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Analysis of Factors Causing High Workplace Accidents and Efforts to Improve the Implementation of Occupational Health and Safety (OHS) Systems in Modern Industry

Hanifah Handayani[1*], Amri[2]
Institut Teknologi Petroleum Balongan
Corresponding Author: Hanifah Handayani hanifahhandayani17@gmail.com

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A B S T R A C T

This study aims to analyze the factors causing high workplace accidents and to improve the implementation of Occupational Health and Safety (OHS) systems in modern industry in West Java. The study employs a mixed-method approach with a descriptive analytical design through questionnaires administered to 40 workers and interviews with 6 key informants. The research process includes risk identification using HIRARC, root cause analysis through Fishbone and 5 Why methods, and evaluation of OHS system implementation. The study was conducted over a three-month period. The results indicate that unsafe behavior, lack of training, and weak supervision are the main causes of workplace accidents. The implications suggest the need to strengthen safety culture and enhance the integration of OHS systems

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INTRODUCTION

Workplace accidents remain a critical global concern, particularly in modern industrial environments where complex operations and high-risk activities are prevalent. Despite advancements in technology and regulatory frameworks, accident rates continue to demonstrate persistent challenges in Occupational Health and Safety (OHS) implementation. According to global reports, millions of workers are still affected annually by occupational injuries, indicating systemic weaknesses in safety management systems (Hämäläinen et al., 2021). Furthermore, the increasing automation and operational intensity in modern industries introduce new categories of hazards that require adaptive safety strategies (Bevilacqua et al., 2020). This situation highlights the urgency of strengthening OHS systems through evidence-based analysis and practical interventions.

In the Indonesian context, particularly in industrial regions such as West Java, workplace accidents remain a significant issue across manufacturing and logistics sectors. Rapid industrial expansion has not been consistently accompanied by effective enforcement of safety standards and risk management practices. Studies have shown that unsafe behavior and insufficient supervision are dominant contributors to occupational accidents in developing industrial environments (Kurniawan et al., 2022). Additionally, gaps between formal safety policies and actual workplace practices often reduce the effectiveness of OHS implementation (Pratama & Sutopo, 2021). These conditions underline the necessity of conducting localized and context-specific investigations into accident causation factors.

Previous studies have extensively examined workplace accident causation and safety system implementation across various industries. For instance, Vinodkumar and Bhasi (2021) emphasized that safety training and employee engagement significantly influence safety performance in industrial settings. Similarly, research by Guo et al. (2022) identified organizational safety climate as a key determinant in reducing accident rates. In another study, Salguero-Caparrós et al. (2020) highlighted that behavioral factors and management commitment play crucial roles in shaping workplace safety outcomes. However, these studies often focus on isolated variables rather than integrating multiple analytical perspectives within a single framework.

The research gap in this field lies in the limited integration of causal analysis and system evaluation within a comprehensive methodological approach. Many studies tend to emphasize either risk identification or behavioral analysis without linking these findings to the effectiveness of OHS system implementation. Moreover, the simultaneous application of analytical tools such as Hazard Identification, Risk Assessment and Risk Control (HIRARC), Fishbone Diagram, and 5 Why Analysis remains underexplored in empirical studies (Targoutzidis et al., 2021). This lack of integrative analysis reduces the ability to develop holistic and actionable safety improvement strategies. Therefore, a more comprehensive approach is required to bridge the gap between theoretical analysis and practical implementation.

This study aims to analyze the factors contributing to high workplace accident rates and to evaluate efforts to improve the implementation of OHS systems in modern industry. Specifically, the research focuses on identifying the relationship between human factors, environmental conditions, and organizational systems in influencing workplace accidents. In addition, the study seeks to develop strategic recommendations based on risk analysis and system evaluation findings. By adopting a mixed-method approach, this research provides both quantitative insights and qualitative depth in understanding workplace safety issues (Cooper, 2020). This integrated objective ensures a comprehensive understanding of accident causation and prevention mechanisms.

From a theoretical perspective, this study contributes to the advancement of occupational safety research by integrating multiple analytical frameworks into a unified model. The combination of HIRARC, Fishbone, and 5 Why Analysis enables a deeper exploration of root causes and systemic weaknesses. Furthermore, this research enhances existing literature by linking causal factors directly with the effectiveness of OHS system implementation (Hollnagel, 2021). Such an approach provides a more robust analytical foundation for future safety studies in complex industrial environments. Consequently, the study offers a novel contribution to the development of integrated safety management models.

From a practical standpoint, the findings of this study are expected to provide actionable recommendations for improving workplace safety in modern industries. The proposed improvements include strengthening safety culture, enhancing risk-based training programs, and optimizing supervisory mechanisms. Additionally, the study supports organizations in aligning their operational practices with established OHS standards such as ISO 45001. By implementing these improvements, industries can significantly reduce accident rates and improve overall safety performance (Fernández-Muñiz et al., 2021). Ultimately, this research serves as a practical guideline for organizations aiming to achieve sustainable and effective safety management systems.

LITERATURE REVIEW

Occupational Health and Safety (OHS) in Modern Industry

Occupational Health and Safety (OHS) is a systematic approach aimed at preventing workplace accidents and ensuring worker well-being through structured management systems. In modern industry, OHS is no longer limited to regulatory compliance but has evolved into a strategic component influencing organizational performance and sustainability. The implementation of OHS systems, particularly based on ISO 45001, emphasizes risk-based thinking and continuous improvement (Fernández-Muñiz et al., 2020). However, in many developing industrial contexts, including Indonesia, the practical implementation of OHS systems often deviates from established standards (Sari et al., 2021). This gap indicates that analyzing both the causative factors of accidents and the effectiveness of OHS implementation is essential to improve safety performance.

H1: The effectiveness of OHS system implementation has a significant influence on reducing workplace accident rates.

Theoretical Perspectives on Workplace Accident Causation

Theoretical frameworks on workplace accidents highlight that accidents are not random events but the result of interacting factors. Heinrich's Domino Theory explains that accidents occur through a chain of failures involving human error and unsafe conditions, while modern perspectives such as Human Error Theory emphasize the role of cognitive and behavioral limitations (Reason, 2020). Additionally, the Safety-II approach argues that accidents arise from systemic weaknesses rather than isolated failures (Hollnagel, 2021). Empirical studies confirm that unsafe behavior, inadequate supervision, and weak safety systems are key contributors to workplace accidents (Kurniawan et al., 2022). These theories directly support the need for this research, as understanding accident causation is fundamental to improving OHS system implementation.

H2: Human error and unsafe behavior have a significant effect on workplace accident occurrence.

Determinants of Workplace Accidents and Their Interrelationships

Workplace accidents are influenced by multiple interrelated factors, including human, environmental, and organizational aspects. Human factors such as lack of awareness, insufficient training, and unsafe behavior significantly increase accident risks (Salguero-Caparrós et al., 2020). Environmental factors, including hazardous working conditions and inadequate equipment, further exacerbate these risks (Guo et al., 2021). Meanwhile, organizational factors such as weak safety policies and ineffective supervision play a critical role in shaping safety outcomes (Pratama & Sutopo, 2021). The interaction among these factors suggests that accident analysis must adopt a comprehensive approach, which aligns with the objective of this study to integrate multiple dimensions of accident causation.

H3: Human, environmental, and organizational factors simultaneously influence workplace accidents.

Risk Analysis Methods in OHS Implementation

Effective OHS implementation requires systematic risk identification and analysis. The HIRARC method is widely used to identify hazards, assess risks, and determine appropriate control measures in industrial settings (Targoutzidis et al., 2021). Complementary tools such as Fishbone Diagram and 5 Why Analysis enable deeper exploration of root causes by categorizing contributing factors and identifying underlying issues (López-Arquillos et al., 2020). However, previous studies often apply these methods separately rather than in an integrated manner. This limitation reduces the comprehensiveness of risk analysis, thereby justifying the need for this research to combine these methods into a unified analytical framework.

H4: The integration of HIRARC, Fishbone Diagram, and 5 Why Analysis improves the effectiveness of workplace accident risk identification.

OHS System Implementation and Safety Culture

The effectiveness of OHS systems is strongly influenced by organizational safety culture, which reflects shared values, attitudes, and behaviors related to safety. A strong safety culture has been proven to reduce accident rates and improve compliance with safety procedures (Neal & Griffin, 2020). In contrast, weak safety culture often leads to unsafe practices and ineffective implementation of safety systems (Zohar, 2021). In Indonesia, several studies indicate that safety culture is still underdeveloped in many industries, leading to inconsistencies between safety policies and actual practices (Putri & Nugroho, 2022). This condition reinforces the importance of evaluating OHS implementation in real industrial settings, as conducted in this study.

H5: Safety culture has a significant effect on the effectiveness of OHS system implementation.

Research Gap and Justification of the Study

Despite extensive research on workplace safety, a significant gap remains in integrating accident causation analysis with the evaluation of OHS system implementation. Many studies focus either on identifying risk factors or assessing safety systems without linking the two aspects in a comprehensive framework. Furthermore, empirical studies that simultaneously apply HIRARC, Fishbone, and 5 Why Analysis remain limited (Tuncel et al., 2022). This gap is particularly evident in the context of modern industries in developing regions such as West Java. Therefore, this study is necessary to provide a more holistic understanding of workplace accidents and to develop integrated solutions for improving OHS systems.

H6: An integrated analysis approach significantly enhances the effectiveness of OHS system improvement strategies.

Contribution and Relevance of the Study

This study contributes both theoretically and practically to the field of occupational safety. Theoretically, it integrates multiple analytical approaches to provide a comprehensive understanding of accident causation and system effectiveness. Practically, the study offers actionable recommendations for improving safety performance, including strengthening safety culture, enhancing training programs, and optimizing supervision. These contributions are highly relevant for industries seeking to reduce accident rates and improve compliance with OHS standards (Bahn, 2020). Thus, this research is essential not only for academic development but also for practical implementation in modern industrial environments.

H7: Improvements in OHS system implementation lead to a significant reduction in workplace accidents in modern industry.

METHODOLOGY

Research Type and Variable-Based Approach

This study employs a mixed-method approach with a descriptive analytical design that integrates quantitative and qualitative data to obtain a comprehensive understanding of workplace accident phenomena. The quantitative approach is used to examine the relationships among research variables, while the qualitative approach is applied to explore the underlying causes and evaluate the implementation of the OHS system. The variables in this study consist of independent variables, namely human factors (X1), work environment factors (X2), organizational/management factors (X3), and OHS system implementation (X4), and the dependent variable, namely workplace accidents (Y). The selection of this approach is based on the need to integrate variable relationship analysis with contextual understanding in occupational safety research (Creswell & Creswell, 2021; Saunders et al., 2020).

Population and Sampling Technique

The population of this study consists of all operational workers in modern industries in West Java with high occupational risk, particularly in the manufacturing or logistics sectors. The sampling technique used is non-probability sampling with a purposive sampling method, in which respondents are selected based on specific criteria relevant to the research objectives. The criteria include workers who have been employed for at least one year, are directly involved in operational activities, and have a clear understanding of workplace conditions.

The quantitative sample consists of 40 respondents. Meanwhile, qualitative data are obtained from 6 key informants, consisting of:

- 1 OHS/HSE officer
- 1 operational supervisor
- 1 operational manager or head of department
- 3 operational workers

This composition ensures representation from both managerial and operational perspectives, which is essential for comprehensive analysis. The sample size is considered adequate for descriptive and exploratory analysis in occupational safety research (Etikan & Bala, 2020; Taherdoost, 2022).

Data Collection Techniques and Instruments

Data collection is carried out using four main techniques: questionnaires, interviews, observations, and documentation. The questionnaire is used to measure respondents' perceptions of the research variables using a five-point Likert scale, with items developed based on previous studies in occupational safety. Semi-structured interviews are conducted to obtain in-depth information regarding accident causes and OHS system implementation in practice. Observation is used to identify actual workplace conditions and potential hazards, while documentation is utilized to collect company accident records.

Validity testing is conducted using the Pearson Product Moment correlation, while reliability testing is performed using Cronbach's Alpha, with a minimum threshold of 0.70 indicating acceptable reliability (Hair et al., 2021; Taber, 2021).

Research Procedure

The research is conducted systematically over a three-month period. The initial stage includes problem identification, literature review, and instrument development. The second stage involves data collection through questionnaire distribution, interviews, and field observations. The third stage consists of data processing and analysis, both quantitatively and qualitatively. The final stage involves interpretation of results and formulation of recommendations for improving the OHS system. This structured procedure ensures alignment between research objectives, data collection, and analytical processes (Sekaran & Bougie, 2020; Kumar, 2021).

Data Analysis Techniques and Tools

Quantitative data are analyzed using descriptive statistics and multiple linear regression analysis to examine the influence of independent variables on the dependent variable. Data processing is conducted using SPSS (Statistical Package for the Social Sciences) software. Meanwhile, qualitative data are analyzed using a thematic analysis approach, combined with HIRARC, Fishbone Diagram, and 5 Why Analysis to identify the root causes of workplace accidents.

The integration of these analytical methods allows for linking statistical findings with real-world workplace conditions. This approach is considered effective in occupational safety research, as it enables both statistical validation and in-depth exploration of accident causation (Braun & Clarke, 2021; Field, 2020)

RESULTS

Analysis of Human Factors (X1) on Workplace Accidents

The quantitative analysis indicates that human factors (X1) have the highest mean score among all variables, suggesting a dominant contribution to workplace accidents. Specifically, indicators such as unsafe behavior and non-compliance with standard operating procedures (SOP) show high values, reflecting that workers frequently disregard safety procedures under certain conditions. This finding reveals a critical gap between safety knowledge and actual behavior in the workplace. Furthermore, regression analysis demonstrates that human factors have a significant positive effect on workplace accidents (Y), indicating that higher levels of unsafe behavior increase accident risk.

Table 1. Human Factors Affecting Workplace Accidents

Indicator	Mean Score	Category
Unsafe behavior	4.25	High
Lack of awareness	4.10	High
Work fatigue	3.95	Moderate-High
Non-compliance with SOP	4.20	High

Further analysis suggests that unsafe behavior is not solely caused by a lack of knowledge but is also influenced by work pressure and production targets. This indicates that human factors interact closely with organizational

conditions. In line with the mixed-method approach, these quantitative findings are reinforced by qualitative data showing that workers often take shortcuts to complete tasks efficiently.

This finding strongly supports H2, confirming that human error and unsafe behavior significantly influence workplace accidents. Interview excerpts: As expressed by one operational worker: "Sometimes we actually know it's dangerous, but because of the target, we still do it" (W-01, January 12, 2026). Similarly, another worker stated: "When things get rushed, we just skip some procedures to finish faster" (W-02, January 15, 2026). These statements indicate that unsafe behavior arises from the interaction between individual decisions and organizational pressure.

Analysis of Work Environment Factors (X2)

The results show that work environment factors (X2) fall within moderate to high categories, indicating that workplace conditions still pose considerable risks. The highest score is observed in hazard exposure, suggesting that workers are frequently exposed to dangerous conditions during daily operations. Regression analysis further reveals that environmental factors have a positive influence on workplace accidents, although the effect is weaker compared to human factors.

Table 2. Work Environment Risk Factors

Indicator	Mean Score	Category
Unsafe equipment	3.85	Moderate
Workplace layout	3.90	Moderate
Hazard exposure	4.05	High
Ergonomic conditions	3.75	Moderate

Analytically, suboptimal workplace conditions increase the likelihood of accidents, particularly when combined with unsafe behavior. This indicates an interaction effect between environmental and human factors. The mixed-method approach further validates this finding, as field observations confirm the presence of unsafe working conditions in several operational areas.

This finding supports H3, indicating that environmental factors significantly influence workplace accidents.

Interview excerpts: As explained by the operational supervisor: "Some work areas are quite tight, so if you're not careful, it can be dangerous" (S-01, January 18, 2026). Additionally, a worker noted: "The work environment does have risks, especially when activities are busy" (W-03, January 20, 2026). These findings highlight that workplace conditions play a critical role in accident occurrence.

Analysis of Organizational/Management Factors (X3)

The findings indicate that organizational factors (X3) are categorized as moderate, suggesting that the safety management system has not been fully optimized. Indicators related to training and supervision show relatively lower scores, indicating weaknesses in implementation. Regression analysis confirms that organizational factors significantly affect workplace accidents, meaning that ineffective management increases accident risks.

Table 3. Organizational Factors

Indicator	Mean Score	Category
Safety supervision	3.70	Moderate
Safety training	3.65	Moderate
Safety policy	3.80	Moderate
Enforcement of rules	3.60	Moderate

From an analytical perspective, weak supervision and insufficient training limit workers' ability to manage risks effectively. This reinforces the role of organizational factors as amplifiers of human-related risks. The mixed-method findings further reveal that limited resources constrain effective supervision.

This finding supports H3, confirming that organizational factors influence workplace accidents. Interview excerpts: As stated by the operational manager: "Training is provided, but not all workers receive it regularly" (M-01, January 22, 2026). Furthermore, the OHS officer explained: "We have limited supervisors, so monitoring is not always optimal" (O-01, January 25, 2026). These statements indicate that managerial limitations significantly contribute to accident risks.

Analysis of OHS System Implementation (X4)

The results show that OHS system implementation (X4) is at a moderate level, indicating a gap between formal policies and actual practices. While the use of personal protective equipment (PPE) scores relatively high, monitoring and risk control mechanisms remain weak. Regression analysis indicates a negative relationship with workplace accidents, meaning that better OHS implementation leads to fewer accidents.

Table 4. OHS System Implementation

Indicator	Mean Score	Category
SOP implementation	3.85	Moderate
Use of PPE	4.00	High
Safety monitoring	3.70	Moderate
Risk control system	3.75	Moderate

This finding suggests that although formal safety systems exist, their implementation is inconsistent across operational areas. The mixed-method approach confirms this through qualitative insights indicating discrepancies between policy and practice. This finding supports H1 and H5. Interview excerpts: As highlighted by the HSE officer: "The system is already in place, but its implementation is not consistent across all departments" (O-01, January 27, 2026).

Integrated Risk Analysis (HIRARC, Fishbone, and 5 Why)

The integrated analysis reveals that workplace accidents are primarily caused by the interaction of human and organizational factors. HIRARC identifies high-risk activities in manual operations, while Fishbone and 5 Why analyses highlight inadequate supervision as the root cause.

Table 5. Root Cause Analysis Summary

Method	Main Findings
HIRARC	High risk in manual operations
Fishbone	Human and management dominant factors
5 Why	Root cause: lack of supervision

This integrated approach provides a more comprehensive understanding compared to single-method analysis. It demonstrates the effectiveness of combining quantitative and qualitative methods in identifying root causes. This finding supports H4 and H6. Interview excerpts: As explained by the supervisor: "If you trace it back, the problem is usually not the equipment, but how people do the work" (S-01, January 29, 2026)

Overall, the findings indicate that workplace accidents result from the complex interaction between human, environmental, organizational, and OHS system factors. Human factors and weak supervision emerge as the primary causes, while OHS implementation functions as a controlling mechanism. These results support H7 and confirm that the mixed-method approach used in this study is effective in producing comprehensive and in-depth insights into workplace safety issues.

DISCUSSION

The main findings of this study indicate that human factors, particularly unsafe behavior, non-compliance with standard operating procedures, and work fatigue, are the strongest determinants of high workplace accident rates, followed by weak supervision and inconsistent implementation of OHS systems. Theoretically, these findings are aligned with Human Error Theory, which posits that unsafe acts are the immediate triggers of workplace incidents, while also emphasizing that such behaviors are shaped by organizational context and production pressures rather than purely individual negligence (Reason, 2020). In this study, this pattern is clearly observed: workers are aware of risks but still take shortcuts when faced with high work targets, demonstrating a strong interaction between human and organizational factors. These findings are consistent with previous research showing that supervisory roles significantly

influence safe behavior among industrial workers, indicating that safety behavior is not solely determined by knowledge but must be reinforced through monitoring and control mechanisms (Yusnandar & Pertiwi, 2020). However, this study extends prior findings by demonstrating that unsafe behavior functions as an operational variable that connects production pressure, procedural compliance, and accident occurrence simultaneously. Therefore, workplace accidents in modern industries should be understood as the result of interactions between worker behavior and systemic work pressures rather than individual error alone.

Work environment factors in this study are categorized as moderate to high, with hazard exposure emerging as the most dominant indicator. Conceptually, this finding supports the theory of unsafe conditions, which states that hazardous physical environments significantly contribute to workplace accidents, especially when combined with poor ergonomic design and aging equipment (Guo et al., 2021). However, this study also demonstrates that environmental factors do not operate independently; rather, they become more dangerous when combined with unsafe human behavior, leading to accidents through the interaction of physical conditions and human responses. This finding is consistent with previous research showing that a strong safety climate is associated with improved safety behavior and reduced accident rates in industrial settings (Hertanto et al., 2023). The similarity lies in the recognition that workplace safety is not solely determined by the presence of protective equipment or formal regulations, but by how workers perceive and respond to risks. The key difference in this study is its emphasis on the direct relationship between hazard exposure and accident occurrence, shifting the focus from perceptual safety climate to operational consequences. As a result, improvements in workplace safety should not only address physical conditions but also focus on redesigning work processes to minimize procedural violations.

From an organizational perspective, the findings reveal that inadequate training, limited supervisory capacity, and weak enforcement of safety policies significantly increase workplace accident risks. This finding highlights a shift from individual-level analysis to organizational-level safety governance. Within the framework of safety culture and safety management systems, supervision, management commitment, and continuous training are critical mechanisms that shape daily safety behavior (Neal & Griffin, 2020). When organizations fail to maintain consistent monitoring and learning processes, safe behavior becomes difficult to sustain. These findings are consistent with prior studies indicating that weak safety culture dimensions, including low worker participation and insufficient supervision, are strongly associated with workplace accidents (Salhi et al., 2024). Additionally, previous research confirms that top management commitment influences safety outcomes through supervisory practices and training effectiveness (Tappura et al., 2022). While these studies emphasize the importance of organizational commitment, this study identifies a key distinction: although formal safety policies exist, their effectiveness is limited at the implementation level due to operational constraints. Thus, the contribution of this study lies in demonstrating that OHS failure in modern industries is not

primarily due to the absence of systems, but rather due to weak translation of safety systems into daily practices.

The findings also indicate that OHS system implementation is at a moderate level, where the use of personal protective equipment is relatively high, but monitoring, risk control, and consistency in SOP application remain weak. Theoretically, this supports the perspective that safety management systems do not automatically reduce accidents merely through formal adoption or certification (Hollnagel, 2021). Previous studies have shown that organizations with ISO 45001 certification may have better institutional safety structures, but this does not necessarily translate into immediate reductions in injury rates (Joo & Baek, 2024). Conversely, other research has demonstrated that safety policies, training, and management systems positively contribute to safety performance (Bautista-Bernal et al., 2024). This study positions itself between these findings by demonstrating that OHS systems function as control mechanisms, but their effectiveness depends on the quality of implementation rather than their existence alone. In other words, while improved OHS implementation can reduce workplace accidents, its impact may be limited if monitoring and risk control are not consistently enforced. This distinguishes the present study from previous research that focuses primarily on certification or formal system presence, as it highlights the gap between system design and actual implementation.

Overall, the integration of quantitative analysis with HIRARC, Fishbone Diagram, and 5 Why methods reveals that the root causes of workplace accidents lie in the interaction between human and organizational factors, particularly weak supervision. This finding supports a systemic approach to accident causation, which argues that workplace accidents should be understood as outcomes of complex system interactions rather than isolated events (Hollnagel, 2021). While unsafe behavior appears as the immediate cause, deeper issues often stem from supervision design, training limitations, resource allocation, and organizational safety culture. These findings are consistent with previous studies emphasizing the importance of structured risk identification and control using HIRARC in industrial environments (Targoutzidis et al., 2021). However, this study advances prior research by integrating risk analysis with worker perceptions and managerial insights within a mixed-method framework. Despite these contributions, this study has several limitations, including a relatively small sample size, purposive sampling, and a limited geographic scope focused on modern industries in West Java. Furthermore, the cross-sectional design does not capture longitudinal changes in safety behavior and intervention effectiveness. Therefore, future research is recommended to adopt larger multi-industry samples, longitudinal designs, and objective safety indicators such as near-miss frequency and compliance audits to provide a more robust evaluation of OHS system effectiveness.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that workplace accidents in modern industry are primarily influenced by human factors, particularly unsafe behavior, as well as organizational weaknesses such as inadequate supervision and insufficient training. Although OHS systems are formally implemented, their effectiveness is limited by inconsistent application in daily operations. The integration of quantitative and qualitative findings confirms that workplace accidents result from the interaction between human behavior, work environment, and management systems. Therefore, it is recommended that companies strengthen safety culture through continuous training, improve supervision mechanisms, and ensure consistent enforcement of OHS procedures. In addition, integrating risk-based approaches such as HIRARC into routine operations can enhance the effectiveness of accident prevention strategies.

FURTHER STUDY

This study is limited by its relatively small sample size, the use of purposive sampling, and its focus on a specific industrial context in West Java. Future research is recommended to involve larger and more diverse samples across multiple industries, apply longitudinal designs, and incorporate objective safety indicators such as near-miss reporting and compliance audits to provide more comprehensive insights into OHS effectiveness.

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