

Evaluation of Building Construction Site Accidents: A Case Study of Some Selected Building Projects in Akure South Local Government Area, Ondo State

WILLIAMS, OPEYEMI SAMUEL¹; OLOWOLAYEMO, OLUWASEUN EBENEZER²; OGUNBODE, AKINTOYE BENSON³

^{1,2,3}*Department of Quantity Surveying, Rufus Giwa Polytechnic, Owo, Ondo State, Nigeria*

Abstract- The construction industry remains one of the most hazardous sectors globally, with building construction activities accounting for a significant proportion of occupational injuries and fatalities. In Nigeria, research on construction safety has largely relied on questionnaire-based assessments of safety perceptions, while relatively limited attention has been devoted to the analysis of documented accident records capable of revealing actual accident characteristics and reporting practices. This study evaluated building construction site accidents using accident investigation forms obtained from twenty selected building projects in Akure South Local Government Area, Ondo State, Nigeria. The study examined accident types, construction activities associated with accidents, injury characteristics, body parts affected, immediate and underlying causes of accidents, and the completeness of accident reporting practices. A descriptive analytical approach was adopted using documented accident reports collected from active construction projects. The findings revealed that falls from height (35%) constituted the most frequent accident category, followed by struck-by-object incidents (25%). Minor cuts and bruises (40%) and other non-fatal injuries (40%) represented the dominant injury outcomes, while lower-limb injuries accounted for 50% of all reported injuries. Poor housekeeping, inadequate risk assessment, lack of maintenance, fatigue, and deficiencies in organizational safety management emerged as major contributory factors. The evaluation of accident reporting practices showed that although accident occurrence and victim information were generally documented, critical investigation components, including witness statements, corrective actions, management review, and regulatory reporting, were frequently incomplete. The study concludes that construction accidents in Akure are driven by a combination of technical, organizational, and reporting deficiencies rather than worker behavior alone. It recommends the development of a standardized construction accident reporting system, mandatory risk assessment procedures, improved temporary works management, routine equipment inspection, and

enhanced regulatory oversight to strengthen construction safety performance in Nigeria.

Keywords: Construction Safety, Accident Reporting, Falls from Height, Occupational Injuries, Risk Assessment.

I. INTRODUCTION

The construction industry plays a fundamental role in economic growth through infrastructure development, employment generation, urban expansion, and industrial development (International Labour Organization [ILO], 2023; Nikitina & Bovykina, 2024). However, construction activities continue to present significant occupational safety challenges because of their dynamic work environment, temporary organizational structures, multiple subcontracting arrangements, and exposure to numerous physical hazards (Adebowale, 2023; Ojo et al., 2025). Building construction sites are characterized by work at height, excavation operations, scaffolding activities, equipment use, manual material handling, and changing site conditions that collectively increase accident risk. Consequently, construction remains one of the sectors with the highest rates of occupational injuries and fatalities worldwide (ILO, 2023).

Globally, falls from height, struck-by-object incidents, caught-in-between accidents, and electrocution continue to account for the majority of serious construction injuries and deaths (Hallowell et al., 2022; Occupational Safety and Health Administration [OSHA], 2024). Despite advances in safety technologies, engineering controls, and safety management systems, accident rates remain significant in many developing countries where

regulatory enforcement, safety culture, and accident investigation practices are often inadequate. The economic consequences of construction accidents extend beyond immediate medical costs and include productivity losses, project delays, compensation expenses, equipment damage, reputational impacts, and long-term organizational inefficiencies (Lingard & Rowlinson, 2022).

In Nigeria, rapid urbanization and increasing construction activities have intensified concerns regarding occupational safety performance within the construction industry. Studies conducted across different regions of the country consistently report inadequate safety training, limited use of personal protective equipment, poor housekeeping, weak supervision, and insufficient enforcement of safety regulations as major contributors to construction accidents (Akinlolu, Haupt, & Smallwood, 2023; Eze, Oke, & Aigbavboa, 2024; Olanrewaju & Abdul-Azeez, 2022). Nevertheless, much of the existing Nigerian literature relies predominantly on questionnaire surveys administered to contractors, consultants, and construction professionals. While perception-based studies provide valuable insight into safety attitudes and organizational practices, they may not accurately capture the actual characteristics of accident occurrence, injury patterns, causative factors, and reporting deficiencies.

An important limitation of questionnaire-based research is that it often examines perceived causes of accidents rather than documented accident events. Accident investigation records contain objective information regarding the nature of accidents, construction activities involved, injury outcomes, body parts affected, immediate and underlying causes, corrective actions, and organizational responses. The analysis of documented accident reports therefore provides a stronger empirical basis for understanding accident mechanisms and evaluating the effectiveness of accident reporting systems (Hinze, 2021; Zhou, Goh, & Li, 2023).

Recent international research has increasingly emphasized the importance of systematic accident reporting and investigation as critical components of organizational learning and accident prevention

(Abubakar et al., 2018; Afolabi et al., 2019; Ikpokini et al., 2025). Effective accident reporting systems facilitate hazard identification, root-cause analysis, corrective action implementation, trend monitoring, regulatory compliance, and continuous safety improvement (Manu et al., 2023; Mohamed et al., 2024). However, evidence from developing countries suggests that accident reporting frequently focuses on documenting accident occurrence rather than generating actionable safety knowledge capable of preventing future accidents.

Empirical evidence regarding construction accident characteristics in Akure South Local Government Area remains particularly limited despite the substantial growth of residential, commercial, institutional, and infrastructure projects within the area. Furthermore, little is known about the quality and completeness of accident reporting practices among construction organizations operating in Akure. This knowledge gap is important because deficiencies in accident investigation and reporting may conceal underlying organizational weaknesses and reduce the effectiveness of safety management interventions.

The present study addresses these gaps by evaluating documented accident records obtained from selected building construction projects in Akure South Local Government Area. Specifically, the study examines the types of construction accidents occurring on building sites, identifies the construction activities associated with accident occurrence, evaluates injury characteristics and severity, investigates immediate and underlying causes of accidents, and assesses the completeness of accident reporting practices. The study also provides empirical justification for the development of a standardized construction accident reporting system capable of strengthening construction safety management and regulatory oversight in Nigeria.

II. LITERATURE REVIEW

2.1 Construction site accidents and occupational safety

Construction site accidents refer to unplanned events arising during construction activities that result in

injury, illness, fatality, property damage, equipment damage, or disruption of construction operations (Kadiri et al., 2014; Williams, Hamid & Misnan, 2019). The complex and continuously changing nature of construction projects makes hazard control particularly challenging compared with manufacturing and other industrial sectors. Construction workers are frequently exposed to falls from height, unstable scaffolding, excavation collapse, falling materials, machinery hazards, electrical installations, confined spaces, and adverse environmental conditions (ILO, 2023).

Contemporary accident causation theories emphasize that construction accidents are rarely caused by a single unsafe act. Rather, accidents result from interactions among technical failures, organizational deficiencies, environmental conditions, management decisions, and human factors. The Swiss Cheese Model and systems-based accident theories suggest that accidents occur when multiple defensive barriers fail simultaneously, thereby allowing hazards to result in injury (Reason, 1997; Hollnagel, 2021). This perspective has shifted accident prevention from blaming workers toward improving organizational safety systems, engineering controls, supervision, maintenance, and risk management processes (Kines et al., 2021; Rasmussen & Leveson, 2020; Thomas, Oluchi & Chinemerem, 2026).

2.2 Global patterns of construction accidents

International studies consistently identify falls from height as the leading cause of construction fatalities and serious injuries. Hallowell et al. (2022) found that scaffold failures, roof work, temporary access systems, and inadequate fall protection remain major contributors to severe construction accidents across multiple countries. OSHA (2024) similarly identifies falls, struck-by incidents, electrocution, and caught-in-between accidents as the “fatal four” hazards responsible for a substantial proportion of construction worker deaths.

Recent research has also demonstrated that increasing mechanization and technological complexity have expanded the range of construction hazards. Equipment-related accidents, electrical incidents, lifting operations, and interaction between workers

and machinery have become increasingly significant in urban construction environments (Mohamed et al., 2024). These findings indicate that construction safety programs must address both traditional building-site hazards and emerging technological risks associated with modern construction practices.

2.3 Construction safety research in Nigeria

Construction safety has received increasing research attention in Nigeria during the past decade. Akinlolu et al. (2023) identified inadequate safety training, poor enforcement of safety regulations, and weak organizational commitment as major factors influencing construction safety performance. Olanrewaju and Abdul-Azeez (2022) reported that many construction organizations lack comprehensive safety management systems and frequently rely on reactive rather than preventive safety practices.

Eze et al. (2024) observed that small and medium-sized contractors often exhibit lower levels of safety compliance because of financial constraints, limited technical capacity, and inadequate safety supervision. Similarly, Oke, Aigbavboa & Akinradewo (2025) found that housekeeping deficiencies, inadequate personal protective equipment, and insufficient risk assessment contribute substantially to accident occurrence on Nigerian construction sites.

Although these studies provide valuable insight into construction safety conditions, most rely predominantly on questionnaire surveys measuring safety perceptions, safety awareness, or organizational safety practices. Relatively few Nigerian studies have undertaken systematic analysis of documented accident investigation forms capable of identifying actual accident types, injury patterns, immediate causes, underlying organizational factors, and reporting deficiencies.

2.4 Accident reporting and investigation systems

Accident reporting constitutes a fundamental component of occupational safety management because it provides information required for accident prevention, organizational learning, and regulatory compliance. Effective reporting systems should include accident notification, detailed incident documentation, witness statements, root-cause

analysis, corrective action tracking, management review, and verification of corrective action implementation (Hinze, 2021).

However, Manu et al. (2023). argued that organizations with comprehensive accident reporting systems demonstrate superior safety performance because accident information is systematically transformed into preventive interventions. Conversely, incomplete accident reporting may result in repeated exposure to the same hazards because underlying causes remain unidentified and corrective actions are not adequately monitored.

Digital accident reporting systems have gained increasing attention because they facilitate standardized data collection, photographic documentation, real-time reporting, trend analysis, and integration with organizational safety management systems (Zhou et al., 2023). Standardized reporting also enables comparison of accident patterns across projects, contractors, and geographical regions.

Evidence from developing countries indicates that accident reporting frequently emphasizes injury documentation while providing limited information regarding accident circumstances, organizational causes, corrective actions, and management responses (Mohamed et al., 2024). Such reporting deficiencies reduce the usefulness of accident data for safety improvement and policy development.

2.5 Research gap

The review of existing literature reveals three important research gaps. First, most construction safety studies in Nigeria rely predominantly on perception-based questionnaire surveys rather than documented accident records. Second, relatively few studies have comprehensively evaluated accident reporting forms to identify accident characteristics, injury patterns, immediate causes, underlying organizational factors, and reporting quality within a unified analytical framework. Third, empirical evidence regarding construction accident reporting practices in Akure South Local Government Area remains limited despite increasing urban construction activities. This study addresses these gaps by

analysing documented accident investigation records from selected building construction projects in Akure, thereby providing objective evidence on accident occurrence and evaluating the quality of construction accident reporting practices. The study further contributes by proposing the need for a standardized construction accident reporting system capable of strengthening accident investigation, organizational learning, and construction safety management in Nigeria.

III. MATERIAL AND METHOD

The study adopted a descriptive case study research design to investigate construction site accidents using empirical data extracted from completed accident reporting forms. A structured accident investigation instrument, developed based on established occupational health and safety frameworks, was used to capture data from active building construction projects in Akure South Local Government Area, Ondo State, Nigeria. A total of twenty ($n = 20$) completed accident reporting forms covering various building sites were purposively sampled and retrieved for the investigation. The recorded variables encompassed project location, timing of incidents, specific trade activities, victim demographics, employment status, accident types, nature and severity of injuries, body parts affected, immediate causes, and underlying organisational factors. Given the sample size and exploratory nature of the investigation, the extracted data were subjected to descriptive statistical analysis. Frequencies, percentages, and comparative case analysis were utilized to summarize the accident characteristics, identify predominant injury patterns, and evaluate prevailing safety management practices across the selected construction sites.

IV. RESULTS AND DISCUSSION

4.1 Overview of the investigated construction projects

This section presents the empirical analysis of accident records obtained from twenty selected building construction projects located within Akure South Local Government Area and adjoining construction corridors in Ondo State. Unlike previous

studies that relied predominantly on questionnaire responses from construction professionals, this investigation analysed actual accident reporting forms completed following accident occurrences on construction sites. The use of documented accident records provides a more objective basis for understanding accident characteristics, injury patterns, causative factors, and reporting practices. The investigated projects covered a wide range of construction activities, including plastering, concrete casting, scaffolding operations, excavation works, block setting, reinforcement work, aluminum installation, drainage construction, and equipment operation. The diversity of work activities captured in the dataset indicates that occupational accidents occur across multiple phases of building construction and are not restricted to a single trade or construction operation. The accident reports also covered both urban and peri-urban construction environments, thereby providing a broader representation of contemporary construction safety conditions within the Akure construction industry.

A notable characteristic of the dataset is that the majority of the reports were completed during 2025 and 2026, indicating that the accident records reflect recent construction safety experiences. Consequently, the findings provide valuable baseline information for understanding current accident trends and reporting practices in the rapidly expanding construction environment of Akure South.

4.2 Distribution of construction accident types

Table 4.1: Distribution of accident types

Accident type	Frequency	Percentage
Fall from height	7	35.0
Struck by object	5	25.0
Slip/Trip	2	10.0
Electrical accident	1	5.0
Caught in machinery	1	5.0
Vehicle/equipment accident	1	5.0
Other	3	15.0
Total	20	100.0

One of the primary objectives of the study was to determine the types of accidents occurring most frequently on the investigated construction sites. Analysis of the accident reporting forms revealed that falls from height constituted the most frequently documented accident category. Seven of the twenty recorded cases involved workers falling from scaffolding, elevated platforms, roofing structures, or temporary access systems, representing approximately 35% of all reported accidents. Struck-by-object accidents were the second most common category, accounting for five cases (25%). These incidents primarily involved falling construction materials, reinforcement bars, concrete components, bamboo scaffolding materials, and other site objects that struck workers during construction activities. Slip and trip accidents occurred in two cases (10%), while one case each was recorded for electrical accidents, machinery-related accidents, vehicle or equipment accidents, and other site-specific incidents. The presence of electrical and machinery-related accidents distinguishes the Akure dataset from the earlier Owo investigation, suggesting that construction activities in Akure involve a broader range of occupational hazards associated with urban construction development. However, the dominance of falls from height is consistent with international construction safety literature, which identifies work-at-height activities as one of the leading causes of injuries and fatalities in building construction. However, the wider distribution of accident categories observed in this study suggests that accident prevention strategies in Akure should address multiple hazard sources rather than focusing exclusively on fall protection.

4.3 Construction activities associated with accident occurrence

The accident records indicate that accidents occurred during a broad range of construction operations. Plastering activities accounted for a substantial proportion of the reported cases, while concrete casting, block setting, scaffolding erection, reinforcement work, and excavation operations also featured prominently. However, Akure dataset demonstrates that accident exposure extends across virtually all major building operations. This finding suggests that construction safety interventions should

adopt a project-wide approach rather than targeting isolated trades. The occurrence of accidents during routine construction activities such as plastering, block setting, and concrete work further indicates that everyday construction operations may present significant safety risks when organizational controls are inadequate.

4.4 Injury characteristics and severity

Table 4.2: Nature of injuries sustained
Nature of injury Frequency Percentage

Minor cut/bruise	8	40.0
Internal injury	2	10.0
Fracture	1	5.0
No injury	1	5.0
Other injuries	8	40.0
Total	20	100.0

The severity of injuries varied considerably across the investigated projects. Minor cuts and bruises represented the largest injury category, occurring in eight of the twenty accident cases (40%). Fractures were recorded in one case (5%), while internal injuries were documented in two cases (10%). One accident resulted in no injury despite the occurrence of an accident event, while several cases involved lower limb injuries requiring medical attention. Importantly, no fatality was recorded among the investigated projects. However, the predominance of non-fatal injuries should not be interpreted as evidence of a low accident burden. Minor injuries frequently result in lost work time, reduced productivity, medical expenses, and increased accident risk if underlying hazards remain uncorrected. Furthermore, the occurrence of fractures and internal injuries demonstrates that serious accidents continue to occur on building construction sites.

4.5 Body parts affected

Table 4.3: Body parts affected
Body part Frequency Percentage

Leg	10	50.0
Hand	4	20.0

Body part	Frequency	Percentage
Head	1	5.0
Foot	1	5.0
Other/unspecified	4	20.0
Total	20	100.0

Analysis of injury locations revealed that the lower limbs were particularly vulnerable. Leg injuries occurred in ten accident cases (50%), making the leg the most frequently affected body part. Hand injuries occurred in four cases (20%), while isolated injuries involving the head and foot were also recorded. Moreover, the concentration of leg injuries reflects the nature of the reported accident mechanisms, particularly falls from height, struck-by-object incidents, and excavation-related accidents. This finding suggests that improved scaffolding systems, safer access routes, material handling controls, and site housekeeping may substantially reduce lower-limb injuries.

4.6 Worker characteristics and accident vulnerability

An important feature of the Akure dataset is the wide variation in worker experience. Accident victims ranged from relatively inexperienced workers with three years of experience to highly experienced workers with more than thirty years of construction experience. Several accident victims possessed 23, 26, 32, 40, and even 61 years of construction experience. This finding differs markedly from the earlier Owo study (Williams, Ogunbode & Olowolayemo, 2026), where apprentices and less experienced workers were disproportionately represented among accident victims. The implication is that construction experience alone does not provide adequate protection against occupational hazards (Kines et al., 2021). Experienced workers remain vulnerable when exposed to defective scaffolding, inadequate supervision, unsafe equipment, poor housekeeping, fatigue, or deficient organizational safety systems. This observation challenges the assumption that accident prevention should focus primarily on new entrants to the construction industry. Instead, the findings support the need for continuous safety training, routine supervision, equipment inspection, and organizational safety improvement across all categories of workers.

4.7 Immediate causes of construction accidents

Table 4.4: Immediate causes of accidents

Immediate cause	Frequency
Poor housekeeping	4
Unsafe equipment condition	2
Lack of PPE	2
Inadequate supervision	1
Violation of safety procedure	2
Other site conditions	4

The accident investigation forms identified several direct factors contributing to accident occurrence. Poor housekeeping was identified in four cases. Unsafe equipment conditions were recorded in two cases. Lack of personal protective equipment was documented in two cases. Violation of safety procedure had two cases recorded. and inadequate supervision was identified in one case. In addition, several reports identified environmental conditions, wet surfaces, and carelessness as contributing factors. A particularly significant finding is that unsafe worker behaviour was not consistently identified as the dominant direct cause of accidents. Instead, many accidents were associated with equipment conditions, site organization, environmental factors, and management deficiencies. This suggests that accident prevention efforts should move beyond behavioural interventions and place greater emphasis on engineering controls, housekeeping, equipment maintenance, supervision, and work environment management.

4.8 Underlying organizational causes

Table 4.5: Underlying causes of accidents

Underlying cause	Frequency
Inadequate risk assessment	4
Lack of maintenance	3
Fatigue/overwork	3
Inadequate training	2
Poor safety culture	1
Poor communication	1
Design/planning error	1

The root-cause analysis revealed substantial organizational weaknesses across the investigated projects. Inadequate training was identified in two cases, while lack of maintenance occurred in three cases. Inadequate risk assessment was documented in four cases, making it one of the most prominent organizational deficiencies. Fatigue and overwork were identified in three cases, while poor communication and design or planning deficiencies were also reported. These are shown in Table 4.5. The prominence of inadequate risk assessment indicates that hazards were frequently not identified and controlled before construction activities commenced. Similarly, maintenance deficiencies contributed to accidents involving scaffolding, equipment, and temporary work structures. The presence of fatigue-related accidents also suggests that work scheduling, rest periods, and workload management require greater attention within construction safety management systems.

4.9 Evaluation of accident reporting practices

Table 4.6: Completeness of accident reporting

Reporting component	Completion level
Accident identification	High
Victim information	High
Injury information	High
Accident narrative	Moderate
Witness statements	Low
Corrective actions	Very low
Investigation committee	Very low
Management review	Very low
Regulatory submission	Very low

The most important contribution of this study relates to the quality of accident reporting itself. Although all twenty accidents were documented using structured reporting forms, the completeness of reporting varied considerably across the investigated projects. Basic accident information, victim details, and injury descriptions were generally completed. However, critical investigation components were frequently omitted. Moreover, witness statements were available for only a limited number of cases. Several accident narratives lacked sufficient detail

regarding accident circumstances, while many reports contained incomplete information regarding corrective actions, investigation committees, management reviews, and regulatory submission procedures. The findings demonstrate that the investigated projects practiced accident documentation, but not necessarily comprehensive accident investigation. The reporting process largely focused on recording the occurrence of accidents rather than generating systematic safety knowledge for future prevention. This distinction is important because effective accident prevention depends on complete documentation of accident circumstances, causative factors, corrective actions, and organizational responses.

V. DISCUSSION

5.1 Construction accident patterns in the Akure urban construction environment

The findings of this study reveal that construction accidents in Akure South are characterised by a diverse pattern of occupational hazards involving falls from height, struck-by-object incidents, slip and trip accidents, electrical injuries, machinery-related accidents, and equipment-related incidents. Unlike the earlier investigation conducted in Owo, Isuada, and Emure (Williams et al., 2026), which was dominated by conventional building-site hazards, the Akure data indicate a broader spectrum of accident mechanisms associated with an expanding urban construction environment. This suggests that urban construction projects may expose workers to a more complex combination of physical, electrical, mechanical, and organizational hazards than smaller peri-urban construction sites.

The predominance of falls from height confirms that elevated work remains a critical source of accident risk within the Nigerian construction industry. However, the present study extends previous knowledge by demonstrating that falls occurred under multiple work conditions, including scaffolding operations, block-setting activities, and temporary access structures. The accident narratives indicate that scaffold failures, bamboo support systems, broken planks, and unstable temporary structures were recurring features of the reported

accidents. This finding suggests that the challenge extends beyond individual worker behaviour and reflects deficiencies in temporary work structure management.

International construction safety research consistently identifies falls from height as the leading cause of construction fatalities and serious injuries. Nevertheless, the Akure findings suggest that the underlying problem is not simply exposure to height but inadequate engineering controls, deficient scaffold inspection practices, poor temporary works design, and weak enforcement of work-at-height safety procedures. Consequently, fall prevention strategies should prioritize structural safety, scaffold certification, and systematic inspection protocols.

5.2 The changing nature of construction hazards

The findings therefore suggest that construction safety programmes require modernization to address emerging technological hazards associated with urban construction development. Furthermore, the occurrence of equipment-related accidents indicates that mechanization alone does not automatically improve safety performance. Without corresponding improvements in equipment maintenance, operator training, supervision, and preventive maintenance systems, mechanization may introduce additional sources of occupational risk.

5.3 Injury burden and occupational health implications

The injury profile observed in this study provides important insight into the occupational health burden associated with construction activities in Akure South. Although minor cuts and bruises represented the largest injury category, the occurrence of fractures, internal injuries, and serious trauma requiring hospital treatment demonstrates that the accident burden extends beyond superficial injuries.

A particularly significant observation is that lower-limb injuries were the most common injury outcome. The predominance of leg injuries differs from many construction studies that report hand injuries as the dominant injury category. The difference may be explained by the high proportion of falls from height, scaffold failures, excavation activities, and material

handling incidents observed within the investigated projects.

The concentration of lower-limb injuries has important ergonomic and safety implications. Workers involved in block setting, scaffolding, excavation, concrete work, and plastering frequently operate on uneven surfaces, temporary platforms, trenches, and elevated structures. Consequently, improvements in access systems, scaffold stability, excavation protection, material storage, and work area organization may substantially reduce lower-limb injuries.

Another important finding is that several injured workers required hospital treatment, indicating that many accidents exceeded the threshold of simple first-aid incidents. This suggests that the economic impact of construction accidents may be considerably greater than is often assumed, particularly when medical treatment, transportation, lost work time, and reduced productivity are considered.

5.7 The need for a standardized construction accident reporting system

The reporting deficiencies observed in this study provide strong empirical justification for the development of a Standardized Construction Accident Reporting System (SCARS). The proposed system represents the central practical contribution of this research. A standardized reporting system would transform accident reporting from a fragmented administrative activity into a structured safety management process. Such a system should integrate accident notification, detailed incident documentation, witness management, root-cause investigation, corrective-action monitoring, management review, and regulatory reporting within a unified framework.

The existing reporting forms already contain several components required for an effective reporting system. However, the implementation process remains incomplete. Future accident reporting should therefore include mandatory completion of accident narratives, photographic evidence, witness statements, root-cause analysis, corrective-action assignment, implementation deadlines, verification

procedures, and digital data storage. A standardized system would also facilitate accident surveillance across multiple construction projects, enabling contractors, regulatory agencies, and researchers to identify industry-wide accident trends, benchmark safety performance, and evaluate the effectiveness of safety interventions.

5.8 Implications for construction safety policy and practice

The findings have important implications for construction safety regulation and practice in Nigeria. First, construction safety should be strengthened through improved temporary works management, particularly scaffolding systems, elevated work platforms, and access structures. Second, equipment inspection and maintenance programmes should be institutionalized to reduce equipment-related accidents. Third, construction organizations should implement mandatory pre-task risk assessments for all major construction activities. Fourth, fatigue management should become an integral component of construction safety programmes. Fifth, accident reporting should be standardized across the industry through regulatory guidance and digital reporting systems. Most importantly, regulatory agencies should require not only accident notification but also comprehensive accident investigation and corrective-action verification. The quality of accident investigations should become a key indicator of organizational safety performance.

REFERENCES

- [1] Adebawale, O. J. (2023). A systematic review of challenges undermining the efficacy of construction health and safety regulations in major African countries. *Construction Economics and Building*, 23(1). Available at: <https://epress.lib.uts.edu.au>.
- [2] Afolabi, A. O., Tunji-Olayeni, P. F., Amusan, L. M., Omuh, I. O., Ojelabi, R. A., & Oyeyipo, O. O. (2019). Safety cultured industry through the integration of occupational health and safety (OHS) courses in the built environment curriculum. *Proceedings of INTED2016 Conference 7th-9th March 2016, Valencia, Spain*

- [3] Akinlolu, M., Haupt, T., & Smallwood, J. (2023). Construction health and safety in developing countries: Current practices and future directions. *Journal of Construction in Developing Countries*, 28(1), 1–20.
- [4] Eze, E. C., Oke, A. E., & Aigbavboa, C. O. (2024). Occupational safety performance of construction contractors in Nigeria. *International Journal of Construction Management*, 24(3), 455–468.
- [5] Hallowell, M. R., Hinze, J., Baud, K., & Wehle, A. (2022). Proactive construction safety control: Measuring, monitoring, and responding to safety leading indicators. *Journal of Construction Engineering and Management*, 148(6), 04022045.
- [6] Hinze, J. (2021). *Construction safety* (3rd ed.). Routledge.
- [7] Hollnagel, E. (2021). *Safety-II in practice: Developing the resilience potentials*. Routledge.
- [8] Ikpokini, D. D., Ashiru, A. T., Mohammed, A. U., Ayanda, P., Ibrahim, R., Zubairu, A., Oyekeye, O. I., & Abubakar, H. O. (2025). Accident investigation and reporting practices in the construction industry enhancing safety and organizational learning. *International Journal of Innovative Science and Research Technology*, 10(9). <https://doi.org/10.38124/ijisrt/25sep818>
- [9] International Labour Organization (2023a). *Safety and health in construction: Global review of occupational injuries and fatalities*. ILO.
- [10] International Labour Organization (2023b). *Developing the construction industry for employment-intensive infrastructure investments*. ILO. ISBN 978-92-2-133586-3. Available at: <https://www.ilo.org>
- [11] Kadiri, Z. O., Nden, T., Avre, G. K., Oladipo, T. O., Edom, A., Samuel, P. O., & Ananso, G. N. (2014). Causes and effects of accidents on construction sites (A case study of some selected construction firms in Abuja F.C.T Nigeria). *IOSR Journal of Mechanical and Civil Engineering*, 11(5), 66-72
- [12] Kines, P., Andersen, L. P. S., Spangenberg, S., Mikkelsen, K. L., Dyreborg, J., & Zohar, D. (2021). Safety interventions for the prevention of accidents at work: A systematic review. *Campbell Systematic Reviews*, 17(1). <https://doi.org/10.1002/cl2.1145>
- [13] Lingard, H., & Rowlinson, S. (2022). *Occupational health and safety in construction project management* (3rd ed.). Routledge.
- [14] Manu, P., Ankrah, N., Proverbs, D., & Suresh, S. (2023). Accident investigation and organizational learning in construction safety management. *Safety Science*, 163, 106112.
- [15] Mohamed, S., Ali, T. H., & Tam, V. W. Y. (2024). Digital transformation of construction safety reporting systems. *Automation in Construction*, 158, 105210.
- [16] Nikitina, N. V., & Bovykina, P. M. (2024). The construction industry as an engine of regional development: Macroeconomic assessment and digital transformation pathways aligned with national objectives. Available at: <https://ideas.repec.org>.
- [17] Occupational Safety and Health Administration (2024). *Common construction hazards and prevention strategies*. U.S. Department of Labor.
- [18] Oke, A. E., Aigbavboa, C. O., & Akinradewo, O. (2025). Safety management deficiencies and accident occurrence on Nigerian construction sites. *Journal of Engineering, Design and Technology*, 23(2), 321–340.
- [19] Olanrewaju, A., & Abdul-Azeez, A. D. (2022). Safety compliance and accident prevention in the Nigerian construction industry. *Journal of Financial Management of Property and Construction*, 27(4), 487–503.
- [20] Rasmussen, J., & Leveson, N. G. (2020). Training in the prevention of major accidents through the proactive safety approach. *Safety Science*, 131, 104911. <https://doi.org/10.1016/j.ssci.2020.104911>
- [21] Reason, J. (1997). *Managing the risks of organizational accidents*. Ashgate.

- [22] Thomas, D. O., Oluchi Nwaichi E., and Chinemerem, P. (2026). Improving Safety Performance in Nigeria's Oil and Gas Construction Industry: A Human Factors Engineering Approach. *Open Research Africa* 2026, 7:1
<https://doi.org/10.12688/openresafrica.14411.2>
- [23] Zhou, Z., Goh, Y. M., & Li, Q. (2023). Data-driven accident reporting and safety analytics in construction. *Advanced Engineering Informatics*, 57, 102041.
- [24] Williams, O. S., Hamid, R. A., & Misnan, M. S. (2019). Causes of building construction related accident in the south-western states of Nigeria. *International Journal of Built Environment and Sustainability*, 6(1), 13-20.
<https://doi.org/10.11113/ijbes.v6.n1.313>
- [25] Williams, S. O., Ogunbode, A. B., & Olowolayemo, E. O. (2026). Comparative Investigation of Construction Site Accidents: A Case Study of Some Selected Building Projects in Owo Local Government Area, Ondo State. *Proceedings of the 2026 Faculty of Environmental Studies International Conference, Owo, Ondo State, Nigeria. Technological Applications in Environmental Sustainability and Climate Change Adaptation.*