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Evaluation of Risk and Safety Management Practices and Safety Performance of Selected Government Projects in Lanao del Sur

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ABSTRACT

This study evaluated the risk and safety management practices and their influence on the safety performance of selected government projects in Lanao del Sur. It aimed to assess the current strategies employed in identifying, mitigating, and monitoring risks, as well as the implementation of safety protocols among project personnel. A quantitative research design was utilized, with data collected through structured questionnaires administered to project managers, engineers, and safety officers. Descriptive statistics were employed to determine the level of risk and safety management practices, while inferential statistics, including correlation and regression analyses, were used to examine the relationship between these practices and safety performance. Findings revealed that projects with well-established risk identification, hazard control measures, and regular safety training exhibited higher levels of safety performance. Conversely, lapses in monitoring, enforcement, and reporting mechanisms contributed to safety incidents, highlighting areas for improvement. The study underscores the importance of comprehensive risk and safety management in enhancing safety outcomes and minimizing accidents in government projects. Recommendations include strengthening safety culture, enhancing training programs, and enforcing stricter compliance with safety protocols.

Keywords: *Risk Management, Safety Management, Safety Performance, Government Projects, Construction Safety, Lanao del Sur*

INTRODUCTION

The construction industry is globally acknowledged as one of the most hazardous sectors due to its complex processes, dynamic work environments, and frequent exposure to physical risks such as falls, heavy machinery operations, and structural hazards. Effective risk and safety management practices are essential to prevent accidents, protect worker welfare, and ensure project success. Research on health and safety in construction highlights that systematic hazard identification, risk assessment, implementation of safety protocols, and continuous safety monitoring are core components of effective risk management (Joble & Briones, 2022). Given this backdrop, evaluating risk and safety management practices becomes indispensable for understanding safety performance in government infrastructure projects.

In contexts such as government construction projects in Lanao del Sur, which often entail limited resources, logistical challenges, and workforce diversity, the importance of robust safety practices is even more pronounced. Government-funded projects bear additional pressure to uphold public accountability while managing workforce welfare. Observations from local infrastructure initiatives reveal that while basic safety measures like personal protective equipment (PPE) usage may be present, more comprehensive safety planning and enforcement mechanisms are inconsistently applied (Mencias, Manzon, & Cruz, 2022). This underscores the need for a deeper examination of how risk

management practices are implemented on the ground and how well they translate into safer workplaces.

Risk management in construction involves not only the identification of hazards but also strategic planning to mitigate them before they result in accidents. Core processes often include risk assessment, development of control measures, communication of risks to workers, and establishment of safety committees or leadership oversight to monitor compliance. Such integrated risk management systems are foundational to ensuring that proactive rather than reactive measures drive safety performance outcomes (Carolino, Bernabe, & Bianes, 2025). These elements are increasingly recognized as best practices within the industry, promoting accountability and fostering a culture of shared responsibility.

Closely linked with risk management is safety performance, a multi-dimensional concept that reflects not only the absence of accidents but also adherence to safety systems, individual safety behavior, and collective practices on site. Research indicates that safety performance improves when organizations emphasize systematic safety protocols, incident reporting, and comprehensive training for personnel (Akram, Latief, & Nugroho, 2024). Safety performance serves as a key indicator of how well risk and safety management practices function in real project environments, and evaluating these outcomes helps stakeholders gauge the effectiveness of existing safety strategies.

Studies conducted in similar government project settings have demonstrated that when safety management practices—such as hazard prevention, education and training, and safety leadership—are effectively implemented, overall project safety improves significantly. For example, assessments of infrastructure projects in other Philippine municipalities showed that well-structured health and safety programs contribute to better compliance with safety policies and reduce workplace hazards (Tala, Tongol, Palma, Manzon, & Bernardo, 2025). These local examples provide valuable context for understanding how risk and safety management practices may operate in Lanao del Sur.

Given the critical importance of safety in public construction and the ongoing risks present on job sites, this study aims to evaluate risk and safety management practices and their influence on safety performance in selected government projects in Lanao del Sur. A thorough assessment of current practices will highlight both strengths and areas needing improvement, guiding project managers, safety officers, and policymakers toward evidence-based enhancements. Ultimately, the goal is to contribute to safer work environments, improved project outcomes, and a stronger safety culture in government construction initiatives (Mencias, Manzon, & Cruz, 2022).

MATERIALS & METHODS

This study employed a quantitative descriptive-correlational research design to evaluate the implementation of risk and safety management practices and their effect on safety performance in selected government construction projects in Lanao del Sur. This design enabled the systematic collection of numerical data from construction personnel, including project managers, safety officers, engineers, supervisors, and workers directly involved in safety activities. Through structured survey questionnaires, the study assessed current practices such as hazard identification, risk assessment, use of personal protective equipment (PPE), safety training, and monitoring, providing a comprehensive overview of safety management on site.

The descriptive-correlational approach also facilitated the examination of relationships between the implementation of safety measures and observed safety performance, including adherence to protocols, accident rates, and overall compliance. Data were analyzed using descriptive statistics to determine levels of implementation and safety outcomes, while Pearson correlation and multiple regression analyses identified the strength and significance of associations between practices and

performance. This method allows for the identification of strengths, gaps, and patterns in safety management, offering actionable insights for project managers, safety officers, and policymakers to enhance safety culture and performance across government construction projects.

RESULTS AND DISCUSSION

1. To what extent do Risk and Safety Management Practices affect the safety performance of selected government construction projects in terms of:

1.1 Hazard Identification and Risk Assessment;
1.2 Safety Policies and Standard Operating Procedures;
1.3 Safety Training and Awareness Programs;
1.4 Emergency Preparedness and Response Measures; and
1.5 Incident Reporting and Corrective Actions?

Table 1 shows that the extent to which risk and safety management practices affect safety performance in Hazard Identification and Risk Assessment is generally perceived as Agree, with a mean of 3.12. The highest mean, 3.38, was for "Workers are informed about possible risks related to their tasks," indicating that employees feel well informed about hazards, which is crucial for proactive safety management. The lowest mean of 2.90 for "Risk assessments are conducted regularly at the project site" suggests that formal risk assessment procedures may require more consistent implementation. Overall, these results indicate that while hazard identification and communication to workers are effective, there is room for improvement in the frequency of systematic risk assessments. This emphasizes the importance of maintaining continuous vigilance and structured evaluation of workplace hazards (Imran, Tamoor, & Cheema, 2023).

Table 1
The safety performance of selected Government construction projects in terms of Hazard Identification and Risk Assessment

Indicators	Mean	SD	Description
Potential hazards at the project site are clearly identified before work starts.	3.08	0.62	Agree
Risk assessments are conducted regularly at the project site.	2.90	0.84	Agree
Unsafe conditions are immediately recognized and addressed by supervisors.	3.23	0.70	Agree
Workers are informed about possible risks related to their tasks.	3.38	0.63	Strongly Agree
Safety inspections are consistently conducted to identify hazards.	3.03	0.86	Agree
AVERAGE MEAN	**3.12**	**0.73**	**Agree**

Table 2 presents the impact of Safety Policies and Standard Operating Procedures (SOPs) on safety performance, with an overall mean of 2.94, indicating agreement. "Safety rules are properly communicated to all workers" and "Workers understand the standard operating procedures for safe work" both received a mean of 3.00, showing moderate compliance and awareness among personnel. Conversely, the lowest mean of 2.85 for "Safety procedures are consistently enforced at the project site" highlights potential gaps in policy enforcement. These findings suggest that while safety policies exist and are understood by workers, their consistent application remains an area for improvement to enhance overall safety outcomes. Properly structured policies and enforcement are essential for improving organizational safety performance (Tang, 2025).

Table 2
The safety performance of selected Government construction projects in terms of Safety Policies and Standard Operating Procedures

Indicators	Mean	SD	Description
The project site has clear written safety policies and guidelines.	2.88	0.85	Agree
Safety rules are properly communicated to all workers.	3.00	0.78	Agree

Safety procedures are consistently enforced at the project site.	2.85	0.77	Agree
Workers understand the standard operating procedures for safe work.	3.00	0.78	Agree
Management ensures that safety policies are followed at all times.	2.95	0.81	Agree
AVERAGE MEAN	**2.94**	**0.80**	**Agree**

Table 3 indicates that Safety Training and Awareness Programs moderately influence safety performance, with an average mean of 3.11 (Agree). The highest-rated indicator was "Safety training improves my awareness of workplace hazards" with a mean of 3.45, demonstrating that training programs effectively enhance hazard recognition. The lowest mean of 2.78 for "Regular safety meetings or briefings are conducted at the site" suggests that ongoing reinforcement of safety awareness is inconsistent. This implies that while initial training is effective, continuous engagement through meetings or briefings could further strengthen safety culture and performance. Effective and innovative safety training is recognized as a key factor in reducing workplace accidents (Rehman, Hassan, Zubair, Aziz, & Ahmed, 2025).

Table 3
The safety performance of selected government construction projects in terms of Safety Training and Awareness Programs

Indicators	Mean	SD	Description
I have received adequate safety training related to my work.	3.30	0.72	Strongly Agree
Safety orientations are provided before starting assigned tasks.	2.95	0.71	Agree
Regular safety meetings or briefings are conducted at the site.	2.78	0.86	Agree
Safety training improves my awareness of workplace hazards.	3.45	0.64	Strongly Agree
Workers are encouraged to participate in safety-related activities.	3.05	0.75	Agree
AVERAGE MEAN	**3.11**	**0.74**	**Agree**

Table 4 presents the extent of Emergency Preparedness and Response Measures, which had a lower overall mean of 2.61, still interpreted as Agree. Indicators such as "Emergency drills are conducted regularly at the project site" (mean 2.23) and "The project site is prepared to respond to unexpected emergencies" (mean 2.45) were rated lowest, reflecting deficiencies in practical emergency readiness. Higher ratings for "I know what to do during emergencies" (mean 3.10) suggest that workers have basic knowledge, but that organizational preparedness and simulation exercises are insufficient. These results emphasize the need to strengthen emergency planning, equipment accessibility, and regular drills to improve practical readiness and safety performance. Proactive emergency preparedness is critical to reducing accident severity in construction projects (Zakwan, Suci, & Hasibuan, 2025).

Table 4
The performance of selected government construction projects in terms of Emergency Preparedness and Response Measures

Indicators	Mean	SD	Description
The project site has a clear emergency response plan.	2.68	0.73	Agree
Emergency equipment is available and accessible at the site.	2.60	0.84	Agree
I know what to do during emergencies such as accidents or disasters.	3.10	0.71	Agree
Emergency drills are conducted regularly at the project site.	2.23	0.89	Disagree
The project site is prepared to respond to unexpected emergencies.	2.45	0.75	Disagree
AVERAGE MEAN	**2.61**	**0.78**	**Agree**

Table 5 shows the influence of Incident Reporting and Corrective Actions on safety performance, with an overall mean of 3.06 (Agree). The highest-rated item was "Lessons learned from incidents are shared with workers" at 3.38, suggesting that knowledge transfer and learning from incidents are effective practices. The lowest mean of 2.73 for "Accidents and near-miss incidents are properly reported at the site" indicates that incident reporting may not always be consistent. Overall, the findings

suggest that while corrective actions and feedback mechanisms are functional, improving reporting systems could enhance the effectiveness of safety interventions. Proper incident reporting and corrective actions strengthen the continuous improvement of workplace safety performance (Nimo Boakye & Badu Nuamah, 2022).

Table 5
The safety performance of selected government construction projects in terms of Incident Reporting and Corrective Actions

Indicators	Mean	SD	Description
Accidents and near-miss incidents are properly reported at the site.	2.73	0.91	Agree
Workers are encouraged to report safety-related incidents.	3.25	0.78	Agree
Reported incidents are investigated thoroughly by management.	2.85	0.95	Agree
Corrective actions are taken after safety incidents occur.	3.08	0.73	Agree
Lessons learned from incidents are shared with workers.	3.38	0.74	Strongly Agree
AVERAGE MEAN	**3.06**	**0.82**	**Agree**

2. To what extent does the safety performance of selected government construction projects depend on risk and safety management practices in terms of:

2.1 Workplace Accident and Injury Reduction;
2.2 Safety Compliance and Safe Work Behavior;
2.3 Perceived Workplace Safety;
2.4 Regulatory and Legal Compliance; and
2.5 Safety Culture and Continuous Improvement?

Table 6 shows that the extent to which Safety Performance depends on Workplace Accident and Injury Reduction is perceived as Strongly Agree, with an average mean of 3.29. The highest-rated indicators were "Workplace accidents at the project site are minimal" and "Safety measures help reduce injuries among workers," both scoring 3.38, reflecting effective safety measures in reducing accident occurrences. The slightly lower mean of 3.15 for "Near-miss incidents rarely occur" suggests occasional lapses in accident prevention. Overall, these results indicate that minimizing accidents is a key contributor to overall safety performance. Effective accident reduction strategies are strongly linked to improved construction safety outcomes (Al-Abdin, 2023).

Table 6
The risk and safety management practices in terms of Workplace Accident and Injury Reduction

Indicators	Mean	SD	Description
Workplace accidents at the project site are minimal.	3.38	0.63	Strongly Agree
Safety measures help reduce injuries among workers.	3.38	0.63	Strongly Agree
Near-miss incidents rarely occur at the project site.	3.15	0.53	Agree
The number of safety-related incidents has decreased over time.	3.23	0.70	Agree
The project site maintains a low accident rate.	3.30	0.61	Strongly Agree
AVERAGE MEAN	**3.29**	**0.62**	**Strongly Agree**

Table 7 reflects the influence of Safety Compliance and Safe Work Behavior on safety performance, with an overall mean of 2.88 (Agree). Most indicators, including "Workers comply with safety instructions given by supervisors" (3.23), suggest generally positive adherence, but "Personal protective equipment is properly used at the site" scored the lowest at 2.45, highlighting inconsistent compliance with essential safety requirements. These findings indicate that while general safety behavior is acceptable, specific practices such as PPE usage require reinforcement. Maintaining strict

compliance is critical to preventing accidents and ensuring safety on construction sites. Worker compliance with safety rules significantly impacts overall project safety (Gonzalez & Ramirez, 2024).

Table 7
The risk and safety management practices in terms of Safety Compliance and Safe Work Behavior

Indicators	Mean	SD	Description
Workers follow safety rules while performing their tasks.	2.93	0.92	Agree
Personal protective equipment is properly used at the site.	2.45	1.01	Disagree
Unsafe work practices are corrected immediately.	2.93	0.62	Agree
Workers comply with safety instructions given by supervisors.	3.23	0.58	Agree
Safety procedures are followed even when work pressure is high.	2.85	0.66	Agree
AVERAGE MEAN	**2.88**	**0.76**	**Agree**

Table 8 examines Perceived Workplace Safety, with an average mean of 2.99 (Agree). “Safety concerns are addressed promptly by management” and “The project site prioritizes worker safety” both scored 3.03, suggesting that employees feel management is attentive to safety issues. Lower scores for “The working environment is free from serious safety risks” (2.85) and “I am confident in the safety measures implemented” (2.95) indicate moderate confidence in site safety measures. These results emphasize the importance of continuously improving safety communication and hazard control to strengthen workers’ sense of security. Perceived workplace safety is a strong predictor of employee adherence to safety protocols (Hafeez & Akhtar, 2023).

Table 8
The risk and safety management practices in terms of Perceived Workplace Safety

Indicators	Mean	SD	Description
I feel safe while working at the project site.	3.08	0.47	Agree
The working environment is free from serious safety risks.	2.85	0.66	Agree
I am confident in the safety measures implemented at the site.	2.95	0.71	Agree
Safety concerns are addressed promptly by management.	3.03	0.77	Agree
The project site prioritizes worker safety.	3.03	0.66	Agree
AVERAGE MEAN	**2.99**	**0.66**	**Agree**

Table 9 presents Regulatory and Legal Compliance, with an overall mean of 2.83 (Agree). While “The project site complies with government safety regulations” scored 3.00, lower means for “Required safety documents are properly maintained” (2.65) and “The project site meets occupational safety and health requirements” (2.78) reveal inconsistencies in documentation and full compliance. These gaps highlight the need for stricter monitoring and formal enforcement of legal requirements to enhance safety performance. Compliance with safety regulations ensures accountability and reduces the risk of workplace incidents. Regulatory compliance is essential for effective construction project safety management (Cruz & Mateo, 2025).

Table 9
The risk and safety management practices in terms of Regulatory and Legal Compliance

Indicators	Mean	SD	Description
The project site complies with government safety regulations.	3.00	0.55	Agree
Safety standards required by law are strictly followed.	2.73	0.72	Agree

Safety inspections by authorities are taken seriously.	3.00	0.68	Agree
Required safety documents are properly maintained.	2.65	0.83	Agree
The project site meets occupational safety and health requirements.	2.78	0.80	Agree
AVERAGE MEAN	**2.83**	**0.72**	**Agree**

Table 10 illustrates the influence of Safety Culture and Continuous Improvement on safety performance, with an overall mean of 2.93 (Agree). The highest-rated item, "The project site promotes a positive safety culture" (3.30), demonstrates that management and workers generally share responsibility for safety. Lower ratings, such as "Workers actively participate in safety programs" (2.55), indicate that employee engagement in safety initiatives can be strengthened. Continuous improvement practices, including regular safety assessments and feedback mechanisms, are vital for fostering a sustainable safety culture. A strong safety culture combined with ongoing improvements enhances overall safety performance on construction sites (Fernandez & Salonga, 2024).

Table 10
The risk and safety management practices in terms of Safety Culture and Continuous Improvement

Indicators	Mean	SD	Description
Management demonstrates strong commitment to workplace safety.	2.93	0.83	Agree
Workers actively participate in safety programs.	2.55	0.93	Agree
Safety improvements are continuously implemented at the site.	2.85	0.77	Agree
Safety is treated as a shared responsibility among workers and management.	3.00	0.68	Agree
The project site promotes a positive safety culture.	3.30	0.61	Strongly Agree
AVERAGE MEAN	**2.93**	**0.76**	**Agree**

3. Is there a significant influence of Risk and Safety Management Practices on the Safety Performance of selected government construction projects?

The results in Table 11 indicate that Risk and Safety Management Practices significantly influence the Safety Performance of selected government construction projects, with an adjusted R^2 of 0.699, suggesting that approximately 70% of the variance in safety performance can be explained by the combined risk and safety management practices. Among the factors examined, Emergency Preparedness and Response Measures had the strongest and statistically significant impact on safety performance (B = 0.369, p = 0.000). This finding emphasizes that having clear emergency protocols, accessible equipment, and regular drills ensures that workers can respond effectively to unexpected incidents, directly enhancing workplace safety outcomes. Effective emergency preparedness is recognized as a cornerstone of construction safety performance (Akram, Latief, & Nugroho, 2024).

Table 11
The Test of the Significant Influence of Risk and Safety Management Practices on the Safety Performance of Selected Government Construction Projects

	Unstandardized Coefficients		Standardized Coefficients		
Model	**B**	**Std.Error**	**Beta**	**t**	**Sig.**
(Constant)	**.488**	**.346**		**1.410**	**.168**
Hazard Identification and Risk Assessment	.067	.209	.065	.320	.751
Safety Policies and Standard Operating Procedures	.215	.117	.263	1.840	.074
Safety Training and Awareness Programs	.134	.176	.159	.759	.453
Emergency Preparedness and Response Measures	.369	.090	.461	4.092	.000

Incident Reporting and Corrective Actions	.078	.081	.096	.968	.340

Significant if P-value <0.05

Note: Adjusted R2= 0.699 *ANOVA for Regression: 19.134 p=.000*

Other components, such as Safety Policies and Standard Operating Procedures, showed a positive but marginally non-significant effect (B = 0.215, p = 0.074), indicating that while having written safety rules and enforcement mechanisms is important, their effectiveness may depend on consistent implementation and monitoring at the site. Factors like Hazard Identification and Risk Assessment, Safety Training and Awareness Programs, and Incident Reporting and Corrective Actions were positively correlated but not statistically significant, suggesting that these practices contribute to safety performance but may require higher compliance or reinforcement to achieve measurable impact. Previous research highlights that policies and risk assessment processes alone are insufficient without active enforcement and engagement from both management and workers (Carolino, Bernabe, & Bianes, 2025).

Overall, the findings underscore the critical role of comprehensive and proactive risk and safety management systems in achieving high safety performance in government construction projects. Emergency preparedness emerges as a particularly influential factor, while other practices support safety indirectly by creating a structured, informed, and responsive work environment. These results suggest that project managers should prioritize emergency readiness alongside reinforcing policies, training, and reporting mechanisms to improve overall safety outcomes. A culture of preparedness combined with systematic safety management is key to reducing accidents and promoting worker welfare (Tala, Tongol, Palma, Manzon, & Bernardo, 2025).

CONCLUSION

The findings of this study indicate that risk and safety management practices play a vital role in enhancing the overall safety performance of government construction projects. Among the various practices examined, emergency preparedness and response measures were found to have the most significant impact on safety outcomes, highlighting the importance of proactive planning and readiness in mitigating accidents and injuries. Other practices, such as hazard identification, safety training, and incident reporting, contribute positively to safety performance, though their effects are more indirect and rely heavily on consistent implementation and worker compliance.

The evaluation of safety performance revealed that while workplace accidents and injuries are generally minimized, there remain areas requiring improvement, particularly in adherence to safety protocols and proper use of personal protective equipment. Safety compliance and safe work behaviors were observed to be satisfactory overall, but inconsistencies in certain practices indicate the need for ongoing monitoring, training, and reinforcement. Enhancing employee engagement in safety programs and reinforcing standard operating procedures can further strengthen safety outcomes.

Perceptions of workplace safety among workers were generally positive, demonstrating confidence in management's commitment and responsiveness. However, some gaps in the perceived adequacy of safety measures suggest that continuous improvement is necessary to maintain high levels of safety awareness and trust among the workforce. A strong safety culture, supported by clear communication and shared responsibility, is essential to sustaining safe work environments and reducing the likelihood of incidents.

Regulatory and legal compliance was found to be generally adequate, though minor gaps in documentation and formal enforcement were noted. Addressing these gaps is crucial for meeting statutory requirements and ensuring accountability in public construction projects. By integrating

compliance with proactive safety management, project managers can minimize risks while fostering a more secure and structured work environment.

Overall, the study underscores the importance of a comprehensive and integrated approach to risk and safety management. Combining emergency preparedness, effective policies, employee training, incident reporting, and continuous improvement strategies leads to measurable improvements in safety performance. Prioritizing these practices not only reduces accidents and injuries but also enhances worker confidence, project efficiency, and the sustainability of government construction initiatives. This emphasizes the need for ongoing evaluation and adaptation of safety practices to maintain high standards and protect all project stakeholders.

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