Original article

THE IMPACT OF ORGANIZATIONAL ROLES ON HAZARD REPORTING AND CORRECTIVE ACTION EFFECTIVENESS IN THE PROJECT MANAGEMENT

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Abstract: Despite extensive hazard reporting systems being implemented across the construction industry, serious injuries and fatalities (SIF) continue to plague worksites, revealing a missing link between hazard identification and effective corrective action implementation. This study addresses this overlooked dimension by examining how organizational roles create systemic variations in hazard response quality, a factor rarely investigated in existing safety literature. Our analysis of 732 hazard reports from a multinational project management construction company demonstrates that safety personnel issued 78.4 % of strong corrective actions while frontline construction teams accounted for only 21.6 %. Statistical analysis revealed an association between organizational role and corrective action effectiveness ($p < 0.001$) with frontline teams showing substantially weaker follow through than safety personnel as evidenced by the complete absence of strongest category corrective actions from construction teams. The research underscores the urgent need for role specific hazard reporting protocols and integrated communication channels between safety personnel and construction teams to bridge this critical implementation gap. Future research should investigate how role based hazard reporting interventions affect accident reduction rates and near-miss reporting trends to establish causal relationships between organizational roles and safety outcomes.

Keywords: Construction industry; Corrective actions; Hazard reporting; Organizational roles; Systems thinking.

1. INTRODUCTION

The construction industry remains one of the most hazardous sectors globally, accounting for approximately 6-10% of the global workforce yet representing 20-40% of all occupational fatalities (Raheem & Hinze, 2014). In the United States alone, construction workers experience fatal injury rates 3.7 times higher than the national average across all industries (U.S. Bureau of Labor Statistics, 2024). This disproportionate safety burden is particularly evident in developing economies like Indonesia, where the construction sector accounts for approximately 30% of all workplace injuries (Desnalia & Waruwu, 2024). Despite extensive efforts over several decades to implement safety regulations and hazard reporting systems, this imbalanced risk profile endures. Recent research confirms that safety performance has plateaued in certain industries, suggesting that current approaches to hazard management have reached their effectiveness limits (Dzawanda et al., 2024). Hazard reporting systems have emerged as a cornerstone of proactive safety management in

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construction, designed to identify potential risks before they escalate into incidents. Unlike reactive incident reporting that documents what has already occurred, hazard reporting captures potential risks while they can still be mitigated (Havinga et al., 2021). By facilitating immediate corrective actions and promoting organizational learning, hazard reporting fosters a proactive safety culture that empowers employees to share experiences and collaboratively address emerging risks. . Research indicates that systematic data collection on safety hazards report is essential for enhancing learning and implementing effective safety measures (Kumar et al., 2024). However, the success of hazard reporting depends heavily on robust documentation processes and comprehensive follow-up mechanisms that ensure reported issues are addressed promptly and effectively.

Hazards in construction can be categorized into various types, including physical, chemical, and ergonomic risks (Vitharana et al., 2015). The construction environment is often fraught with dangers, such as exposure to toxic chemicals, falls from heights, and electrical hazards (Al-Bayati, 2021). For instance, the detrimental effects of chemical hazards in construction, which can lead to long-term health issues for workers, have been documented in the literature (Kumar & Cruz, 2022). Additionally, effective safety communication among workers is essential to mitigate hazard exposure and reduce injury likelihood (Pandit et al., 2018). This underscores the need for a robust safety culture that encourages open communication and proactive hazard management (Cheung et al., 2018). Due to the significance of hazard identification and recognition, workers on-site need to possess the necessary skills to identify hazards correctly. Research indicates that workers' hazard recognition abilities are influenced by a multifaceted interplay of factors, including cognitive limitations, attention biases, lack of experience, environmental conditions, and organizational factors (Jeelani et al., 2017; Shrestha et al., 2022; Uddin et al., 2020).

Having the ability to identify hazards is insufficient on its own. For instance, project teams in construction industry often face conflicting goals between progress and safety, which can influence their emotional states. These emotional states, in turn, significantly impact hazard recognition abilities. Positive emotional states can impair hazard identification performance, while negative emotional states do not necessarily lead to a similar reduction in performance (Bhandari et al., 2016). Furthermore, risk attitudes and work experience play key roles. Workers with higher risk aversion tend to identify more hazards compared to those with higher risk tolerance. Additionally, safety-specific experience, such as conducting inspections, is more effective in improving hazard recognition than general work experience (Eiter & Bellanca, 2020). Successful construction projects depend not only on efficient project management and timely completion but also on how effectively hazards are identified and corrected. Inadequate hazard identification and failure to implement corrective actions can lead to workplace injuries, project delays, and increased costs, which ultimately undermine project success. Effective risk management in oil and gas construction projects, such as those observed in Yemen, relies on identifying key risk factors like government delays and changes during construction (A. Kassem et al., 2019). For example, implementing a hazard identification system that prioritizes these risks allows project teams to allocate resources efficiently, ensuring projects are completed on time and within budget

While effective hazard reporting plays a critical role in improving safety outcomes on construction industry, the quality of the reports submitted remains a significant concern. Poor quality reporting can lead to a focus on minor issues while neglecting more severe hazards that require immediate attention (Basahel & Taylan, 2016). This phenomenon is exacerbated by the enforcement of Key Performance Indicators (KPIs) that prioritize easily fixable problems over more complex safety challenges (Nghitanwa & Zungu, 2017). Consequently, safety officers may feel pressured to report on less critical issues, which can undermine the overall safety culture within construction sites (Akal & El-Kholy, 2021). A culture that may prioritize productivity over safety is particularly susceptible to underreporting (Zebrak et al., 2022). Furthermore, the reliance on safety officers to manage hazard reporting can create a

disconnect between frontline supervisors and safety management, leading to inadequate oversight of safety practices (Deng et al., 2019). The issue of hazard reporting in the construction industry is critically linked to the quantity of reports submitted and follow up system rather than solely the quality of those reports. Workers are less likely to report issues in the future if there is no proper follow up system, highlighting the importance of establishing a robust feedback mechanism that ensures workers feel their reports are taken seriously and addressed appropriately. This is partly because the hazard is not treated as an incident report that must be closed out within a proper timeline and with accountability to top management (Havinga et al., 2021). Organizations that pursue their people in reporting hazards often believe that the more hazard reports there are, the more corrective actions will be taken, which will subsequently improve site conditions. However, focusing on the number of reports can create an illusion of complacency in numbers. Behavior-based safety (BBS) reporting studies have found surprising results, showing that the impact of BBS reports produced mixed outcomes due to systemic factors, one of which is the dynamics of goal commitment (Guo et al., 2018). Conflicting targets between production and safety can create friction that hinders the initial intention of having hazard reporting followed up with systemic recommendations to address the causes. Despite an advancement highlighting various factors influencing hazards on-site, a significant proportion of hazards still remain unrecognized on construction sites (Uddin et al., 2020). Even if they can identify hazards, workers must also have the skills to translate this recognition into on-the-job hazard mitigation strategies. This, in turn, is expected to reduce the number of injuries. (Eiter et al., 2016). Therefore, it is important for workers to have the skills to correctly identify hazards and document them properly, enabling the creation of complete reports with appropriate mitigation measures or recommendations.

On formulating mitigation or recommendations following hazard reporting, it is important to have a systems thinking approach. By recognizing the interconnectedness of various factors, organizations can develop more informed and sustainable corrective actions. Moreover, the application of systems thinking in the context of audits and hazard reports can lead to improved organizational learning and capacity building. A socio-technical systems perspective in systems thinking reveals that frontline safety performance is fundamentally shaped by organizational structures, cultural norms, and decision-making processes operating at higher system levels, rather than merely reflecting individual worker behaviors or attitudes (Zarei et al., 2023). Therefore, effective hazard mitigation must address not only immediate workplace conditions but also the broader organizational context that influences safety practices, recognizing that 'people can be the solution' when supported by appropriate system design rather than being treated as 'the problem' to be fixed. Roux highlights that systems methods not only generate knowledge but also provide experiential learning opportunities for diverse stakeholders, enabling them to explore alternative hypotheses regarding the causes of issues (Diez Roux, 2011). The work of Jensen and Aven illustrates how combining different hazard analysis methods can generate a more comprehensive understanding of risks in complex systems (Jensen & Aven, 2017). By employing a systems thinking approach, organizations can pinpoint critical areas where interventions can yield the most significant impact. Adopting a systems perspective can also help organizations address "*decoupling*," a phenomenon where there is a disconnect between documented safety practices and their actual implementation. Systems thinking approach encourages a holistic examination of safety practices, aligning organizational goals with actionable outcomes and fostering a culture of continuous improvement (Hutchinson et al., 2024). In conclusion, employing a systems thinking approach in hazard mitigation and recommendations is essential for overcoming the limitations of traditional methods.

Finally, while the application of systems thinking has been recognized as a valuable approach in safety management, it is underutilized in understanding how organizational roles and corrective action strength are interconnected. A systems thinking approach could provide deeper insights into how organizational structure and follow-up

systems interact to influence hazard mitigation efforts. By applying this perspective, organizations could better align their corrective actions with safety objectives and improve the overall effectiveness of their safety management practices (Diez Roux, 2011). Hutchinson's study examined how corrective actions could be systematically evaluated within audit frameworks, ensuring that these measures were effective in addressing the root causes of issues (Hutchinson et al., 2024). This study seeks to bridge the gap by applying the systems thinking approach used in auditing to hazard reports in the construction industry. By doing so, we aim to ensure that corrective actions stemming from hazard reports are not merely reactive but are also systematically assessed for their effectiveness and sustainability.

This research seeks to address this by analyzing a comprehensive dataset of hazard reports and focusing on the distribution of corrective action types and strength, as well as examining the relationship between organizational roles and the effectiveness of hazard mitigation efforts. By incorporating a systems thinking perspective, this study aims to explore how organizational roles can better align corrective actions with hazard recognition, ensuring that the actions taken are comprehensive, effective, and truly address the hazards identified.

2. RESEARCH METHODOLOGY

2.1 Study design and setting

This study employed a retrospective quantitative descriptive design to analyze hazard and potential incident reporting data collected between January 2022 and December 2023 from a project managed by a multinational company operating in Indonesia. The analysis focused on identifying and categorizing the types and strength levels of corrective actions recommended in response to reported hazards. Furthermore, the study examined whether the strength of the recommended corrective actions was associated with the individuals who provided those recommendations.

2.2 Data collection and preparation

A total of 886 reports were extracted from the company's safety data reporting system. The dataset was first checked for duplicate entries, but no duplicates were found. Following this, a total of 128 reports were excluded because they were classified as good practices, referring to documentation of activities or conditions that demonstrated compliance, improvements, or positive examples in safety implementation. An additional 26 reports were excluded because they did not include any corrective action recommendations, which were essential for the analysis. As a result, the final dataset comprised 732 reports, which were used for further classification and statistical analysis. The data cleaning process was performed using the Pandas library in Python. The complete data cleaning and exclusion process is summarized in Figure 1.

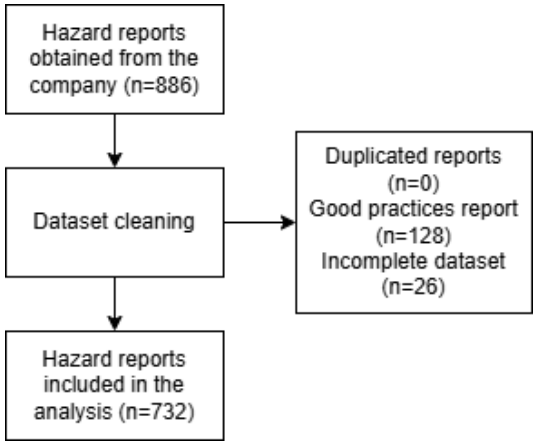

Figure 1: Report selection process

2.3 Data coding and classification

As outlined in the previous section, a total of 732 hazard reports were included in the analysis. Each report was reviewed to identify two key components: the type of corrective action and the category of corrective action strength, following the classification framework developed by Hutchinson et al. (2024). The types of corrective action were grouped into four categories: physical, administrative, administrative addressing physical aspects, or review/assessment of risk. Meanwhile, the categories of corrective action strength were classified as strong, moderate, and weak. Further descriptions of each category are provided in Table 1 and Table 2. Two authors conducted the coding independently and collaboratively to ensure consistency. Inter-rater reliability was assessed using Cohen's Kappa, with results indicating substantial agreement for both type of corrective action ($\kappa = 0.77$) and category of corrective action strength ($\kappa = 0.70$), based on calculations performed in Python using Google Colab. These values fall within the range of 0.60–0.80, which is interpreted as substantial agreement (Paul et al., 2022).

2.4 Data analysis

Descriptive analyses were conducted to examine the distribution of reported hazard categories, types of corrective actions, and levels of corrective action strength, and were visualized using the Matplotlib library in Python. To assess whether there was a significant association between the strength of corrective actions and the individuals who provided the recommendations, Fisher's exact test was performed using SPSS version 27.

Table 1: Types of corrective action

Types	Focus on action categories
Physical	The corrective action in the hazard report deals specifically with a physical item, feature, or practice at work.
Administrative	The remedial action for the hazard report involves dealing with an administrative issue or facet of the workplace.
Administrative addressing physical aspect	The hazard report corrective action is an administrative corrective action that is designed to address, verify, or inspect tangible items, aspects, or routines in the workplace.
Review or assessment of risk	Corrective action in a hazard report is an administrative measure that requires an assessment or review.

Table 2: Categories of corrective action strength

Types	Corrective action strength
Strong category(a)	Corrective action directly targets the root cause of the hazard or issue
Strong category (b)	Corrective action directly addresses the root cause of the hazard or issue and aims to resolve related problems
Moderate	Corrective action indirectly mitigates the underlying hazard or issue through a proxy measure
Weak	Corrective action indirectly mitigates the underlying hazard or issue and/or addresses a separate issue that is not directly related to it
None / not applicable	No clear or identifiable hazard or issue could be identified.

3. RESULTS AND DISCUSSION

3.1 Common hazard reported types

The analysis of 732 safety-related findings revealed a clear distribution across various hazard categories , as illustrated in Figure 1. The most frequent findings were Housekeeping (98 occurrences) and Communication (77 occurrences), highlighting significant concerns in organizational and procedural processes. Procedural lapses were common, with Procedures not

followed/inadequate (54 occurrences) and Permit issues (46 occurrences) being frequently identified, along with Inspection, signage, and tagging issues (47 findings).

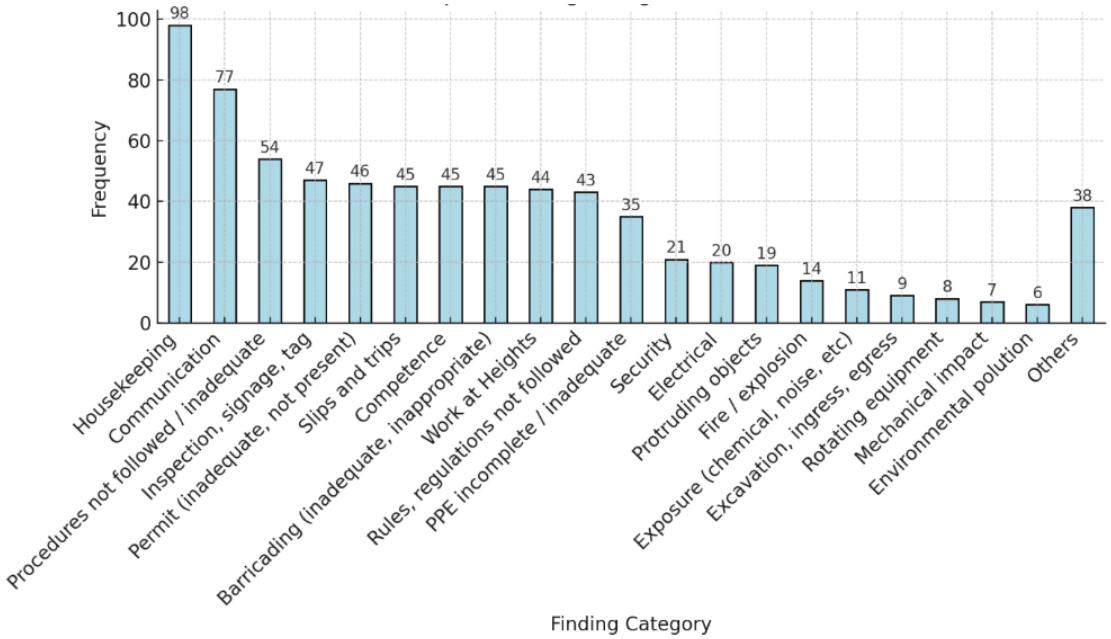

Figure 2: Distribution of common hazard reported type

The analysis of hazard reporting reveals that most hazards reported are low-level or low-energy hazards, typically involving familiar issues that have predefined responses such as housekeeping. This suggests that the primary function of hazard reporting systems is not to uncover new or emergent risks but to address routine hazards that are well understood within the organization. This finding aligns with the view that hazard reporting systems, in practice, are not merely extensions of incident reporting systems as assumed in the literature but are instead separate processes focused on immediate corrective actions (Havinga et al., 2021).

3.2 Distribution of corrective action type and strength

Among the 732 reported cases, most corrective actions targeted physical aspects (51.1%) and administrative measures (25.8%), while other categories are presented in Figure 3. The dominance of physical interventions suggests a preference for engineering-based solutions that are robust and less dependent on worker behavior (Jogie et al., 2025). These measures, such as securing equipment or isolating hazards, have been shown to reduce unsafe acts in high-risk settings (Chen et al., 2025). However, the lower proportion of administrative controls may indicate missed opportunities to strengthen safety awareness and organizational culture. While administrative measures may offer short-term improvements in awareness, their long-term value lies in shaping proactive safety behavior and integrating risk management into daily routines (Benson et al., 2024). Balancing both types of interventions is critical to achieving sustainable hazard control.

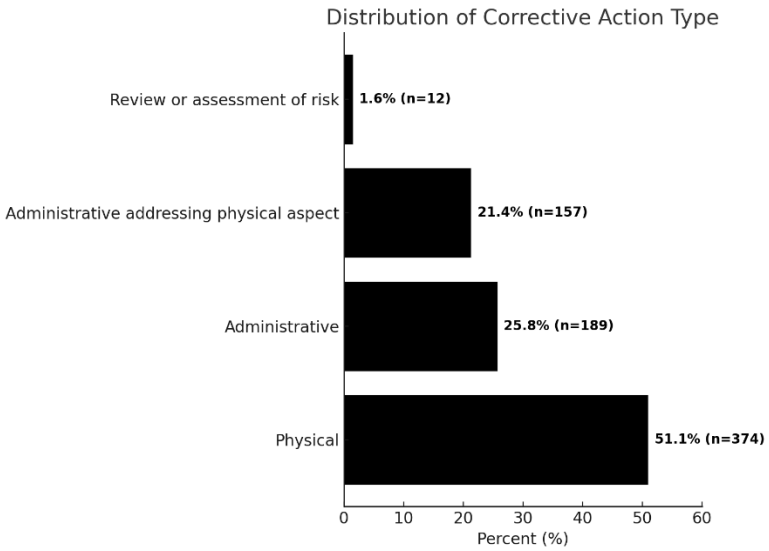

Figure 3: Distribution of Corrective Action Type

The distribution of corrective action strength was analyzed to evaluate the effectiveness of hazard mitigation efforts within the construction industry, as shown in Figure 3. The data, derived from 732 cases, revealed that the majority of corrective actions fell into the "Strong (a)" category, with 496 instances. This was followed by "Moderate" actions, which accounted for 199 cases. The "Strong (b)" and "Weak" categories were less frequent, with 21 and 16 cases, respectively.

These findings show a strong organizational preference for robust corrective actions, particularly in the "Strong (a)" category, which reflects a focus on directly addressing underlying hazards. The lower frequency of "Weak" actions further underscores this trend, suggesting that organizations prioritize substantial measures to mitigate risks effectively.

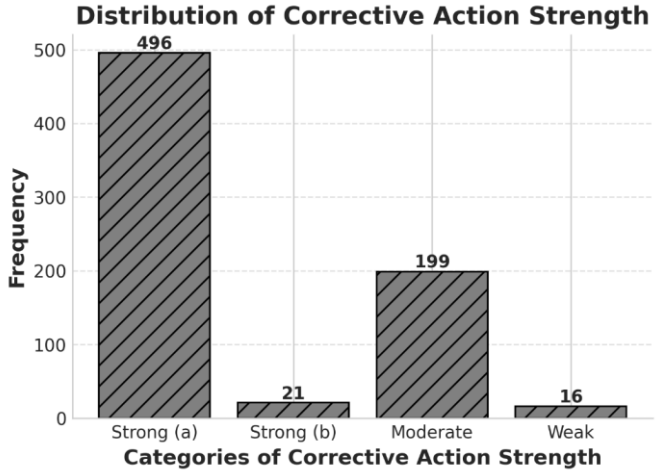

Figure 4: Distribution of corrective action strength

3.3 Association between position and corrective action strength

The relationship between organizational positions and the strength of corrective actions taken in response to reported hazards was examined using a chi-square test of independence (Fisher's Exact Test). The analysis included 732 cases, with corrective action strength categorized as Strong (a), Strong (b), moderate, and weak. The positions analyzed were HSSE (Health, Safety, Security, and Environment) and Project Construction Team.

The relationship between organizational positions and the strength of corrective actions taken in response to reported hazards was examined using Fisher's Exact Test, which revealed a statistically significant association ($p < 0.001$). The effect size, measured using Cramér's V, was 0.155 with a 95% confidence interval, indicating a small but meaningful association. The HSSE personnel contributed a substantially higher proportion of strong corrective actions compared to the Project Construction Team. For instance, 78.4% of Strong (a) corrective actions (n = 389) were issued by the HSSE team, while only 21.6% (n = 107) came from the Project Construction Team. Moreover, all Strong (b) corrective actions were recorded exclusively by the HSSE group. The detailed cross-tabulation of these results is presented in Table 3.

Table 3: Fisher's exact test of corrective action strength by position

Variable	Strength of Corrective Action					
	Strong (a)	Strong (b)	Moderate	Weak	Total	p-value
Organizational Role (n,%)						
HSSE	389 (78.4%)	21 (100%)	179 (89.9%)	13 (81.2%)	602 (82.2%)	0.000178*
Project Construction Team	107 (21.6%)	0 (0%)	20 (10.1%)	3 (18.8%)	130 (17.8%)	

Note : *Fisher Exact Test

The findings of this study reveal a significant disparity in the efficacy and structure of corrective measures enacted in response to recognized dangers within the construction industry, predominantly shaped by organizational positions. The HSSE (Health, Safety, Security, and Environment) team generally implements more stringent corrective procedures than the Project Construction Team. This disparity underscores a vital aspect of hazard reporting, since the organizational structure significantly influences the effectiveness of hazard reduction efforts. The results demonstrate that the effectiveness of remedial actions is influenced by both the severity of the identified risk and the individual's position within the organizational structure.

This study addresses a gap in the literature by systematically examining the quality of corrective actions taken in response to hazard reports—an aspect often overlooked in previous research on construction safety. Unlike most studies that focus solely on hazard types or reporting rates, this research assesses the strength of corrective actions and analyzes their association with organizational roles. This provides a more nuanced understanding of how different departments contribute to safety outcomes. By using a relatively large dataset of 732 hazard reports, the study offers empirical evidence that can inform both theory and practice, particularly in strengthening safety culture through targeted follow-up strategies and role-based accountability mechanisms.Importantly, the study sheds light on how the quality and strength of corrective actions can differ significantly depending on organizational role, suggesting that safety outcomes in construction are not only a product of hazard recognition and reporting but also of how organizational systems prioritize and respond to safety concerns (Jeelani et al., 2018).

One explanation for the variation in corrective action strength across different organizational positions is the inherent responsibilities and priorities associated with each role. The HSSE team, as safety specialists, is more likely to take decisive and robust action to mitigate hazards due to their direct responsibility for worker safety. In contrast, the Project Construction Team, whose focus may be more on productivity and project deadlines, might prioritize addressing less critical hazards or provide less comprehensive solutions. This is consistent with findings that conflicting priorities between safety and production could lead to less effective hazard mitigation efforts (Guo et al., 2018). This also echoes findings

that workers' focus on operational tasks can hinder their ability to effectively recognize and respond to hazards (Uddin et al., 2020).

The results also align with the work of Diez Roux (2011) who argued that a systems thinking approach is essential for understanding safety management practices. According to Roux, adopting a systems perspective allows organizations to better comprehend the interconnectedness of various factors influencing hazard mitigation, including organizational roles, training, and decision-making processes. In this context, the observed disparity in corrective action strength between HSSE and construction teams could be seen as a reflection of organizational silos, where safety responsibilities are compartmentalized and not always effectively communicated or followed through on by frontline workers.

Furthermore, the study reinforces previous research on hazard recognition, particularly the importance of workers' emotional states, work experience, and risk attitudes in identifying and reporting hazards (Jeelani et al., 2018). In the construction industry, the project team is often under immense pressure to meet deadlines and achieve targets. This high-stress environment can create negative emotions among the team, especially when it comes to reporting safety issues. Project teams may perceive that raising safety concerns could delay the project, which in turn could have negative consequences for meeting deadlines. This fear of delays can lead to a reluctance to report hazards or only focus on low level hazards that are considered easy to fix, as team members worry that their concerns will negatively impact the project's timeline

This study extends previous research on hazard recognition and reporting by providing empirical data that connects organizational roles to the strength of corrective actions taken in response to hazards. While prior studies, such as those by Kumar and Cruz (2022) and Jeelani et al. (2018), have explored the individual factors affecting hazard recognition and reporting, few have explicitly examined how organizational roles influence the quality of corrective actions. By incorporating a large dataset of hazard reports and categorizing corrective actions, this study provides new insights into the relationship between hazard reporting, organizational roles, and safety outcomes.

Additionally, the study adds to the growing body of research on the impact of organizational culture on safety practices. A safety culture that prioritizes quantity over quality can lead to complacency in addressing significant hazards (Guo et al., 2018). This study challenges the notion that a higher number of reports automatically leads to better safety outcomes, underscoring the importance of robust follow-up mechanisms and the quality of corrective actions taken in response to hazards. This is consistent from previous research that highlighting safety reporting systems must focus not only on increasing the number of reports but also on ensuring that corrective actions are comprehensive and effective (Havinga et al., 2021). Similarly, as noted in other studies, a failure to consider the root causes of safety incidents due to compliance-focused auditing may lead to poor safety outcomes, which mirrors the failures seen in the construction industry's hazard reporting systems. (Hutchinson et al., 2024).

The findings of this study have important implications for the construction industry and safety management practices on making policy related to enforcement of hazard reporting. One key implication is the need for organizations to recognize the role that different teams play in hazard reporting and mitigation. The study suggests that safety officers (e.g., the HSSE team) are more likely to implement The study suggests that safety officers (e.g., the HSSE team) are more likely to implement effective corrective actions, which underscores the importance of empowering safety officers and ensuring they have the resources and authority to act decisively. In line with this, research has shown that safety management and leadership are crucial factors in construction projects, and their success relies on active input from all stakeholders throughout both the design and construction phases (Berglund et al., 2023). This active stakeholder involvement extends to risk management practices, where engagement mediates effects to drive sustainable outcomes across environmental, economic, and social dimensions (Song et al., 2025). This highlights the need for a collaborative approach to safety,

where all involved parties, including safety officers, work together to address hazards effectively and ensure corrective actions are implemented in a timely manner. Organizations should consider establishing clearer lines of communication and collaboration between safety officers and project teams to ensure a more unified approach to hazard mitigation. A relevant study emphasizes that communication implementation strategies significantly influence the effectiveness of safety intervention programs in Nigeria's construction industry. Their findings indicate that well-defined communication channels, including hazard warnings and specific training sessions, are fundamental to improving safety interventions (Okoye et al., 2017). Additionally, successful safety communication programs must focus on multiple feedback sources, which underlines the importance of a systematic approach to safety communication, thereby reinforcing hazard recognition and control measures on construction sites (Sparer et al., 2015). Furthermore, by solely focusing on quantitative measures, such as enforcing the project team to simply submit reports, organizations risk creating a situation where the project team merely completes the reporting task without addressing the underlying hazards. This approach could lead to a pattern of repeating the same hazards, with little to no follow-up action to ensure they are properly addressed. This situation is common in many organizations that set targets for reporting, using KPIs to measure success, but neglect the need for effective hazard mitigation. As a result, while the team may meet the reporting requirements, the actual safety issues may remain unresolved, ultimately undermining the goal of creating a safer work environment. This point is further supported by research indicating the importance of not just the quantity, but the quality of safety related activities such as leadership engagement in safety management. Their research indicates a shift toward evaluating the effectiveness of leadership in promoting safety, rather than just focusing on metrics like report submission (Bhandari et al., 2022).

Furthermore, the study supports the notion that hazard reporting should not only focus on increasing the number of reports but also on enhancing the quality and strength of corrective actions. The importance of having a robust follow-up system is supported by the study, which states that safety management systems (SMS) are crucial for identifying and addressing various safety hazards, with a particular focus on managing high-severity risks and ensuring compliance with safety protocols to prevent accidents (Golabchi et al., 2025). This insight could lead to improvements in the design of reporting systems, with an emphasis on not only tracking the number of reports but also assessing the effectiveness of the corrective actions taken.

The study opens several avenues for future research. One direction is to further explore the factors that influence the quality of hazard reports, including worker attitudes, emotional states, and organizational culture. It would be valuable to conduct longitudinal studies to determine whether stronger corrective actions lead to long-term improvements in safety outcomes, such as reduced accident rates or near-miss incidents.

Future research could also examine the impact of different safety communication strategies on hazard recognition and reporting. As Jeelani et al. (2018) suggest, communication plays a vital role in hazard identification and risk mitigation, and understanding how information flows between workers, supervisors, and safety officers could lead to more effective hazard reporting systems. Additionally, comparative studies between different industries could help determine whether the trends observed in the construction industry are applicable to other high-risk sectors, such as manufacturing or oil and gas.

The construction industry is at a critical juncture in its approach to safety management. With the increasing availability of data on hazards and accidents, there is a growing opportunity to move from reactive safety measures to proactive safety management practices. Adopting a systems thinking approach, as recommended in the literature, will allow organizations to view safety as an interconnected process rather than isolated events (Diez Roux, 2011). By fostering a culture of safety that encourages open communication, continuous learning, and

collaboration, the industry can work towards significantly reducing accident rates and improving overall safety outcomes.

4. CONCLUSION

Despite widespread hazard reporting systems, construction safety outcomes remain suboptimal due to implementation gaps. This study highlights the significant role that organizational structure and follow-up mechanisms play in the effectiveness of hazard reporting and corrective actions. Findings from the 732 hazard reports analyzed in this study suggest that improving safety practices in construction should not solely focus on increasing the number of reports, but also on implementing structured processes to ensure the quality and follow-up of corrective actions. Organizations could, for instance, integrate routine evaluation of corrective action strength into their safety management systems, and provide targeted training for personnel responsible for hazard mitigation.

This study makes an important contribution to the body of research on hazard reporting and safety management in high-risk industries. By exploring the relationship between organizational roles and corrective actions, it provides a foundation for further research on the effectiveness of hazard reporting systems. The insights gained from this study could help shape future safety policies and practices, not only in construction but also in other sectors that face similar safety challenges.

This study was limited by its retrospective design, which prevents a causal analysis of the relationship between hazard reporting and safety outcomes. Additionally, the data was obtained from a single multinational project management construction company in Indonesia, which may limit the generalizability of the findings. Future research could employ longitudinal methods such as cohort follow-up studies or time-series trend analysis to evaluate the long-term effects of hazard reporting and corrective actions on actual safety outcomes, such as injury rates or near-miss frequencies. Such studies could also compare the effectiveness of hazard reporting systems across different industries and regions to enable more evidence-based improvements. Moreover, future studies could investigate the psychological and emotional factors that influence hazard recognition and reporting, which are often overlooked but may significantly affect reporting behavior.

Overall, this study underscores the need for organizations to adopt a more holistic approach to safety management, one that emphasizes the quality of hazard reports and the effectiveness of corrective actions rather than focusing solely on the quantity of reports. By improving hazard reporting systems and fostering a stronger safety culture, organizations can significantly reduce the risks faced by construction workers and improve safety outcomes across the industry.

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