

Effective On-Site Supervision- A Yardstick to Minimizing Building Construction Failure In Southwest Nigeria

Adeyemi, F. O^{1*}, Olaniyi O. A², Esuruoso, O.T³.

^{1,2,3}Department of Civil Engineering, Ajayi Crowther University, Oyo, Oyo state, Nigeria.

*Corresponding author's email: fo.adeyemi@acu.edu.ng

Received 23 April 2025; revised 16 May 2025; accepted 20 June 2025

Abstract

The building construction industry plays an essential role in the development of any developing nation. Despite various regulations and professional guidelines in the building construction sector, Nigeria continues to experience frequent building failure. This research therefore aims at assessing the effectiveness of on-site supervision as a yardstick to minimizing building construction failure in Nigeria. Data were collected from 108 stakeholders in the building industry via a well-structured questionnaire. Result findings show that in Nigeria building construction site, the supervision practice is often done daily, and site engineers are clearly at the forefront. The on-site supervision was found to be effective in Nigeria Building industry, indicating a strong overall confidence in the supervisory process. Although corruption and bribery were identified as major challenges, and they have considerable negative impact on the perceived effectiveness of supervision. Results also show that there is a potential gap in the consistent application of building regulations. It is therefore recommended stricter enforcement of building regulations be made, and the adoption of modern technology such as drones, AI monitoring, as these will ensure proper supervision techniques, and reduce the likelihood of construction errors, thereby minimizing failures of buildings in Nigeria.

Keywords: Chi-Square Test, building failure, building industry, stakeholders, site supervision

Introduction

The building construction industry plays an essential role in the development of any developing nation. Building construction projects be it small, large, complex or mega is vital to man's survival, economic activities, enhancement and development of his activities within the natural and built environment. One of the primary drivers of global economic expansion and development is the building sector. The national economy is impacted by the building construction sector both directly and indirectly, Chang *et al.*, (2018). Buildings serve as shelters for man, his properties and activities, and during their designed life, building structures are expected to fulfill certain requirements such as safety and durability, and to achieve the intended level of environmental pleasure.

Unfortunately, since humans first started construction, there have been numerous occasions when buildings structures fail to perform their intended functions, Shahraki *et al.*, (2018). Reports and various incidences show that failures of building occur even during the construction stage, and these cause huge amount of economic loss, and high death toll. Failures can occur at a project level, typically resulting in cost or time

overruns, or disputes, or they can occur at a construction level, generally caused by deficiencies in design, products, specifications or workmanship. Deficiency in building can be traced to execution errors, weak or inferior materials, supervision lapses, and the absurdity of workers.

Looking around the country Nigeria today, the nation has witnessed several cases of building failure related issues. According to Daniel (2024), several cases of building failures abound in Nigeria. More buildings suffer heavy damages after few years of construction, which raises several questions on the roles of the building stakeholders in the nation, although the professionals in the building industry often exonerate themselves from the blame for building failure, Chiemezie & Krzysztof (2021). It was observed by Ayeni & Adedeji (2015) that building failure cuts across the major cities in the six geopolitical zones in Nigeria with various casualties, and as opined by Danladi (2012), Lagos, the commercial capital of Nigeria has always recorded the highest number of building failure or collapse closely followed by Abuja, the Federal Capital Territory attributing it to the high rate of urbanization and construction taking place in these cities. This has become a recurring issue, leading to loss of lives, economic setbacks, and infrastructural deficiencies.

Research findings by Olubi & Adewolu, (2018) shows that 93.86% of the total building failure in Nigeria were as a result of human activities or in-activities of which the professionals are not exempted. According to Anyanwu (2013) other various factors have been blamed for the failure or collapse of buildings in Nigeria and across the world. Factors like the use of inefficient project executors, inadequate funding, rising cost of building materials, poor management, poor technical know-how, carelessness and greed, ignorance, incompetent contractors, use of substandard materials and quacks etc. Findings by Ayeni & Adedeji (2015) also revealed that factors responsible for continuous occurrences of building collapse in Nigeria range from human errors, absence of soil tests, structural designs by quacks, uncoordinated activities between professional bodies, non-adherence to specifications, poor and bad construction practices, use of substandard materials, lack of proper supervision, illegal conversion of buildings, poor monitoring of work force, foundation failures, bad designs.

Since construction projects are a national capital for each country so monitoring them is an important issue and prevents loss of quality (Wang *et al.*, 2013). An important factor in maintaining and controlling quality of buildings is continuous supervision, Shahraki *et.al.*, (2018), and with the rapid urbanization and increasing demand for housing, the need for effective supervision in the building construction industry is more critical than ever. One important component of preserving the quality and strengthening of structures is ongoing project oversight (Javad, 2017). Time management, safety, cost, and quality are all significantly impacted by supervisory systems. Given the devastating consequences of building failures, there is a need for a thorough evaluation of on-site supervision practices. By identifying gaps and challenges in supervision, this study aims to propose actionable solutions that can enhance construction quality and safety in Nigeria. Effective monitoring or supervision will reduce the duplicate expenses and improves quality. This will also increase the lifespan of the building structure, and reduces the costs of maintenance. Findings from this research will facilitate a definite improvement within the building construction industry by reduction in building failure and promoting sustainable structures. It will also align with the Sustainable Development Goals (SDGs) nine (9) which is Industry, Innovation, and Infrastructure by enhancing construction quality, reducing structural failures and promoting innovation and compliance

Research Methodology

Data Collection

This research follows a mixed method of quantitative and qualitative approach, which allows for the concurrent analysis of both quantitative and qualitative data. Qualitative data collection was provided for through provision of comment sections in an otherwise close-ended questionnaire where the respondents gave additional information to add depth to responses given quantitatively.

The content of the designed instrument geared towards obtaining information on the perceptions on effective site supervision as a yardstick to minimizing building construction failure in southwest zones of Nigeria. The respondents in this study gave their impression based on a Likert-type scale provided in the questionnaire to enable quantitative interpretation.

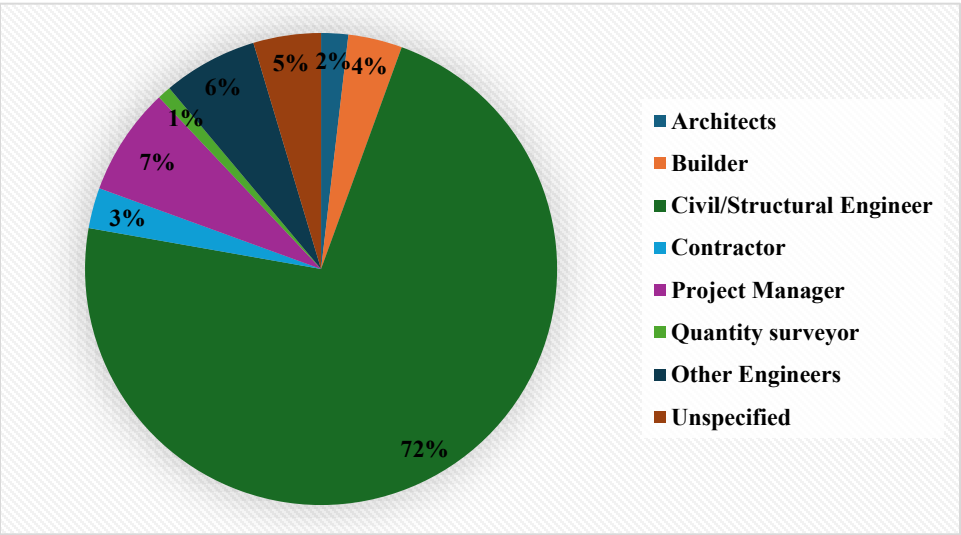


Fig 1: Category of Respondents and their population

Data Analysis

The data collected were entered into a data analysis software application; a Statistical Package for Social Science (SPSS) ready for analysis, in order to successfully asses the effectiveness of on-site supervision in minimizing building failures in Nigeria. The frequency, percentage and cumulative percentage were computed to find out the result of the research objectives.

Results and Discussion

Findings and discussions on the effectiveness of on-site supervision, as a yardstick to minimizing building construction failure in Nigeria are presented. The data presented includes the assessment of the building supervision practice in Nigeria, the effectiveness of the on-site supervision, assessment of the level of compliance and regulation and recommended actions for improved supervision. There are several mathematical approaches used in describing quantitative data analysis. However, in this study, frequency distribution and percentage counts were used. The analysis and interpretation of the data are presented in the following order:

Questionnaire Administration and Return Rate

Out of 108 questionnaires administered to the respondents, all the 108 questionnaires were duly filled and submitted. The 108 responses were found valid for analysis, and represented a total of 100% response rate as revealed in the result. This 100% response rate, is considered satisfactory to make conclusions for the study. This can be related to Mugenda & Mugenda (2003) who said a 50% response rate is adequate, 60% good and above 70% rated very good. This implies that based on this assertion, the response rate in this case of 100% is very good.

Demographic Characteristics of the Respondents

The demographic data of the respondents namely; gender, age, years of experience in the building industry and qualification are presented in the study.

Respondents by Gender

Table 1 depicts the distribution of respondent by gender. The table shows that there are more male 91 (84.3%) than female 15 (13.9%), while 2 (1.8%) did not specify their gender. From this it can be deduced that although the study sampled both gender, majority of the respondents were male. This implies that the most employed gender in the the building indsutry is male.

Table 1: Distribution of respondents by gender

S/N	Gender	Frequency	Percentage	Cumulative Percentage
1.	Male	91	84.3%	84.3
2.	Female	15	13.9%	98.2
3.	Unspecified	2	1.8%	100
	Total	108	100.0	

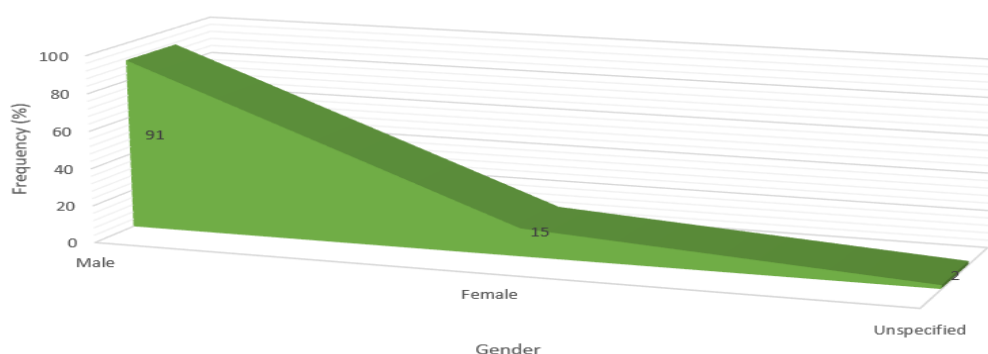


Fig 2: Distribution of respondents by gender

Respondents by Age

Table 2 shows the distribution of respondent by age. From the table, the ages of the respondents showed that 53 (49.1%) are between 36-45years, while 34 (31.5%) are between 26-35years. 12 respondents (11.1%) are above the age of 46 years. Eight (8) respondents (7.4%) are 18-25 years, while 1 (0.9%) did not specify the age. It also shows that approximately 99% are above 15years of age which is the minimum legal working age in Nigeria according to the Labour Act of Nigeria, with restrictions on the type of work. Similarly, they are also above 18years of age which is the minimum age of standard entry into workforce in Nigeria, full-time without restrictions.

Table 2: Distribution of respondents by Age

S/N	Age	Frequency	Percentage	Cumulative Percentage
1.	18-25 years	8	7.4%	7.4
2.	26-35years	34	31.5%	38.9
3.	36-45years	53	49.1%	88
4.	46years and above	12	11.1%	99.1
5.	Unspecified	1	0.9%	100
	Total	108	100.0	

Respondents by Years of Experience

The years of experience in the building industry is another factor considered in this research. Table 3 depicts the distribution of respondent by year of experience. On the respondent years of experience, from the table, 30 (27.8%) have spent between 1-5 years, 32 (29.6%) have spent between 5-10 years, 30 (27.8%) have 11-15 years of working experience, 7 (6.5 %) have worked for 16-20 years while 7 (6.5%) have worked for more than 20 years, while 2 respondents representing 1.8 % did not specify their years of work experience. This implies that almost all the respondents have a minimum of 5 years working experience in the Building industry. It shows that the majority of the respondents 76 (70.4%) have at least 5 years' experience, which is enough to be able to give their ideas on how effective on-site supervision can help in minimizing building construction failure in Nigeria.

Table 3: Distribution of respondents by Years of Experience

	Years of Experience in the building industry	Frequency	Percentage	Cumulative Percentage
1.	Less than five years	30	27.8%	27.8
2.	5-10	32	29.6%	57.4
3.	11-15	30	27.8%	85.2
4.	16-20	7	6.5%	91.7
5.	More than 20years	7	6.5%	98.2
6.	Unspecified	2	1.8%	100
Total		108	100.0	

Respondents by Qualification

Table 4 depicts the distribution of respondent by qualification. Based on qualifications, the table shows that only one respondent has Diploma/OND/NCE (0.9%), 35(32.4%) respondents are in possession of Bachelor's degree, 28 (25.9%) respondents have Master's degree respectively while respondents with PhD are just 7 (6.5%). 2 (1.9%) respondents did not specify their qualification.

Table 4: Distribution of respondents by Qualification

Qualifications	Frequency	Percentage	Cumulative Percentage
Diploma/OND/NCE	1	0.9%	0.9
HND	35	32.4%	33.3
Bachelor's Degree	35	32.4%	65.7
Master's Degree	28	25.9%	91.9
PhD.	7	6.5%	98.1
Unspecified	2	1.9%	100
Total	108	100	

Respondents by Profession

Table 5 revealed the category of construction stakeholder of the respondents. The table shows that 78 (72.2%) of the population are Civil/structural Engineers who are actually involved in the building construction and supervision. Architects constitute 2 (1.9%), Builders 4 (3.7%), Contractor 3 (2.8%),

Project Manager 8 (7.4%), Quantity surveyors 1 (0.9%). The table also reveal others with no designation to be 5 (4.6%)

Table 5: Distribution of respondents by profession

Profession	Frequency	Percentage	Cumulative Percentage
Architects	2	1.9%	1.9
Builders	4	3.7%	5.6
Civil/Structural Engineer	78	72.2%	77.8
Contractor	3	2.8%	80.6
Project Manager	8	7.4%	88
Quantity surveyor	1	0.9%	88.9
Other Engineers	7	6.5%	95.4
Unspecified	5	4.6%	100
Total	108	100	

Source: Researcher's Computation, 2025

Based on the type of building being supervised, 22 (20.3%) supervises commercial buildings, 31 (28.7%), deals with the supervision of Government owned building/Public infrastructures, while 6 (5.6%) base their supervision on Industrial buildings. 45 (41.7%) focus their supervision on Residential buildings while 4 (3.7%) are based on other types of buildings.

Analysis of objectives

Building supervision practices in Nigeria

The researchers studied the effective on-site supervision, as a yardstick to minimizing building construction failure in Nigeria. This is because the quality and effectiveness of supervision contributes to the success or failure of building projects in Nigeria. In most construction sites, about 62 percent, are supervised daily, showing a strong commitment to keeping projects on track and up to standard. This also helps to promptly monitor the various construction activities going on, materials supplied, equipment and staff supervision, controlling and minimizing any form of failure. Chiemezie & Krzysztof (2021) also agreed that strict supervision should be carried out by the site supervisor, on a daily basis during the project life cycle would help eradicate this increasing occurrence of building failure. Another 18 percent are visited biweekly, while 12 percent receive supervision only at key points in the construction process. Only 4 percent are supervised weekly, suggesting that although many sites are closely monitored, a few may receive less frequent attention. Table 6 shows the summary of supervision practices.

Table 6: Summary of Supervision Practices

Variable	Category	Count	Percentage (%)
Visit Frequency	Daily	62	62.0%
	Bi-weekly	18	18.0%
	At Key Milestones	12	12.0%
	Weekly	4	4.0%
Primary Responsibility	Site Engineer	81	81.0%
	Project Manager	11	11.0%
	Architect/Contractor	4	4.0%

Source: Researcher's Computation, 2025

In terms of who handles supervision, site engineers are clearly at the forefront, responsible for 81 percent of the work in Nigeria building industry. This highlights their central role in managing day to day site activities. Other stakeholders also have roles to play, but the most essential is that of the site Engineer. Project managers follow with 11 percent, and architects or contractors are involved in just 4 percent of supervision efforts. This engineer led approach helps ensure technical consistency, but it may limit the involvement of other professionals who bring valuable perspectives on design and overall project coordination. From the result findings, it was also seen that ensuring adherence to design specifications 37 (34.3%), monitoring material quality/quality control 34 (31.5%) and ensuring compliance with health and safety regulations 32 (29.6%) are the key roles to be carried out by site supervisor. Other roles include Supervising labor efficiency, Monitoring progress, Risk management etc. Using the Chi-Square Test Analysis to show the Association between Profession and Supervision Frequency. Table 7 shows the Observed and Expected Frequencies.

H₀₁: There is no association between profession and supervision frequency.

H₁₁: There is an association between profession and supervision frequency.

Table 7: Observed and Expected Frequencies

Profession	Daily	Weekly	Bi-weekly	Monthly
Architect	15 (11.2)	10 (11.2)	5 (7.0)	5 (5.6)
Engineer	10 (9.6)	15 (9.6)	5 (6.0)	0 (4.8)
Builder	5 (9.6)	10 (9.6)	10 (6.0)	5 (4.8)
Surveyor	10 (9.6)	5 (9.6)	5 (6.0)	10 (4.8)

Table 8: Chi-square Test Results

Statistic	Value
Chi-Square Statistic	22.99
Degrees of Freedom	9
p-value	0.006

From the result in Table 8 there is a statistically significant association between profession and supervision frequency ($\chi^2 = 22.99$, $df = 9$, $p = 0.006$). Since the p-value is less than the conventional significance level of 0.05, we reject the null hypothesis (H₀) and accept the alternative hypothesis (H₁). This indicates that the frequency of supervision is not independent of profession. Certain professions tend to experience different levels of supervision more or less frequently than others.

Effectiveness of on-Site supervision in Nigeria

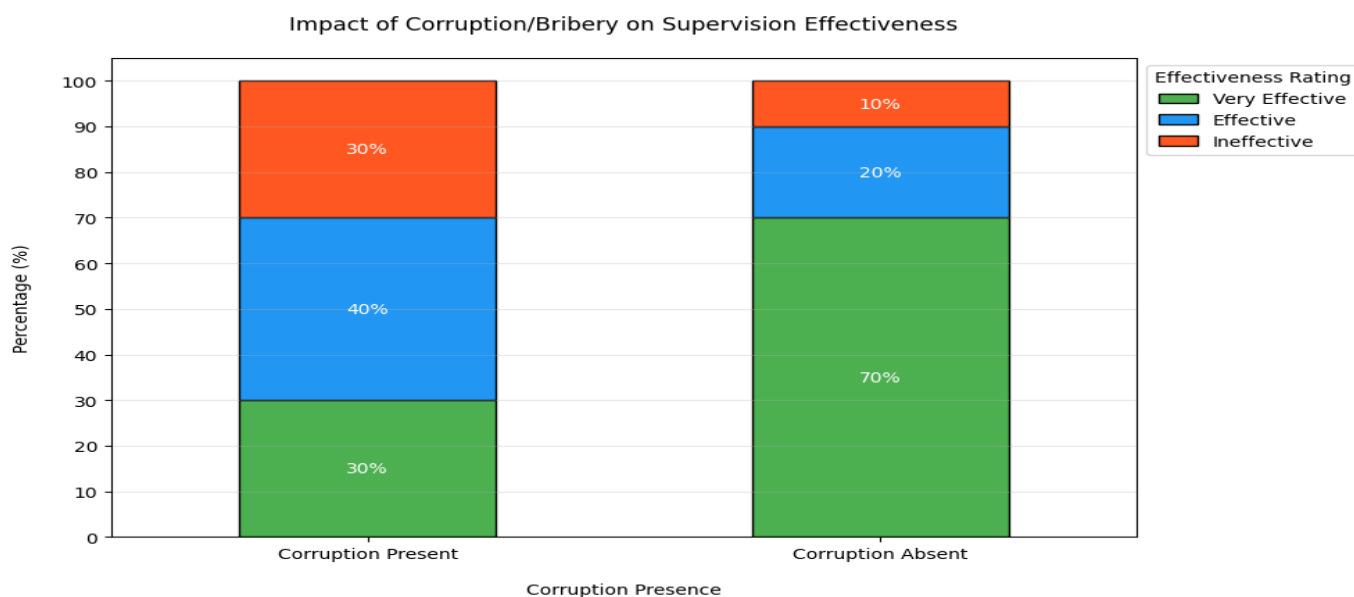
Table 9 presents respondents' perceptions of the effectiveness of supervision in Nigerian building industry. The majority of respondents (60%) rated supervision as "Very Effective," indicating a strong overall confidence in the supervisory process. An additional 25% described it as "Effective," suggesting that most participants found supervision to be beneficial to some degree. Only a small proportion (15%) viewed supervision as "Ineffective," highlighting that dissatisfaction with supervision was relatively limited. These results suggest that, overall, supervision is perceived positively by the majority of individuals surveyed. It was also confirmed that there have been improvement in site supervision practices in Nigerian building construction industry in the last 5 years.

Table 9: Perceived Effectiveness of Supervision

Effectiveness Rating	Count	Percentage
Very Effective	12	60%
Effective	5	25%
Ineffective	3	15%
Total	20	100%

Impact of Corruption/ Bribery on Supervision Effectiveness

Research has also shown that despite the effectiveness of the on-site supervision, there exist some lapses. A major challenge identified is corruption and bribery in project execution. Other contributing factors include, poor communication between stakeholders, inadequate enforcement of building codes, and insufficient manpower for supervision and poor remunerations for supervisors. Figure 3 illustrates the perceived effectiveness of supervision in contexts where corruption or bribery is either present or absent. The data reveal a clear contrast: when corruption is absent, 70% of respondents rated supervision as "Very Effective," compared to only 30% when corruption is present. Additionally, the percentage of respondents who rated supervision as "Ineffective" increased significantly in the presence of corruption, rising from 10% (corruption absent) to 30% (corruption present). This suggests that corruption has a considerable negative impact on the perceived effectiveness of supervision. Table 10 shows the Spearman's Correlation Analysis: Effectiveness versus enforcement.

**Fig. 3:** Stacked bar chart showing Impact of Corruption/ Bribery on Supervision Effectiveness**Table 10: Spearman's Correlation Analysis: Effectiveness versus enforcement**

Variables	Spearman's ρ	p-value
Effectiveness vs. Enforcement	-0.58	< .001

The analysis revealed a statistically significant moderate negative correlation between enforcement and supervision effectiveness, Spearman's $\rho = -0.58$, $p < .001$. This finding suggests that as perceived

enforcement becomes weaker, the perceived effectiveness of supervision also tends to decrease. The strength and direction of this relationship indicate that enforcement plays a meaningful role in shaping how supervision is experienced.

Assessment of the level of Compliance and Regulation

The findings on perceived enforcement of building codes among the respondents (Table 11) indicate that enforcement is generally viewed as inconsistent or moderate. A majority of participants perceived enforcement as either *rarely enforced* (40%) or *moderately enforced* (45%), suggesting a potential gap in the consistent application of building regulations. Only a small proportion (15%) reported that enforcement is *very strict*, highlighting concerns about the overall strength and uniformity of code enforcement. It was also agreed by 94.4% that penalties for negligence in site supervision be stricter. This will reduce project failures and abandonment, prevent substandard construction, and allows for accountability and professional discipline. It was also agreed that mandatory training and certification be enforced for all site supervisors as agreed by 98 (90.7%). In Nigeria, professional bodies such as COREN, NIOB, and ARCON have been playing adequate roles in this regard. 98 (90.7%) of the respondents agreed to support mandatory training and certification for site supervisors.

Table 11: Perceived Enforcement of Building Codes

Enforcement Level	Count	Percentage
Rarely enforced	40	40%
Moderately enforced	45	45%
Very strictly	15	15%
Total	100	100%

Association between Profession and Enforcement Perceptions

Table 12: Chi-Square Test Analysis: Association between Profession and Enforcement Perceptions

Profession	Rarely (Observed (Expected))	Enforced (Observed (Expected))	Moderately (Observed (Expected))	Enforced (Observed (Expected))	Very (Observed (Expected))	Strictly (Observed (Expected))
Architect	20 (12.27)		5 (10.91)		5 (6.82)	
Engineer	15 (12.27)		10 (10.91)		5 (6.82)	
Builder	5 (10.23)		15 (9.09)		5 (5.68)	
Surveyor	5 (10.23)		10 (9.09)		10 (5.68)	

From the Chi-square test result, let H_0 : There is no association between profession and enforcement strictness and H_1 : There is an association between profession and enforcement strictness. The results of the Chi-Square Test reveal a statistically significant association between profession and perceptions of enforcement strictness, $\chi^2 (6) = 22.32$, $p < 0.001$. This finding suggests that professionals do not share a uniform view of how strictly regulations are enforced. For instance, architects were more likely than expected to report that enforcement is rarely applied, while builders more frequently perceived enforcement as moderate, and surveyors were more inclined to report very strict enforcement. These variations imply that the nature of each profession may shape how individuals experience or interpret regulatory enforcement, possibly due to differing work environments, responsibilities, or interactions with regulatory bodies.

Table 13: Chi square Test Results

Chi-Square Statistic	Degrees of Freedom	p-value
22.32	6	<0.001

Recommend actions for improved supervision

The result findings show that some important recommendations can be made for improved on site supervision in Nigeria, these include training and certification programs for site supervisors 82 (23.4%), Hiring more qualified site supervisors 78 (22.2%), Stricter enforcement of building regulations 85 (24.2%), encouraging whistle-blowing on substandard practices 58 (16.5%) and adoption of modern technology (e.g., drones, AI monitoring) 48 (13.7%). All these will ensure proper construction techniques, and reduce the likelihood of construction errors. Similarly, 93 (86.1%) also agreed that they would support the use of government policies to enforce mandatory site supervision at all construction sites.

Conclusion

This research assesses the effectiveness of on-site supervision as a yardstick to minimizing building construction failure in Nigeria building construction industry. To achieve this aim, research questions were designed as research instrument in a more coherent and logical manner which helped to ease of data collection, measurement and analysis, and administered to various respondents in the Building Construction Industry. The data were collected and analyzed using SPSS statistical software. From the results analyzed, the following conclusions were made;

1. In Nigeria building construction site, the supervision practice is often done daily, showing a strong commitment to keeping projects on track and up to standard.
2. Another practice in Nigeria building construction is that site engineers are clearly at the forefront. Other stakeholders also have roles to play, but the most essential is that of the site Engineer.
3. The on-site supervision was found to be effective in Nigeria Building industry, indicating a strong overall confidence in the supervisory process.
4. It can also be concluded that ensuring adherence to design specifications, monitoring material quality/quality control and ensuring compliance with health and safety regulations are the key roles carried out by site Engineers in Nigerian building construction site
5. The frequency of supervision is dependent of profession. Certain professions tend to experience different levels of supervision more or less frequently than others.
6. There have been improvement in site supervision practices in Nigerian building construction industry in the last 5 years. Although a major challenge identified is corruption and bribery in project execution. This suggests that corruption has a considerable negative impact on the perceived effectiveness of supervision.
7. Finding suggests that as perceived enforcement becomes weaker, the perceived effectiveness of supervision also tends to decrease. The strength and direction of this relationship indicate that enforcement plays a meaningful role in shaping how supervision is experienced.
8. Penalties for negligence in site supervision be stricter. This will reduce project failures and abandonment, prevent substandard construction, and allows for accountability and professional discipline.
9. Variations imply that the nature of each profession may shape how individuals experience or interpret regulatory enforcement, possibly due to differing work environments, responsibilities, or interactions with regulatory bodies.

References

- Anyanwu C.I (2013) *Project Management and The Project Manager. A Strategy for addressing the problem of Building and Infrastructural collapse in Nigeria*. Scientific Research Journal (SCIRJ), Volume I, Issue III, October 2013 Edition
- Ayeni, D. & Adedeji Y. (2015) *Strategies for Mitigating Building Collapse in Nigeria: Roles of Architects and Other Stakeholders in the Building Industry*. Civil and Environmental Research Vol.7, No.8, 2015
- Chang, R. D., Zuo, J., Zhao, Z. Y., Soebarto, V., Lu, Y., Zillante, G., and Gan, X. L. (2018). *Sustainability attitude and performance of construction enterprises: A China study*. Journal of Cleaner Production, 172, 1440-1451.

- Chiemezie C.N & Krzysztof Z. (2021) *Identification of the key causes and measures to prevent building collapses in Nigeria*. Civil and environmental engineering reports. CEER 2021; 31 (4): 0055-0075 DOI: 10.2478/ceer-2021-0049
- Daniel Adaji (2024). *Nigeria records 135 building collapse incidents, 26 deaths* – Report. Available at <https://punchng.com/nigeria-records-135-building-collapse-incidents-26-deaths-report/>
- Danladi, S. M. (2012). *The Challenges of Building Collapse in Nigeria*. Paper presented at the National Technical Workshop on Building Collapse in Nigeria, 15-16 April, 2012, Abuja.
- Javad, Y. (2017). Effect of unprofessional supervision on durability of buildings.
- Mugenda, O. M., & Mugenda, A. G. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Acts Press, Nairobi, 2003
- Olubi, A R. & Adewolu, T. O. (2018) *Impacts of Building Collapse on Sustainable Development in Nigeria*. Civil and Environmental Research. ISSN 2224-5790 (Paper) ISSN 2225-0514 (Online) Vol.10, No.11, 2018
- Shahraki S, Saghatforoush E, and Ravasan, A. Z. (2018). *Identification and Classification of Factors Affecting the Performance of Building Supervisor Engineers for Construction Industry*. Journal of Engineering, Project, and Production Management 2018, 8(2), 65-74
- Wang, H., Fan, Y., and Huang, K. (2013). *An Integrated Collaboration Model of Public Services in Construction Supervision*. Paper presented at the 2013 International Conference on Service Sciences (ICSS).