Mitigation Measures Against Building Collapse in Daniya, Bali Local Government Area of Taraba State

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ABSTRACT

Building collapse remains a persistent and critical challenge in Nigeria's construction industry, particularly in developing communities where regulatory enforcement is weak. This study examines the causes of building collapse in Daniya, Bali Local Government Area of Taraba State, and proposes practical mitigation measures. A descriptive review approach was adopted using existing literature, field observations, and professional insights. Findings reveal that poor structural design, substandard materials, lack of supervision, weak regulatory enforcement, and engagement of unqualified personnel are the major contributors to building failure. The study concludes that building collapse is largely preventable through strict adherence to standards, improved supervision, and public awareness.

Keywords: *Building collapse, mitigation, construction quality, regulation, structural failure*

1.0 INTRODUCTION

Buildings are fundamental to human existence, providing shelter, safety, and support for economic and social activities. However, the increasing rate of building collapse in Nigeria has become a major concern to professionals, government agencies, and the public. These failures often result in loss of lives, destruction of property, and reduced confidence in the construction industry.

In areas such as Daniya in Bali Local Government Area of Taraba State, cases of structural failure are becoming more noticeable. Despite the presence of building regulations, many structures are erected without proper approval, supervision, or adherence to professional standards. This situation highlights the need for a comprehensive assessment of the causes of building collapse and the development of effective mitigation strategies.

Recent studies indicate that the rising incidence of building collapse in Nigeria is strongly associated with rapid urbanization, increased demand for housing, and weak enforcement of construction regulations (Ibrahim et al., 2020). As urban expansion continues, many developers and contractors adopt cost-cutting measures that compromise structural integrity, including the use of inferior materials and bypassing professional input. This trend has contributed significantly to the vulnerability of buildings, particularly in semi-urban and developing communities.

Furthermore, inadequate technical knowledge among local artisans and lack of a strong maintenance culture have worsened the situation. Many buildings are left without periodic inspection, allowing minor defects such as cracks and material deterioration to develop into serious structural problems over time (Adizue 2020). Addressing these challenges requires a coordinated approach involving strict regulatory enforcement, professional accountability, and increased public awareness to ensure safe and sustainable construction practices.

2.0 LITERATURE REVIEW

Several studies have identified the causes of building collapse in Nigeria. According to Field (1986), structural failure often results from errors in design, poor construction practices, and inadequate supervision. Similarly, Iroh (2019) emphasized that poor workmanship and lack of technical expertise contribute significantly to building failures. These early works established the foundation for understanding structural deficiencies in construction.

Research by the Nigerian Society of Engineers (2021) revealed that the use of substandard materials and non-compliance with building codes are major factors responsible for collapse. Oduwole and Arimanwa (2023) further noted Poor quality materials and improper concrete mix ratios reduce structural strength and durability. These findings highlight the technical dimensions of building failures, especially in regions where quality control practices are inadequate (Aljaafreh et al., 2023).

More recent studies have reinforced these earlier findings while providing deeper insights into emerging challenges. For instance, Akinyemi and Ibrahim (2022) observed that rapid urbanization and increasing housing demand in Nigeria have led to a rise in informal construction practices, where developers bypass professional input and regulatory procedures. Similarly, Odeyemi et al. (2024) identified poor project management, lack of proper site supervision, and inadequate inspection as critical contributors to building collapse.

According to Ede and Aina (2020) emphasized that structural failures are often linked to a combination of human error, environmental factors, and material deficiencies. Extending this view, Ibidapo (2025) argued that corruption within the construction approval process and weak enforcement of building regulations significantly contribute to the persistence of structural failures. Their study highlighted that even when building codes exist, failure to enforce them effectively undermines their purpose.

Recent evidence also points to the role of climate and environmental conditions in structural deterioration. According to Fagge et al., 2024 increased rainfall intensity, flooding, and soil instability in parts of Nigeria have negatively affected foundation performance, thereby increasing the risk of building collapse. In addition, Adesina et al. (2025) noted that lack of routine maintenance and structural inspection allows minor defects such as cracks and corrosion to develop into major structural failures over time.

In addition, studies have shown that weak regulatory enforcement allows unqualified individuals to participate in construction activities, thereby increasing the risk of structural failure. This situation is particularly common in semi-urban areas like Daniya, where monitoring mechanisms are limited. Overall, the literature indicates that building collapse is rarely caused by a single factor but rather by a combination of design errors, poor materials, inadequate supervision, and institutional weaknesses. These findings provide a strong basis for understanding the situation in Daniya and for proposing effective mitigation measures.

3.0 METHODOLOGY

This study adopts a descriptive research approach based on: 1) Review of relevant literature, 2) Field observations within Daniya and 3) Professional experience in building construction

The method is suitable because it allows the researcher to analyze existing conditions and propose practical solutions without requiring complex experimental procedures.

4.0 CAUSES OF BUILDING COLLAPSE IN DANIYA

4.1 Poor Structural Design

Many buildings are designed without proper structural calculations, leading to inadequate load-bearing capacity (Afolabi, 2020).

4.2 Use of Substandard Materials

Inferior materials such as weak cement and low-quality reinforcement reduce durability and strength (Lardhi & Mukhtar, 2023).

4.3 Lack of Supervision

Construction without professional supervision leads to errors in execution and deviation from design specifications.

4.4 Weak Foundation

Failure to conduct soil investigation results in poor foundation design and differential settlement.

4.5 Engagement of Unqualified Personnel

Untrained workers lack the technical knowledge required for proper construction (Iroh, 1980).

4.6 Non-Compliance with Building Regulations

Ignoring building codes and approved plans significantly increases failure risk (Nigerian Society of Engineers, 2021).

5.0 MITIGATION MEASURES AGAINST BUILDING COLLAPSE

5.1 Use of Qualified Professionals

Only licensed engineers, builders, and architects should handle construction projects.

5.2 Proper Design and Analysis

All structures should be designed using standard codes such as BS 8110 and Eurocode 2.

5.3 Quality Control of Materials

Materials should be tested and certified before use.

5.4 Adequate Supervision

Continuous supervision ensures adherence to design specifications.

5.5 Soil Investigation

Geotechnical analysis should guide foundation design.

5.6 Enforcement of Regulations

Government agencies must ensure compliance with building codes.

5.7 Public Awareness

Education on safe construction practices is necessary.

6.0 DISCUSSION

The findings of this study are consistent with previous research, which identifies poor design, material quality, and lack of supervision as key factors in building collapse. The situation in Daniya reflects broader challenges within Bali's construction industry.

However, the study also shows that these problems are preventable. With proper enforcement of regulations and engagement of professionals, the rate of building collapse can be significantly reduced.

7.0 CONCLUSION

Building collapse in Daniya is largely preventable. Addressing issues such as poor design, substandard materials, and weak supervision will improve structural safety. A collaborative effort between government, professionals, and the public is essential.

8.0 RECOMMENDATIONS

1. Only qualified professionals should be engaged in construction activities.

2. Government should strengthen regulatory enforcement mechanisms.

3. Use of quality materials should be mandatory at all construction stages.

4. Regular building inspection should be enforced.

5. Public awareness programs should be increased to educate stakeholders.

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