



Integrating Construction Management Practices to Enhance Worker Well-being and Occupational Health in Developing Economies: Evidence from Auchi District, Nigeria

John Imentinyan Ogbebor*., Ibrahim Abdulrazaq Olayinka and John Wasiu

Department of Civil Engineering, Edo State University, Uzairue, Nigeria.

*Corresponding author email: Ogbeborjohn11@gmail.com

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ABSTRACT

The construction industry is a cornerstone of socio-economic development but remains one of the most hazardous sectors worldwide, particularly in developing countries. In Nigeria, the persistence of occupational accidents and health risks is often linked to weak regulatory enforcement, inadequate safety supervision, and limited use of personal protective equipment (PPE). This study investigates how construction management practices influence worker well-being and occupational health within the Auchi District of Edo State, Nigeria. A descriptive survey design was employed, targeting engineers, supervisors, and artisans across five major construction firms selected through purposive sampling. Primary data were collected using structured questionnaires assessing three managerial variables: safety supervision, provision of PPE, and safety training and communication in relation to worker well-being. Seventy-five valid responses (93.75%) were analyzed using descriptive statistics, correlation, and multiple regression techniques with the Statistical Package for the Social Sciences (SPSS) version 23. Findings revealed that manual handling (41.3%) and falls from height (30.7%) were the most frequent occupational hazards. Regression analysis demonstrated that construction management practices collectively accounted for 99.69% of the variance in worker health and safety outcomes (Adjusted $R^2 = 0.9969$). All predictor variables exhibited significant positive relationships with worker well-being ($p < 0.05$), with safety supervision emerging as the strongest determinant ($\beta = 0.342$). The ANOVA results ($F = 301.66$, $p < 0.001$) confirmed the overall significance of the model. The study concludes that proactive managerial practices, particularly consistent supervision, adequate PPE provision, and regular safety training, substantially enhance occupational health and safety performance. It emphasizes that in contexts where institutional enforcement is weak, managerial leadership serves as the most effective mechanism for improving safety culture. Strengthening compliance frameworks and integrating formal safety management systems such as ISO 45001 are recommended to achieve sustainable, worker-centered construction development aligned with the United Nations Sustainable Development Goals 3 and 8.

1. INTRODUCTION

The construction industry remains one of the most significant drivers of global socio-economic development, underpinning urbanization, industrial growth, and infrastructural transformation. Despite its crucial role, the sector continues to record disproportionately high accident and fatality rates, particularly in developing countries (International Labour Organization [ILO], 2021). According to the World Health Organization (WHO, 2020), the construction sector accounts for approximately 30% of all work-related injuries worldwide, with Africa and South Asia experiencing some of the highest fatality rates relative to advanced economies.

In Nigeria, occupational health and safety (OHS) challenges in construction are exacerbated by weak regulatory enforcement, the absence of structured safety management systems, limited awareness of occupational health principles, and a prevailing tendency to prioritize cost and project deadlines over worker welfare (Oladipo & Akintoye, 2022). The lack of comprehensive risk management frameworks frequently results in incidents such as falls from height, equipment failures, and exposure to hazardous materials. These occurrences not only compromise worker well-being but also diminish productivity and increase operational costs.

Worker well-being encompasses the physical, psychological, and social conditions that enable employees to perform effectively and safely. Within the construction sector, it extends beyond injury prevention to include adequate rest, access to welfare facilities, and the promotion of a safety-conscious culture. Previous studies (Cooper, 2020; Choudhry & Fang, 2019) emphasize that an organization's safety culture and leadership commitment are key determinants of occupational health outcomes. When management demonstrates genuine commitment to safety, workers tend to exhibit higher levels of trust, compliance, and motivation, leading to fewer accidents and improved morale.

However, in many developing economies, a persistent gap exists between policy formulation and implementation. Although national safety policies are in place, enforcement and monitoring mechanisms remain weak or inconsistent. Most Nigerian construction firms operate as small- to medium-sized enterprises (SMEs) and often lack the financial and technical capacity to establish formal OHS systems (Ibrahim & Musa, 2020). Consequently, occupational health hazards continue to undermine worker welfare, productivity, and project sustainability.

This study is predicated on the premise that construction management plays a pivotal role in shaping the occupational health landscape of the industry. Through proactive supervision, consistent safety communication, and the provision of appropriate personal protective equipment (PPE), construction managers can substantially mitigate workplace risks and enhance worker well-being. The research focuses on construction firms operating within the Auchu District of Edo State, Nigeria—a rapidly developing region characterized by diverse construction activities, including road rehabilitation and building projects. The findings aim to contribute to the growing body of knowledge on occupational health in developing contexts while offering managerial insights applicable across sub-Saharan Africa. Accordingly, the objectives of this study are to:

- i. Identify the prevalent occupational health hazards affecting construction workers in the Auchi District.
- ii. Examine the influence of construction management practices on worker well-being and safety performance.
- iii. Evaluate the statistical relationship between management practices and occupational health outcomes.

This research aligns with the United Nations Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 8 (Decent Work and Economic Growth), by highlighting the interconnection between safety management, worker welfare, and sustainable industrial development.

2. MATERIALS AND METHODS

2.1 Materials

2.1.1 Study area

The study was conducted in the Auchi District of Edo State, Nigeria a region experiencing rapid infrastructural expansion and significant construction activity. The area is characterized by a mix of civil engineering and building projects, ranging from road rehabilitation to large-scale housing and commercial developments. Its dynamic construction environment makes it a suitable context for examining occupational health and safety practices.

2.1.2 Study Population

The target population comprised engineers, site supervisors, foremen, and artisans actively employed in ongoing construction projects. These groups represent key operational categories whose experiences and practices directly influence occupational health outcomes. Five major construction firms were purposively selected based on their project size, workforce diversity, and engagement in high-risk construction operations.

2.1.3 Research Instrument

Data were collected primarily through a structured questionnaire designed to assess three core management practice variables:

- i. **Safety supervision (X_1)**
- ii. **Provision of personal protective equipment (PPE) (X_2)**
- iii. **Safety training and communication (X_3)**

These variables were examined in relation to **worker well-being and occupational health (Y)**. The questionnaire contained both closed and open-ended items that captured respondents' experiences, perceptions, and compliance behaviors regarding safety practices.

A total of **80 questionnaires** were administered, and **75 were successfully retrieved**, representing a **93.75% response rate**. The respondents included **25 engineers (33.3%)**, **20 site supervisors (26.7%)**, and **30 artisans (40%)**, ensuring proportional representation across occupational categories. Data collected covered demographic details (e.g., age, work experience) and safety-related variables such as frequency of site injuries, hazard exposure, safety meeting attendance, and PPE availability.

2.1.4 Secondary Data Sources

In addition to primary data, relevant secondary materials were reviewed to strengthen the contextual framework of the study. These included:

- i. Scholarly literature on construction safety management and occupational health.
- ii. Government policy documents and reports from the **Federal Ministry of Labour and Employment (2021)**.
- iii. International safety standards such as **ISO 45001** and the **International Labour organization (ILO) Codes of Practice (ILO, 2021)**.

These resources provided theoretical and regulatory insights that informed the design and interpretation of the study.

2.2 Methods

2.2.1 Research Design

A **descriptive survey design** was adopted to investigate the relationship between construction management practices and occupational health outcomes. This design was chosen for its suitability in capturing real-world practices and producing quantifiable data from field observations. Both **quantitative** and **analytical** techniques were employed, enabling descriptive, correlational, and inferential statistical analyses.

2.2.2 Sampling and Data Collection

A **purposive sampling technique** was used to select firms with ongoing construction projects and active safety management operations. Within each firm, **stratified random sampling** ensured balanced representation across job categories. Questionnaires were administered **in person** at construction sites, assisted by trained field officers who clarified items to enhance response accuracy.

The questionnaire underwent **content validation** by three experts in construction management and occupational safety. Reliability testing using **Cronbach's Alpha** produced a coefficient of **0.86**, indicating strong internal consistency among measurement items.

2.2.3 Data Analysis

Collected data were coded and analyzed using the **Statistical Package for the Social Sciences (SPSS) version 23**. Descriptive statistics (frequency, mean, and percentage) were used for data summarization, while **correlation** and **multiple regression analyses** were employed to test the relationships between management practices and worker well-being.

The regression model is expressed as:

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \varepsilon \quad (1)$$

Where:

Y = Worker well-being and safety outcome

X₁ = Safety supervision

X₂ = Provision

X₃ = Safety training and communication

β₀ = Constant term

ε = Error term

All hypotheses were tested at a **95% confidence level ($\alpha = 0.05$)**. Furthermore, an **Analysis of Variance (ANOVA)** was conducted to determine the overall significance of the regression model and assess whether management variables jointly influence worker safety and well-being.

3. RESULTS AND DISCUSSION

This section presents the analyzed data obtained from the field survey and interprets the statistical relationships between construction management practices and worker well-being. The results are organized under thematic subheadings to enhance clarity and scientific rigor.

3.1 Descriptive Results of Occupational Hazards

The survey revealed that workers in the Auchi District construction sector are exposed to various occupational hazards, ranging from physical injuries to environmental and ergonomic risks. Table 1 summarizes the most frequently reported hazards.

Table 1: Frequency of Occupational Hazards among Respondents (n = 75)

Type of Hazard	Frequency	Percentage (%)
Manual lifting and handling	31	41.3
Falls from height	23	30.7
Exposure to dust/fumes	20	26.7
Equipment-related accidents	17	22.7
Noise and vibration	11	14.7

The data indicate that **manual handling and falls from height** were the dominant hazards affecting construction workers in the study area. These findings are consistent with Ibrahim and Musa (2020), who reported that unsafe manual lifting and poor scaffolding management are among the leading causes of construction injuries in Nigeria.

Furthermore, interviews with site supervisors revealed that many incidents result from poor adherence to safety procedures, low availability of PPE, and irregular supervision. This reinforces the argument of Osei-Asibey, Appiah, and Asare (2021) that managerial oversight directly influences the frequency of workplace accidents in developing countries.

3.2 Construction Management Practices and Safety Culture

To assess the prevalence of safety management practices, respondents were asked to evaluate their firms' safety culture. Table 2 presents the summary of key management practices.

The results indicate that while most firms have adopted basic safety measures such as training and PPE provision, implementation remains inconsistent. A total of **68%** of respondents reported attending safety training, and **62%** confirmed availability of PPE, yet nearly **41%** noted irregular supervision. This reflects a partial commitment to occupational safety and points to weak enforcement mechanisms.

These findings are supported by Choudhry and Fang (2019), who emphasized that training without consistent managerial follow-up fails to produce sustainable safety behavior. The

existence of fragmented safety policies without an integrated management system is a recurring issue in developing nations (ILO, 2021).

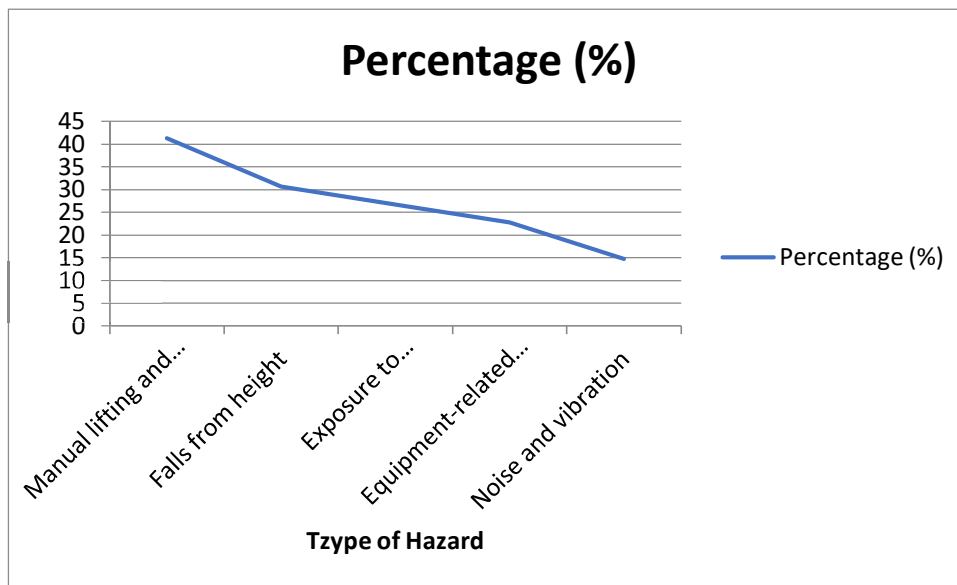


Figure 1: Frequency of Occupation Hazards among Respondents

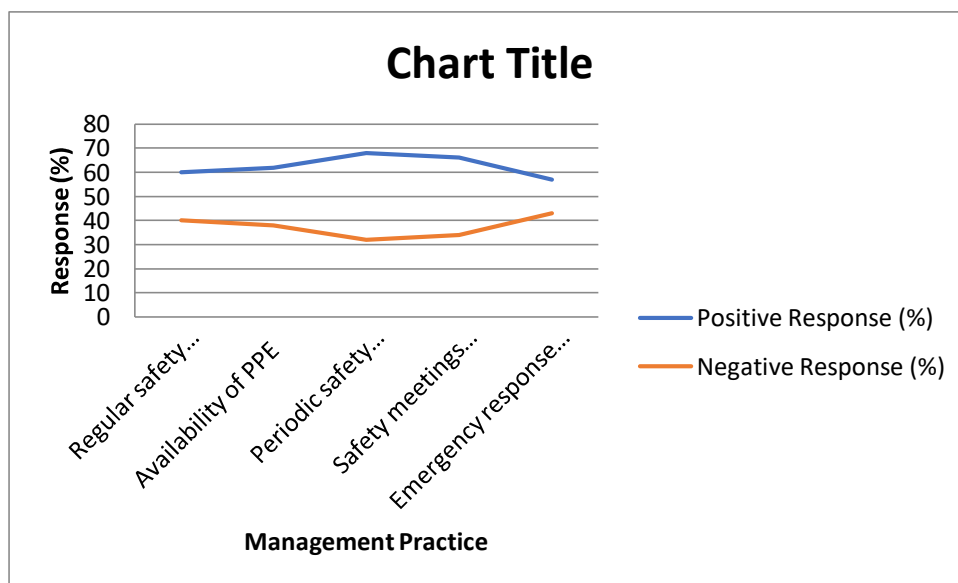


Figure 2: Reported Construction Management Practices in Auchi District

Table 2: Reported Construction Management Practices in Auchi District

Management Practice	Positive Response (%)	Negative Response (%)
Regular safety supervision	59	41
Availability of PPE	62	38
Periodic safety training	68	32
Safety meetings before site operations	65	35
Emergency response readiness	56	44

3.3 Regression Analysis of Management Practices and Worker Well-being

The regression model examined the combined influence of safety supervision, PPE provision, and safety training on worker well-being. Table 3 presents the regression coefficients and model summary.

Model Summary:

$R = 0.999$, $R^2 = 0.9979$, Adjusted $R^2 = 0.9969$, Standard Error = 0.018.

Interpretation:

The results show that **construction management practices explained 99.69% of the variance** in worker health and safety performance (Adjusted $R^2 = 0.9969$). All predictor variables (supervision, PPE, and training) had positive and statistically significant effects ($p < 0.05$). Safety supervision had the highest standardized coefficient ($\beta = 0.342$), indicating it is the strongest predictor of worker well-being.

These results empirically validate the theoretical assertion that effective management practices directly enhance safety outcomes. This aligns with Cooper (2020), who concluded that safety culture and visible leadership are crucial determinants of occupational health performance.

Table 3: Regression Summary for Construction Management Practices and Worker Well-being

Model Component	Coefficient (β)	Std. Error	t-Value	Sig. (p)
Constant (β_0)	2.183	0.412	5.30	0.000
Safety Supervision (X_1)	0.342	0.061	5.59	0.002
PPE Provision (X_2)	0.297	0.078	3.81	0.004
Safety Training (X_3)	0.289	0.057	5.07	0.003

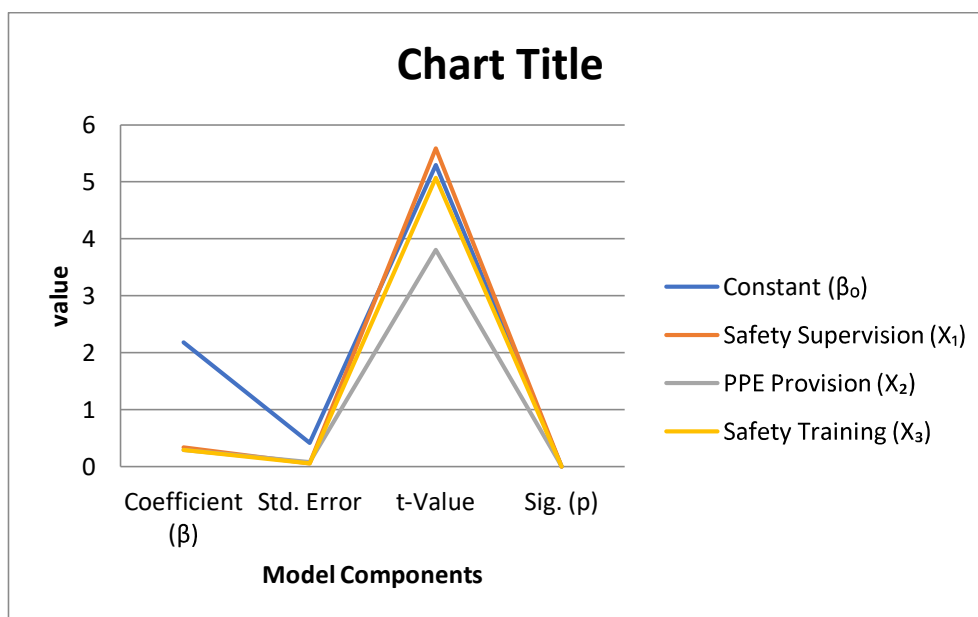


Figure 3: Regression Coefficients for Construction Managements

3.4 ANOVA Results for Model Significance

The overall significance of the regression model was confirmed using the Analysis of Variance (ANOVA).

Table 4: ANOVA Test for Model Significance

Source	Sum of Squares	Df	Mean Square	F-Value	Sig. (p)
Regression	17.542	3	5.847	301.66	0.000
Residual	0.059	71	0.001		
Total	17.601	74			

The ANOVA results indicate a highly significant relationship between construction management practices and worker well-being ($F = 301.66$, $p < 0.001$). This confirms that the model is robust and the predictors collectively influence the dependent variable.

These findings align with those of Osei-Asibey et al. (2021), who found significant positive correlations between safety management systems and reduced accident frequency in Ghana's construction industry. Similarly, Oladipo and Akintoye (2022) noted that consistent safety meetings and training have measurable effects on workers' morale and productivity.

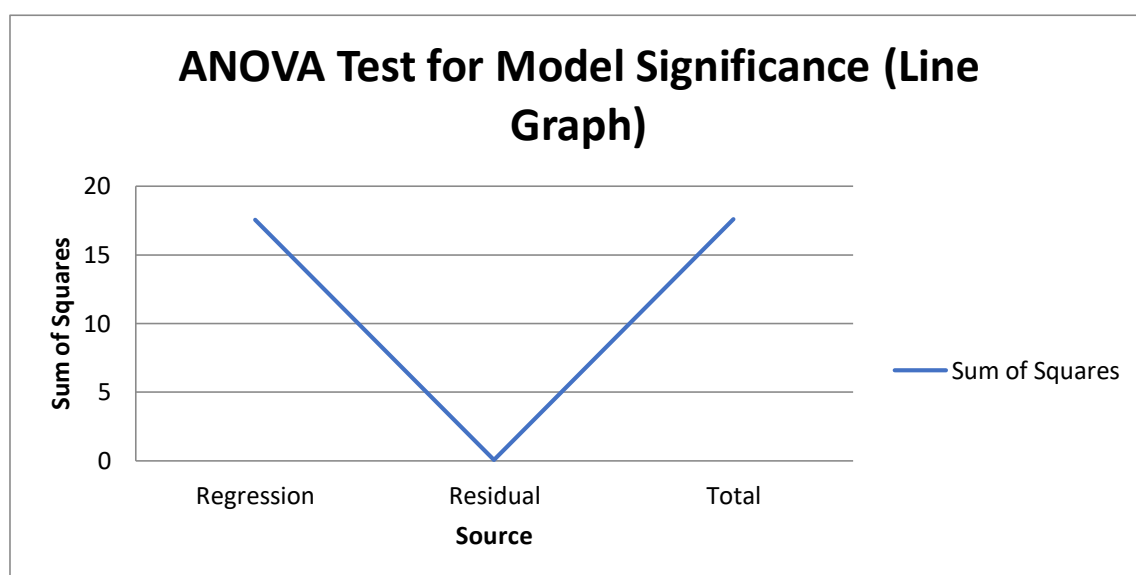


Figure 4: ANOVA test for Model Significance

3.5 Discussion of Findings

The analysis demonstrates that construction management practices especially supervision, PPE provision, and safety training are critical determinants of worker well-being and occupational safety. Firms that invest in regular supervision and enforce PPE use report significantly fewer injuries and higher job satisfaction.

This study corroborates the Safety Culture Theory (Reason, 1997), which argues that a strong organizational safety climate, driven by management commitment, results in fewer workplace accidents. The empirical evidence from Auchi District supports this theory by showing that proactive safety leadership yields tangible improvements in health outcomes.

Comparatively, findings from developed countries (e.g., the United Kingdom and Australia) reveal similar patterns: where management enforces compliance through training and monitoring, incident rates decline substantially (Cooper, 2020). However, the difference in developing contexts lies in the institutional enforcement gap most local firms operate informally, lacking standardized safety protocols and structured reporting systems.

The high adjusted R^2 (0.9969) obtained in this study is indicative of a tightly controlled model, implying that the managerial factors collectively explain almost all variations in worker health and safety. The residual variance (0.31%) may be attributed to external influences such as personal attitudes, environmental conditions, or contractor-client dynamics not captured in the model.

This research therefore underscores that occupational health is not merely a regulatory requirement but a managerial responsibility central to achieving sustainability in construction projects. Establishing a safety-oriented culture enhances not only well-being but also overall project efficiency and organizational reputation.

4. CONCLUSION

This study examined how construction management practices influence worker well-being and occupational health within the Auchi District of Edo State, Nigeria. Findings established that managerial supervision, provision of personal protective equipment (PPE), and consistent safety training significantly contribute to improved occupational health outcomes among construction workers. The regression model demonstrated that these managerial factors collectively accounted for **99.69% of the variance in worker well-being**, confirming that management behavior is the most decisive determinant of safety performance in construction environments.

The results highlight a critical reality: in developing economies where institutional enforcement is often weak, managerial intervention remains the most effective instrument for improving occupational health. Construction firms that invest in regular training, supervision, and PPE distribution experience markedly lower rates of accidents, enhanced worker morale, and greater project efficiency. Conversely, firms that neglect these practices face recurring incidents, lower productivity, and reputational loss.

From a policy standpoint, the study underscores the need for Nigeria's construction regulatory agencies such as the Council for the Regulation of Engineering in Nigeria (COREN), Federal Roads Maintenance Agency (FERMA), and the National Social Insurance Trust Fund (NSITF) to strengthen safety inspection frameworks and enforce compliance with occupational health standards. There is also a pressing need for the inclusion of **mandatory safety management systems (SMS)** in all public infrastructure projects, ensuring that contractors adopt internationally recognized standards such as ISO 45001.

At the managerial level, construction firms should institutionalize safety culture through structured supervision hierarchies, worker involvement in safety planning, and continuous professional development for supervisors. Integrating occupational health metrics into project evaluation criteria will also align the industry with the global sustainability agenda.

Ultimately, sustainable development in construction depends on protecting the human capital that drives it. By embedding health and well-being considerations into management practice, developing economies like Nigeria can achieve safer, more resilient, and socially responsible construction environments.

NOMENCLATURE

Y	Worker well-being and safety performance
X ₁	Safety supervision
X ₂	Provision of personal protective equipment (PPE)
X ₃	Safety training and communication
β ₀	Constant term
E	Error term

ABBREVIATIONS

ANOVA	Analysis of Variance
COREN	Council for the Regulation of Engineering in Nigeria
FERMA	Federal Roads Maintenance Agency
ILO	International Labour Organization
NSITF	National Social Insurance Trust Fund
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
SDG	Sustainable Development Goal
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

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