Oyedele[28] there is no state in Nigeria, and the Federal Capital Territory that building collapse has not occurred in the past 10 years. The rate of incessant building collapse in Nigeria is so high that, in every six months at least one or more incidence of building collapse must occur somewhere in the country and that the frequency of these events has not only become a source of concern but also have put the citizenry at a high level of uncertainty of the construction works and thereby affecting the economy [6]. The frequency of this collapse will even tempt public to say is a deliberate act. The high rate of building collapse in Nigeria has become so worrying that one wonders if it is a deliberate design to reduce the population of the country [24]. The incessant building failure and collapses in Nigeria does not speak well to the values and integrity of professionals in the industry, also portrays Nigerian building industry as corrupt due to sharp practices of some of its dishonest elements [17].

In order to address the objective 1, the study first reviewed the past and current literatures on building failures and collapse in Nigeria in order to generalize or summarize the major causes of frequent building failures and collapse in Nigeria with the aim to providing a lasting solution for the problem. Table 1, shows the major findings of different researchers from 2007 to 2017 on the issue of building failures and collapse in Nigeria.

Table 1. Causes of building failures and collapse in Nigeria as identified by various researchers.

S/No.	SOURCE (Publications)	MAJOR FINDINGS (Causes of the Building Failure/Collapse)
1	[26] Opara (2007)	Poor workmanship, use of cheap and inferior materials, wrong interpretation of building design, inadequate supervision, non-adherence to due process in building construction, lack of maintenance culture, greedy attitude of contractors Professional in competence, the activity of the quacks, the use of plans approved for one storey building for multi-storey building and the nature of the soil are the major causes of building failure identified.
2	[11] Fagbenle and Oluwunmi (2010)	Hasty construction, low quality workmanship, poor supervision, inexperience (use of incompetent hands), ignorance, evasion/ non-compliance with building regulations and non-enforcement of building quality, standard and control on construction site/market.
3	[10] Ede (2010)	Corruption, lawlessness and our presumptions that any engineer or professional in the built environment can assume all forms responsibility in a building process without the basic skill required for it. The use of unskilled labour, inexperienced professionals, tendency of some professionals to cross-carpet to lucrative specialist duties where they lack the skill, ignorance and the abundance of quacks.
4	[22] Oloyede, et al., (2010)	Low quality building materials coupled with employment of incompetent artisans and weak supervision of workmen on site. Second, public opinion revealed that the blames of building collapse were due to non-compliance with specifications/standards, use of substandard building materials and equipment and the employment of incompetent contractors. Third, opinion of the academia on remote causes of building collapse showed that the route causes are mainly the non-enforcement of existing laws and endemic poor work ethics of Nigerians at large.
5	[29] Taiwo and Afolami (2011)	Substandard materials, quality and quantity of cement used in the construction was very poor. The concrete mix was not evenly distributed, reinforcement steel bars used in the construction of this building had low area of steel in the beams, columns and floor slabs, Proper supervision was not given, quacks were used for the design, supervision and construction.
6	[23] Oke (2011)	Poor maintenance culture, design error, poor quality of materials and workmanship, natural phenomenon and excessive loading contributed to about 7%, 15%, 52%, 7% and 20% respectively of building collapse in Nigeria with most of them being private residential buildings executed by indigenous contractors.
7	[12] Fakere, et al., (2012)	Improper demolition method, coupled with its dangerous nature, contributed to the collapse of the building. The coarse aggregates used in the construction contained impurities like biotite and muscovite, which are oxidizing agents capable of accelerating building collapse.
8	[3] Adesanya and Olanrewaju (2014)	Non-enforcement of building codes, conversion and disregard for approved drawings, use of substandard materials, poor workmanship and quackery.
9	[4] Adewole, et al., (2014)	The use of inappropriate cement grade (Portland-limestone cement grade 32.5), particularly for the construction of building foundations is a potential cause of the incessant collapse of buildings in Nigeria.
10	[27] Oseghale, et al., (2015)	Bad design, faulty construction, over loading, non-possession of approved drawings, Possession of approved drawings but non-compliance, and the use of quarks.
11	[8] Chendo and Obi	Faulty design, negligence, incompetence, faulty construction, foundation failures,

	(2015)	extraordinary loads and corruption, and forces of nature.
12	[25] Omenihu, et al., (2016)	Structural failures (24.9%), substandard materials (13.2%) and poor workmanship (12.2%), faulty design (8.8%), use of quacks (7.3%) and inappropriate foundation (6.8%).
13	[5] Akande, et al. (2016)	Use of substandard materials, coupled with the activities of quacks.
14	[2] Adebowale, et al., (2016)	Use of substandard building materials; poor workmanship, the use of quacks instead of professionals, non-enforcement of building codes or construction regulations, corruption in the building industry.
15	[19] Obot and Archibong (2016)	The use of quacks in the building industry had contributed in no small measure.
16	[20] Oduola (2017)	poor quality concrete and concrete materials which affect the strength development, durability properties, and thus the in-service load-carrying capacity of the structural elements.
17	[6] Essien and Ajayi (2017)	Weak/faulty foundations, inefficient stringent quality control in material utilization and management, boycotting the professionals, absence of proper site investigation, and the engagement of inexperienced personnel.
18	[21] Oloke, et al. (2017)	Abuse of property management functions by property owners and non-professionals alike in the management of various properties.
19	[15] Mansur and Tahar (2017)	Substandard reinforcement, structural steel and cement used for the production of foundations, columns, beams and slabs are the main causes of building collapse as a result of lapses in construction supervision.
20	[1] Adamu and Bashar (2017)	Faulty design, poor workmanship and poor-quality materials.



Figure 1. showing the front side of collapsed St. Paul's Catholic Church at Adagrassa-Ugolo, Okpe LG.A., Delta State, Nigeria on 2nd September, 2018.
Source: Bldr. Kingsley Oghoro picture coverage.



Figure 2. showing a cross section of collapsed St. Paul's Catholic Church at Adagrassa-Ugolo, Okpe LG.A., Delta State, Nigeria on 2nd September, 2018.
Source: Bldr. Kingsley Oghoro picture coverage.

According to Bldr. (Builder) Kingsley Oghoro, a construction of a new structure was going on which encircled the existing one. And that the caused of the collapse was as a result of poor construction methodology followed by the ponds created by the excavated areas which initiated instability and the collapse of the rear and right elevation walls of the existing building which now led to the eventual collapse of the roof. The congregation were saved no live was lost. This happens as a result of negligence in the use of professionals and use of Church building committee that are not experienced in the field of construction.

2.2. National Building Code

A Building code can be defined as a collection of laws, regulations and decrees or other statutory requirements adopted by a government legislative authority involved in assuring the suitability of the physical structure and welfare of the building users. And the major way of achieving this is through the compliance of law and order in all aspects of human endeavors. It explains the reason why the provision of any buildings, which involved the processes of pre-design (i.e. planning), design, pre-construction, construction and post construction stages, is not done anyhow.

The current National Building Code we know today was crafted and agreed by all the stakeholders in the Nigerian Built environment in 2006, with the aim to set minimum standard on building Pre-design, Designs, Pre-construction, Construction and Post Construction stages with a view to ensuring quality, safety and proficiency in the building industry. Twelve years after, this publication in the industry still remain very fragmented and operating in "Business-as-usual". In real terms, we still experience poor constructed buildings, structural failures and even total collapse of building within our environment. Teamwork is lacking and respect of professional specialization neglected. Section 13 of the Building Code that dealt on "Control of Building Works" is not respected but its provisions ignored by even the very professionals that sat for months to craft the very Code. It is worthy to note that if there is any sector or area Nigeria has failed since her independence, it is in the area of regulation and control of the building construction practices then a call is needed for proactive action by all stakeholders in the built environment to forestall negative practices in the industry and put an end to it[24]. Oyedele[28] has reported that "Professional builders in the country have called on the government to speed up the passage of the National Building Code in order to check some of the discrepancies in the industry".

The study of Dahiru, et al. [9] revealed that the introduction of the national building code is a step forward in improving the quality of buildings and thereby achieving sustainable built environment, and that the national building code has incorporated few sustainable construction measures and hence needs to be reviewed to incorporate more sustainable construction measures at the pre-design, design and construction stages. According to Ngwaba[16] "Revised 2017 Nigerian Building Code (NBC) is on-going with the National Council on Housing". "Contrary to the belief and views held by some people, there have always been Building laws and regulations in Nigeria that regulate and control construction of Buildings and infrastructures, what has been lacking is the institution with power and resources to enforce or ensure compliance with the building laws and regulations by developers" [14]. And this means that, Nigeria as a country needs an effective National Building Code in order to curb the incessant building failures and collapse within the environs.

The challenges of Code Administration in Nigeria according to Ngwaba [16] are: Non-Workable Code; Lack of Enabling Environment (operation, enlightenment, and legal framework); Unclear Code Administration Framework; States Adoption of Code is Optional; Lack of Continuity in the Management and Oversight of the Code Administration; Appointed Federal Ministers of Work oversee Code Committee; Professional Organizations Self Regulate, Administrate, and Enforce the Code; Lack of Publicity of Code Existence and Content; Lack of Framework for Code Development/Administration at various levels of Governments (Federal, State, and Local Governments); and The Nigerian Professionals and Artisans are operating without any code guidance which puts them and society at a disadvantage. Also the key stakeholders in Nigeria Codes/Built Environment according to Ngwaba[16] are listed as follows:Federal Government; State Governments (36 States & FCT); Local Governments (774 LGA's); Nigerian Building Code Committee (NBCC); Industry/Professional Organizations such as Nigeria Institute of Architects (NIA), Nigeria Institute of Builders (NIOB), Nigerian Institute of Town Planners (NITP), Council for Registration of Engineers in Nigeria (COREN), Nigeria Society of Engineers (NSE) and Nigeria Institute of Estate Surveying & Valuations (NIESV); Industry/Professional Organizations such as Nigeria Institute of Quantity Surveying (NIQS), Standards Organization of Nigeria (SON), National Environmental Standard and Regulation Enforcement Agency (NESREA), Surveyors Council of Nigeria (SURCON), Nigerian Electricity Regulation Commission (NERC), and Manufacturers, Trades, etc.; and finally Citizens.

The Relevant of National Building Code to the Built Environment according to Iroegbu, et al., [13] are as follows: the national Building Code does stipulate who does what, what tests of engineering, functional and other integrity of component, materials, and workmanship that are required in the process of the project; it also makes it easier to allocate and attribute liabilities in event of product failure; the code provides among others a

convenient vehicle for the education of the uninitiated client; it also educates the developer and even the entire public; the code apart from the brief attribution of responsibilities spelt out for each specialist professional, it will now be easier to identify incompetent practitioners, impostors and quacks and to deal with them under the law.

III. DISCUSSIONS AND THE WAY FORWARD

From table 1 above it can be seen based on the different researchers' findings on the causes of building failures and collapse in Nigeria are many. And most of these findings are often being repeated among these 20 researchers, which denotes that something is not right in the system of Nigeria building industry. From the table 1 also, this study had summarized the findings of the causes of building failures and collapse under 15 factors as follows:

- Poor workmanship/construction
- Inadequate or poor supervision of construction works
- Poor methodology adopted for construction
- Non-compliance with specification/standards
- Inferior or substandard materials
- Faulty design
- Alteration of approved design
- Wrong interpretation of building design/drawings
- Employment of incompetent contractors
- Non-adherence to due process in building construction
- Non-enforcement of building codes or construction regulations
- Corruption, greed and client's penchant to cut corners
- Lack of maintenance culture
- Boycotting/negligence of the building professionals
- Activities of the quacks.

The above causal factors of building failures and collapse are purely attributed to man-made factors which can be managed in a well-planned system. With the help of the government that is not one-sided and corrupt, the building industry will have a good system for construction. These factors that are responsible for building failures and collapse can also be categorized into the five various stages of building process; that is Pre-design stage, design stage, pre-construction stage, construction stage and post construction stage in order to address them critically. These man-made factors of building failures and collapse are as a result of human errors within the whole building processes of planning, design, construction and maintenance of building [15]. According to Mansur and Tahar [15] to solve a problem, the solution lies on identifying the source of the problem. Therefore, in order to solve the problem of incessant building failures and collapse in Nigeria, the study identified the following possible sources of the problems associated with building failures and collapse which are also facts in Nigeria:

- a) In construction industry, the design processes are being separated from the production process.
- b) Every building is unique, that is to say two building of the same design are quite different in the sense that their locations and positions in which they are erected are different, materials used in them are different in composition and quality, their construction methods different and the degree of supervision also different.
- c) The construction of the building work, that is the actual building production at the site is not regulated and therefore left to "whosoever" in the country to handle, that is, building industry in Nigeria allows everyone to participate.
- d) In the industry, there is no effective building codes or construction regulation agencies that monitors and controls the erection of building structures in Nigeria.

From the above fact statements, the study therefore supports the findings of previous researchers on building failures and collapse that the fundamental possible causes of incessant building failures and collapse in Nigeria include also non-regulatory arm of the building production; lack of respect and negligence in the use of some key professionals in the building industry; design work by non-professionals and untrained persons are being used for construction of buildings; buildability and maintainability analysis are not often carried out on production drawings; lack of effective National Building Code and Unprofessional and unqualified personnel (quacks) manage building production to the detriment of sound practice and documentation of the building process. Until these causal factors are addressed, buildings will continue to fail and as a result of these issues,

the country continues to record sick building, building failures and collapse, resulting in lost of lives, funds, time, and lack of confidence in the Nigerian building industry to the detriment of the economy.

Buildings as we know have never collapsed on paper work (i.e. building drawings) rather on ground where it is been erected or constructed. That is to say that the management of the building production on site should not be allowed to enter into wrong hands. The question boils down to, which among the professions has its main responsibilities to carry out the buildability and maintainability analysis of the working drawings and as well manage the production process of building on site? The answer is not far fetch. A good and effective national building code should be able to assign the responsibility to the appropriate profession.

It has been the scenario in Nigeria when a building collapse, professional bodies such as Council for Registration of Engineering in Nigeria (COREN), Architects Registration Council of Nigeria (ARCON) and some Government Officials usually setup panels to investigate and determine what caused the building to collapse and possibly recommend sanctions to those responsible, but despite these researches and panels, building collapses still on the increase in Nigeria [6]. In Nigeria, there are seven (7) notable professional bodies in the building industry. The distinguished among the professionals in the industry are Architects, Builders, Engineers (Mechanical, Electrical, Structural, Geotechnical, Civil, etc.), Estate Surveyors and Valuers, Quantity Surveyors, Surveyors and Town Planners and these professionals must have an input in every construction works in the country for a change in the system to happen. But teamwork is lacking and respect of professional specialization neglected. What the industry mostly needs now is to have a national conference that is championed by all the stakeholders and professionals involved or concerned in the building sector in order to come up with a common goal and objectives that will put a stop to this incessant building failures and collapse caused by man-made factors in Nigeria and not just mere reports that is made after the collapse by just two professionals. Construction is a team work and the trend now are specialization. Every professional should be proud of his/her profession and stand firm on the area of expertise like in the developed countries and not because of greediness or selfish interest be venturing in other professions which he/she was not professionally trained. Circumstantial evidence has shown that in Nigeria people see building and construction works as a quick and easy way of making money, today you will see a Lawyer, a Microbiologist, a Political Scientist or even a Trader ventures into the Building and Engineering professions undisturbed and it is not about knowing how to read an architectural or structural drawings or having money to go into real estate and property development that makes one a Builder or an Engineer, it is all about having the required skill and academic discipline to marry the profession [24].

Generally, the various inputs of building professionals are interwoven and at times very difficult to differentiate by the public. Among the key stakeholders in Nigeria Codes mentioned earlier are the professionals such as the Architects, Builders and Engineers that always have questions to answer when building failed or collapsed. It will be of utmost important to state categorically the major or core responsibilities of these professionals in building project delivery for the benefit and understanding of the public.

There are different specializations in engineering, we have structural engineers, Civil engineers, high way engineers, mechanical engineers, electrical engineers and others. In building construction, engineers undergo some calculations and analysis to come out with a design solution. In other words, engineers like the architects produces a design solution of a building structure. Architects are known for their expertise in imaginative form and architectural arrangement of spaces and aesthetics provision of external and internal features of building, preparation of drawings indicating or expressing the client's requirements, also drawing the details that will enable the successful contractor to construct and complete the structure that is being designed [18].

The roles of building contractors and that of craftsmen viz-a-viz the professional services of Builders are also creating confusion. While building contractors are entrepreneurs and craftsmen are tradesmen, trained for a particular skill, Builders are professionals with the analytical mind, by virtue of their training to organize and co-ordinate the activities of the tradesmen, subcontractors, suppliers and to manage the whole building production process from inception to handover, with a view of ensuring that the project is completed on time, within the cost and to specified quality standard by utilizing the most optimal construction methodology, and including other unique roles of Builders in building project delivery for example buildability and maintainability analysis on production drawings etc. [7].

IV. CONCLUSION

This article has been able to identify and analyzed the major causes of building failures and collapse which has become a recurring incidence in several states of Nigeria. And this situation has raised much fear and worry about the safety of lives and property in the country. Investigations has shown that the causes of these building failures and collapse are man-made factors that can be avoided or managed in a system that works. The use of effective National Building Code will not only provide a minimum standard on building Pre-design,

Designs, Pre-construction, Construction and Post Construction stages with a view to ensuring quality, safety and proficiency in the building industry but also defines ‘who is who’ in the industry and their various inputs in building projects delivery. Currently, the building industry system in Nigeria is not that effective and that is why the incessant building failures and collapse is still on the increase. The study identified the fundamental possible causes of incessant building failures and collapse in Nigeria which include non-regulatory arm of the building production, lack of respect and negligence in the use of some key professionals in the building industry, design work by non-professionals and untrained persons are being used for construction of buildings, buildability and maintainability analysis are not often carried out on production drawings, lack of effective National Building Code and Unprofessional and unqualified personnel (quacks) manage building production to the detriment of sound practice and documentation of the building process. Until these causal factors are addressed, buildings will continue to fail and as a result of these issues, the country continues to record sick building, building failures and collapse, resulting in lost of lives, funds, time, and lack of confidence in the Nigerian building industry to the detriment of the economy.

V. RECOMMENDATIONS

In spite of the high rate of these horrible incidences and its effects, nothing has been achieved or made to control the threat of building failures and collapse in Nigeria. Based on this study, the author recommended that the industry should adopt and enforced a National Building Code that will be effective throughout the federation so as to set a minimum standard on building Pre-design, Designs, Pre-construction, Construction and Post Construction stages with a view to ensuring quality, safety and proficiency in the building industry. In the same manner, the production arm of the building process should be regulated by enforcing effective regulatory agency for monitoring and controlling building construction projects on site. The study also recommends that team work among the seven notable professionals in the building industry should be embraced in the realization of building projects in Nigeria. Buildability and Maintainability Analysis on production drawings should be made compulsory on every building projects and to be carried out by the Professional Builders. And finally, government should always give a listening ear to all the professional bodies in the building industry and avoid being one-sided for the betterment, advancement and growth of the industry and nation at large. The author believes that if these recommendations are taken seriously, then the issue of incessant building failures and collapsed caused by man-made factors in the country will be drastically reduced if not completely eliminated.

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