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BUILDING FAILURE CRISIS IN NIGERIA: ADDRESSING CAUSES, PREVALENCE AND SOLUTIONS

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ABSTRACT

This paper investigates through recent literature review the rising incidences of building failure in Nigeria, a hydra-headed issue that has grave implications for the economy and public safety. It identified certain root causes as prevalent among many authors including defective foundations, poor quality of building material, construction practices which are in violations of extant building codes and underperforming enforcement regime. Also identified in the study as a challenge is the lack of detailed reporting and media attention sufficient to understand the issues. The importance of standardizing building collapse reporting, re-jigging the current regime of regulation enforcement, skill and knowledge update for construction professionals is emphasized. Additionally highlighted is the need to prioritize some pre-construction variables including soil investigation, design load determination and material testing to ensure the use of quality materials. The study advocates a shift in cultural perspectives regarding regulation enforcement, accuracy of reporting as well as accountability in the management of construction firms towards advancing the safety indices in the built environment and reducing building collapse incidences.

KEYWORDS: Building collapse, Construction industry, building regulation, Building collapse reporting.

INTRODUCTION

The real estate sector has experienced rapid growth consequent upon the massive financial investment into this sector.[1] Nevertheless, the shortage of affordable and befitting housing

remains intractable in Nigeria with an estimated figure of shortage put at 17 million units.[2] This shortage is reported to have been aggravated by rapid urbanization obviously beyond what was projected.[3] The existing residential settlements particularly in low -income and high-density neighborhood have as a result been challenged. An increasing migration of rural dwellers to urban centers has brought about increase in the demand for housing. While this phenomenon is favorable for the housing market, it has had very dire consequences on the quality of housing construction. There have been obvious records of unprofessional practices in the construction industry in Nigeria as a result of unethical practices aimed at increasing profitability.[4] Such practices have increased the incidences of building failure.[4]

Furthermore, violations of regulations on safety in the construction industry in Nigeria have also been cited as a factor contributing to the collapse of buildings. Therefore, the safety index in the Nigerian construction industry have been adjudged one of the lowest in the world.[5] According to[5], an evaluation of the extent of safety compliance by the management of construction firms accounts for the abysmal record of safety performance. In a study on safety management in the Nigerian construction industry,[6] underscored the significance of improving safety procedures as a vital measure in stemming the tides of construction mishaps and building collapses.

When there are deficiencies in the method of construction and the materials used in building are defective, there is bound to be collapse of buildings. This has been the predominant cause of the many cases of construction accidents in Nigeria. The wood processing industry, for example, has been unable to supply quality wood for construction due to the decline in the quality of logs harvested from the forest as a result of overlogging. As a result, some of the wood supplied for construction have failed to meet the requirements for structural application.[7] Sequel to this, the structural capacity of many buildings has been undermined, especially for such components where wood is the primary structural material like in roof carcasses.

Furthermore, exploring the use of sustainable ground breaking initiatives can be very instrumental in reducing building collapse. Sustainable innovation could be in the area of improving the quality of materials through the use of conventional materials formulated with innovations. Hence the construction industry must accept the challenge of imbibing innovativeness in design and construction otherwise known as green architecture.[1] In the aspect of material science, a lot of innovation has been introduced into improving the

performance of concrete as a construction material. Hence, the concept of self-consolidating concrete (SCC) has been presented as a way to boosting the demand for concrete structures in Nigeria.[8] Concrete is a widely used material, but the use of SCC is an innovation intended to improve on such qualities as durability by the introduction of special admixtures.

The Building Code, Regulations and Enforcement towards building collapse mitigation

Some of the causative factors of building collapse include unethical practices in the conduct of professionals quite apart from the involvement of quarks. In view of these, the extant building codes and regulations were enacted for enforcement prescribing the minimum bench marks expected of practitioners and the none professional actors' participation and discourage professionals from producing buildings are upheld. However, the poor enforcement of the current building codes has been reported as one the contributing factors to construction failure.[9]

Similarly,[10] pointed that enforcement lapses coupled with the participation of unqualified actors and supervision omissions particularly from relevant agencies of government are among reasons cited for building collapses. Enforcement gaps before, during and after construction make room for unethical practices to fester without punitive measures to deter none professional actors' participation and discourage professional from producing buildings with compromised substandard.

Agencies such as local town planning authorities charged with the indispensable role of enforcement by assessing compliance of building plans with established codes and regulations, according to[9], are not very effective. Hence, many of the building collapses could have been forestalled through strict enforcement at the pre-construction stage. In addition to weak enforcement, a lack of material testing leading to the deployment of defective materials has been fingered as a cause of building collapse.[11] Post-accident evaluation of construction materials from building collapse sites, according to a study[11], shows that substandard steel rods with mechanical properties short of code requirements are usually deployed in constructions that eventually fail.

The fact therefore remains that building code infractions are a serious challenge in the Nigerian construction sector. The culture of code violations obviously endangers the society at large. Where code and regulation enforcement are weak, social inclusion and human rights violations will be widespread, communities will not develop at the expected pace, and social

justice is compromised.[12] A number of benefits can be derived from enforcing building regulations, including: material testing to ensure that building materials used on construction projects do not fall short of meeting minimum requirements; construction practitioner identification and verification to ensure that persons involved in building construction have met the requisite qualifications and are verifiable members of relevant recognized professional bodies. This further ensures that punitive measures can be well administered where infractions are committed by members of the relevant recognized professional bodies. These benefits have the overall result of preventing building collapse and all the associated consequences.

Furthermore, when there is a perceived lack of stringency in enforcing corporate governance laws by agencies of government saddled with such duties, companies and firms feel less compelled to comply.[13] This failure of governance, characterized by lack of appropriate sanctions by relevant organs of government, perpetuates a culture of lawlessness, which contributes not only to building failure but failure across every fabric of society including the construction industry.

Some action points necessary for improving the capacity for compliance with building regulations and codes were identified by.[14] It is implied that many professionals are not well trained in understanding building codes let alone their enforcement. Hence, bridging the knowledge gap among professionals will be instrumental to improving their capacity for compliance. This according to[14] can be achieved through targeted training workshops to update the skill of building professionals. With this type of intervention, it is possible to reduce the incidences of building collapses traceable to non- implementation of building code regulations largely due to knowledge deficits.

The impact of building collapses on the economy and society, and the need for reliable and accurate reporting

Building and infrastructure projects are known to require very huge capital overlay, which is why frequent building collapses set economies and society backward. Against this background, it is germane to strengthen building collapse prevention. A typical case is the 2011 collapse of the Hotel grand Chancellor situated in Christchurch. According to[15], the direct economic losses were monumental because building collapses are disruptive to local economies in terms of job and investment recovery losses. Similarly, the psychological ramifications are equally serious as people get traumatized and communities suffer a lot of

grieve.[17] Also, some survivors suffer permanent or long term physical and psychological injuries thereby increasing the burden of dependency. Included in the wide array of consequences are displacement of persons rendered homeless and vulnerable to all manner of social vices. Consequently, it may well be added that because of the social and economic value of building infrastructure, building collapse one too many will dovetail into aggravating the security challenges many societies grapple with due to the survival tendencies of building collapse survivors, affected businesses and neighborhoods.

Sequel to this, the accuracy of building collapse reporting is germane and hereby advocated. Building collapse reporting asides making the rounds on mainstream news media to raise awareness on the occurrence of a catastrophic event should most importantly provide sufficient data on root causes and aftermath. It should include essential information on locations affected, severity of the incidents and it should provide an avenue for accurate data collection which upon proper curation makes more vital future disclosures on root causes and aftermaths. Thereby, Policy makers are better able to use the information garnered to set policy directions on building regulations and safety requirements so as to reduce incidences[17]; professional bodies and educational institutions also can have a basis for designing course content for professional training and curriculum design. Accurate building collapse reporting can as well strengthen corporate governance practices such as accountability and transparency among construction firms with regards to safety related issues, building codes and regulations compliance or the lack of it.[17]

A learning-from- failure culture which accurate building collapse reporting fosters is desirable in reinforcing the strategies against both future and frequent occurrences. Design, construction and maintenance practices will be enhanced as a result of the insights authentic building collapse reporting affords. Insights into the mechanisms of failure necessary for updating the existing building codes will be gained.[18] Consequently, more robustness and resilience can be factored into buildings in reducing the likelihood for collapse.

For building collapse reporting (BCR) to be a veritable means to building collapse mitigation, certain cornerstones must be identified in what would be considered BCR. First is an effective data collection mechanism, data analysis, and inferred mitigation strategies emanating from the data collected and analyzed. [19] suggest that the value of standardizing the protocols and procedures for BCR makes for data consistency and comparability of incidences. Similarly,[20] advocate application of technological sophistry in remote sensing

and inhuman intelligence as a means for deepening the efficiency of data collection and validation of the ensuing analysis.

Building Collapse reporting In Nigeria; What is building collapse reporting?

Many building professionals more often than not will be at variance as to what the underlying issues are in any building collapse. Some of these variances in causes of building collapse is attributable to exculpation.[21] However, considering the fact that structural stability is scientific, it goes also to say that structural failure is also not a conjecture. However, because many of the building failure reported in Nigeria seems to have no known governing standard, vital information is usually left out in reporting with certainty causes of building collapse. Against this background, this study attempts to present a working definition to building collapse reporting as there is as of yet no known agreed definition as far as this review can tell as to what this all-important area of endeavor should be in the wake of frequent building collapses in Nigeria. It is suggested in this review that building collapse reporting should be a standardized practice which should be a vital part of the training of professionals in the built environment. This will ensure that persons reporting building collapse understand the practice and the vital information to collect and in presenting reliable reports on building collapse, such reports are useful for collapse mitigation.

Therefore, within the context of generic reporting, certain elements are indispensable, these include; documentation, communication of information, structured data collection, data analysis, clear and succinct presentation of facts. These will be general practice across any field of endeavor for which reporting is relevant. Hence, within the context of building collapse reporting, it can be said to be the documentation of incidences of collapse, scientific and reliable data collection and analysis in identifying causes and effects of the collapse and communicating the facts concisely to both the general public and policy makers.

Reporting building collapse is a task requiring specialist skill sets in keeping detailed records of vital information linked to the collapse and transmitting same to relevant state agencies. It also requires timely and reliable data gathering as many important information can be lost at the site of a construction accident. The data collected must be subjected to scrutiny to unravel through data analysis likely causes and mitigation strategies. As a result of the enormity of various categories of losses incurred after a collapse, it is germane that a significant portion of the report should be devoted to capturing details of causes and accurate inferences as preventive measure.

Evidently, many building collapses have been recorded in the Nigeria. However, those in urban centers are the most publicized, a remarkable one being the collapse of the guest house at the synagogue church of all nations in Lagos Nigeria in 2014. This facility played host to a lot of international guests and was as such a peculiar incidence of international scale. However,[16] highlighted how the lack of accurate reporting in many building collapse cases of this magnitude makes it difficult to document key findings and have a considerable assessment of the event to glean key learning outcomes to forestall future occurrences. Similarly other authors[22] have identified how BCR has underperformed in terms of scholarly outlets and media outfits participation in highlighting the socioeconomic dimension of building collapses on society and the influence of human involvement in exacerbating the situation. Also,[12,17] focused on the effects stakeholders in the construction industry suffer as a result of building collapse; how search and rescue operations are constrained by the inadequacy of earthmoving and extrication equipment. The study brings to the fore the need for building collapse reporting to delve extensively beyond the first few days of the events into root cause; identifying culpable parties and ensure accountability where such are found culpable; and tracking the spate of building collapse and its effect on stakeholders. This in essence goes further to show that BCR with the effective participation of scholarly and media outlets must bring critical issues to the knowledge of the public so as to ensure the institution of legal processes and the conclusion of the same for persons found culpable. It also shows that BCR must offers some form of metrics in recording and analyzing incidences of collapse. Likewise,[23] explored building collapse mitigation by turning the search light on causes and effects. The primacy of BCR in raising public consciousness on causes of building failure and the possibility of future building failure frequency was argued in the study. The roles of BCR to shape policy formulation and direction in reducing building collapse was enunciated. Moreover,[24] suggested the place of accurate BCR in galvanizing widespread support of all and sundry particularly religious institutions and state governments in collaborating towards mitigating building failure occurrences

Many studies have investigated the need for accurate reporting of building collapse to get the root causes and proffer actionable preventive measures.[25,21,26] Also, a systematic categorization of causes of building failure was presented by.[25] The study harped on the need to classify for the purpose of sound analysis causes of building failure in accurate reporting. This will provide useful facts for both failure prevention and enhance best practices in building construction.[21,25,26,].[21] underscored the benefits of reliable reporting in steering

policy formulations and project management practices toward building collapse mitigation. Evidently, because of the variance among building professionals as to the causes of building collapse it is imperative to standardize the reporting mechanisms and templates so as to match cause and effects accurately.

Identifying Causes of Building Collapse in Nigeria

Over the years, Nigeria has recorded numerous cases of building collapse making it an issue of serious concern. The reasons for building failure are attributed to a lot of factors. These factors include; construction methodologies fraught with errors, weak, compromised or nearly nonexistent enforcement of established building codes and regulations, and faulty foundation and defective materials.[9,21,24] Moreover, weak or faulty foundation was identified as a predominant cause of building collapse.[21] Thus, showing either arbitrariness or bias in selection of foundation types with a likelihood of the foundation choices made not from scientifically informed consideration. It therefore underscores the need for geotechnical studies in foundation design and construction so as to ensures that soil investigation results are considered as a necessary requirement to inform the type of foundation befitting for particular buildings. Moreover, error in design load computations which can lead to gross under estimation of the quantity and strength of materials to withstand the actual loads coupled with defective materials, and error accumulation from construction are also factors that lead to building failure. Compromise or negligence in the part of government agencies charged with monitoring the building production process and approvals are also culpable in the menace of building collapse.[9]

However, although the problem of collapse of building is not specific to any regions it is quite prevalent in areas where properties are highly priced and the property market is apparently lucrative.[16] A good example is Lagos, where in 2014, numerous fatalities were recorded in the collapse of a guest house belonging to the Synagogue Church of all Nations. The rising spate of this problem has remained a source of concern among stakeholders in the construction industry and the government[17] Furthermore, since there is a prevalence in urban centers because of the profitable property market, the tendency for developers to put investment decisions above engineering considerations and public safety is high. Hence it is crucial that building code and regulation enforcement must be stringent in such locations because of the economic and public safety ramifications of building collapse.

Furthermore, there is need to ramp up public awareness in understanding the causes of building collapse so as to reduce cases of building failure. The general public, if not properly educated on the consequences and causes of building collapse, such factors as use of shoddy procedures, involvement of quarks or aiding of unethical practices among professionals, the adoption of inadequate building procedures and use of cheap but defective material will continue. However, to entrench public awareness, the gaps in information dissemination as a result of underreporting from the side of credible scholarly journals and media outfits must be closed.[22] Hence, addressing the seemingly intractable challenge of building collapse requires, stricter enforcement of building regulations, harmonization of the efforts of professional bodies and town planning authorities and improvements in the quality of monitoring and supervisor of construction projects.[9,12,25] Soil investigations must be conducted and results considered while the determination of anticipated design loads must be verified. Similarly, public awareness efforts must be ramped up on the causes of building collapses and the need to adhere to regulations.[22]

CONCLUSION AND RECOMMENDATION

In conclusion, it is an acknowledged fact that building collapse in Nigeria is a hydra headed endemic of astronomical consequence on every facet of life. No doubt the economy, society at large and the safety of the general public have had to bear the brunt of incidences of collapse to a large extent with not very many culprits brought to book. The growing demand for housing alongside evident housing deficit especially in urban centers has been attributed as part of the cause of increases in the incidences of collapse as many housing developers and construction practitioners opt for practices that are a gross violation of extant codes and regulations. Even though the drafting of these codes and regulation are well intentioned, the performance of this codes has been wanting from the standpoint of enforcement. Hence, construction materials and methods well below code provisions have continued to be the order of the day in Nigeria chiefly for economic gain.

Consequently, to stem the tide of incidences of collapse, certain issues must be brought to fore. First is the need to tighten the tolerance on enforcement of building codes and regulation. To this end, statutorily authorized agencies of state must become more invested in entrenching compliance with established standards of operation prior to and post construction.

Secondly is the need for capacity building among construction professionals via relevant fora such as workshops and trainings to strength both awareness and compliance with building regulations and to prioritizing material testing on projects, soil investigation report and structural load determination as variables that account for the structural viability of any building.

It is critical that the practice of accurate building collapse reporting must be standardized to engender comprehensiveness, accuracy and reliability of the report so that vital information is captured in a timely manner, analyzed accurately and the emerging facts are communicated concisely to the public and the relevant policy making arms of government to aid accountability and the administration of punitive measures to culprits of building collapse. Equally of importance is promoting the culture of transparency in the management of construction firms and the regulating of reporting procedures for collecting and analyzing relevant data on building failure so that the facts are made clear. Finally, it must be noted that the solutions to addressing building collapse in Nigeria is multivariate including a paradigm shift in both regulatory and cultural dimensions. Furthermore, strengthening building code enforcement, bridging the knowledge gap and skill enhancement among professionals and accurate building collapse reporting are necessary steps towards a safer built environment and building failure mitigation.

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