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Developing a Culture of Safety Communication for Enhancing Risk Awareness in Industrial Workplaces

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ABSTRACT

The increasing need to strengthen the safety culture in the industrial sector, especially in large industrial areas such as Karawang which has a high level of work risk and complexity of communication between organizational levels. A suboptimal safety communication culture often hinders the formation of worker risk awareness, so a deep understanding of how communication practices, organizational values, and daily interactions build or weaken awareness of occupational hazards. This study aims to analyze the process of developing a culture of safety communication and explain how safety communication patterns can increase risk awareness in industrial work environments. Using a qualitative approach of case studies on two manufacturing companies in Karawang, data was collected through in-depth interviews with 12 informants consisting of 2 HSE managers/staff, 4 production line supervisors, and 6 operators from various work units, accompanied by direct observation on safety briefing activities and K3 document review. Data were analyzed using thematic analysis techniques to identify patterns, barriers, and communication practices that affect workers' risk perceptions. The results show that an effective safety communication culture is built through active leadership involvement, open hazard reporting mechanisms, consistency of safety messages, and the use of communication media that is easy to understand across levels. In addition, risk awareness increases when communication is dialogical, routine, and integrated with the safety learning system. This study concludes that strengthening safety communication culture contributes significantly to increasing risk awareness and encouraging safe work behaviors, as well as providing practical implications for the development of organizational culture-based OSH strategies in the industrial sector.

Key Word *Culture, Safety Communication, Risk Awareness, Industrial Workplaces*

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INTRODUCTION

Occupational safety has become a strategic issue in modern industry due to the high number of accidents triggered by weak communication and low risk awareness in the workplace (Samarasinghe & Heenatigala, 2024). Global reports show that more than

70% of industry incidents are directly related to ineffective safety communication between workers and management (Naji et al., 2022). This situation is particularly relevant in large industrial estates such as Karawang, which has thousands of manufacturing facilities and high-risk job characteristics. Operational complexity, workforce diversity, and production process dynamics magnify the urgency of implementing a strong and consistent safety communication culture. When safety messages are not received or understood appropriately, the risk of malfunctions and accidents increases significantly. Therefore, the development of a culture of safety communication is an urgent need for industries that want to build a safe, adaptive, and sustainable work environment.

In Indonesia, the implementation of K3 regulations is often not in line with the conditions of safety communication practices in the field. Many companies still place safety communication as an administrative activity, rather than as a culture that lives in everyday work interactions. Research shows that the gap between regulation and practice often leads to risk information not being comprehensively communicated to production line workers (Zara et al., 2023). This condition is exacerbated by an organizational culture that tends to be hierarchical, so workers feel reluctant to express concerns about work hazards. In addition, the use of safety communication media is still limited and not always relevant to the needs of workers at various levels. This situation underscores the importance of in-depth research on how safety communication culture can be systematically formed, managed, and evaluated in the context of Indonesia's manufacturing industry.

Globally, studies have confirmed that safety communication culture is a fundamental element in building strong risk awareness in the industrial environment (Kavalela et al., 2024). However, most of the research focuses on the mining, oil and gas, or construction sectors, so studies on the manufacturing sector, especially in dense industrial areas such as Karawang, are still limited. In addition, previous research has addressed more technical factors, such as safety procedures or administrative compliance, than examined how communication interactions between organizational levels affect workers' risk perceptions (Chionis & Karanikas, 2022). The lack of understanding of the relationship between communication, organizational cultural values, and behavioral change in the context of local industries is still a significant scientific gap (Shrivastava et al., 2022). This gap is even more visible when the results of safety audits show that most workers still have a low perception of risk despite having attended routine K3 training. This condition shows the need for a more contextual and oriented research approach to real communication dynamics in the industrial environment.

From the perspective of organizational communication theory, safety communication culture is not only understood as message delivery, but as a process of

forming a common meaning regarding risk and safe behavior (Rice & Searle, 2022). Research shows that dialogical, open, and participation-based communication can improve workers' ability to recognize, assess, and manage occupational hazards (Hinsberg et al., 2024). However, the implementation of dialogical communication in the Indonesian manufacturing industry still faces various obstacles, such as authoritative leadership styles and limited worker safety literacy. These structural barriers cause safety messages to often be one-way and do not encourage active worker involvement in the risk identification process. In addition, there is little research that examines how communication media, work experience, and organizational social norms interact in forming a solid safety culture. This is the basis for the importance of research that examines safety communication in a more holistic manner.

In the context of Karawang, the dynamics of the workforce that come from various educational backgrounds, ages, and experiences further expand the challenges of safety communication. Variations in the ability to understand safety messages contribute to differences in risk awareness levels among workers. Research shows that new hires generally have lower risk awareness than experienced workers, especially if the organization doesn't have a strong safety mentoring and communication system in place (Faruque, 2024). In addition, a work culture that emphasizes production speed often causes safety communication to be perceived as an operational bottleneck. This situation makes clear the importance of a safety communication culture approach that is not only informative, but also adaptive to the characteristics of workers and the operational demands of the industry. Thus, this research is needed to understand the factors that shape the effectiveness of safety communication in the Karawang manufacturing industrial environment.

Based on these gaps, this study explicitly aims to analyze the process of developing a culture of safety communication and explain how safety communication patterns can increase risk awareness in the industrial work environment. The research focus is directed at inter-organizational communication interactions, safety message delivery practices, leadership roles, and workers' perceptions of risk information. This study also examines how safety communication practices are practiced in daily activities, such as safety briefings, hazard reporting mechanisms, and socialization of safe work procedures. Using a qualitative approach of case studies, this study provides an in-depth overview of the dynamics of safety communication in manufacturing companies. The findings of this study are expected to provide a richer empirical understanding of the supporting and inhibiting factors for strengthening safety communication culture.

This research contributes theoretically by expanding the literature on safety communication in the context of manufacturing industries in developing countries, which is still rarely studied. This research also enriches academic understanding of the

relationship between organizational culture, communication, and safety behavior through contextual and in-depth analysis. Practically, this study offers strategic recommendations for organizations in designing safety communication programs that are more dialogical, inclusive, and sustainable to increase worker risk awareness. Research findings can be a reference for K3 managers, production supervisors, and policymakers in developing relevant and effective safety communication systems. In addition, this research contributes to the development of cultural-based safety standards that can be widely applied in large industrial areas such as Karawang. Thus, this research not only strengthens the scientific basis of safety culture, but also provides direct benefits for the application of K3 in the industrial sector.

RESEARCH METHOD

Types and Approaches to Research

This study uses a qualitative approach with a case study design to deeply understand the process of developing a safety communication culture and its influence on increasing risk awareness in the industrial work environment. The qualitative approach was chosen because it is able to reveal the dynamics of interactions, meanings, and safety communication practices that cannot be explained quantitatively. The case study design allowed the researcher to contextually explore the phenomenon in two manufacturing companies in the Karawang industrial area that have different operating characteristics and work risks. This method is effectively used to explore communication patterns across organizational levels, including relationships between managers, supervisors, and operators. In addition, this approach is relevant to examine the process of forming a safety culture that is complex and develops through everyday interactions. Thus, this study emphasizes a holistic understanding of the phenomenon of safety communication that contributes to workers' risk awareness (Viera, 2023).

Population, Participants, and Sampling Techniques

The research population is all workers in two manufacturing companies located in Karawang and have an already running K3 management system. Participants were selected using a non-probability sampling technique with a purposive sampling approach, which is the selection of informants based on their position, experience, and involvement in safety communication practices. There were a total of 12 informants, consisting of 2 HSE managers/staff, 4 production line supervisors, and 6 operators from various work units, so that cross-level representation of the organization was maintained. The selection of this number takes into account the depth of information, the adequacy of data, and the principle of saturation in qualitative research (Braun & Clarke, 2021). The informant was chosen because he had direct experience in the implementation of safety briefings, hazard reporting, and daily communication

interactions. This sampling technique allows researchers to obtain rich and relevant information about safety communication practices in each company.

Data Collection Techniques and Instruments

Data was collected through three main techniques, namely in-depth interviews, direct observations, and documentation studies. Interviews were conducted using semi-structured guidelines so that researchers could explore informants' perceptions related to safety communication, hazard reporting, and risk awareness formation. The interview instrument was prepared based on theoretical constructs regarding the organization's safety culture and communication (Van Nunen et al., 2022). Observations are carried out in routine activities such as safety briefings, field inspections, and work interactions to see communication practices that occur authentically. The documentation reviewed includes K3 SOPs, incident reports, hazard reporting forms, and safety campaign materials from the company. The triangulation method is used to increase the credibility of the data and minimize researcher bias.

Validity, Reliability, and Research Ethics

To ensure data quality, the study applied triangulation of sources, methods, and time according to qualitative research standards (Donkoh & Mensah, 2023). Validity is strengthened through member checking, which is the process of asking informants to verify the summary of the interview results to ensure the correctness of the interpretation. In addition, peer debriefing is carried out by asking peer researchers to review the analysis process to reduce subjectivity. Field notes, interview recordings, and observation results are systematically stored as evidence of trail audits. The ethical aspect is maintained by obtaining informed consent from all informants, ensuring identity confidentiality, and using data only for academic purposes. This procedure ensures that research takes place ethically, transparently, and accountably.

Research Implementation Procedure

The research procedure is carried out in stages, starting from determining the research location and obtaining permits to the management of the two companies. In the initial stage, the researcher conducted preliminary observations to understand the context of safety culture, production flows, and internal communication mechanisms. Furthermore, the researcher developed interview guidelines and conducted instrument tests to limited informants to ensure the clarity and appropriateness of the questions. The data collection phase lasts for several weeks through in-depth interviews that are flexibly scheduled according to the company's working hours. The observation process is carried out in an integrated manner by participating in safety briefing activities, production area inspections, and daily operator activities. After all the data is collected, the researcher performs transcription, initial coding, and categorization to enter the thematic analysis stage.

Data Analysis Techniques

Data analysis was carried out using thematic analysis techniques based on the steps of theme identification, data coding, pattern categorization, and interpretation of meaning (Naeem et al., 2023). This method was chosen because it was able to reveal the relationship between safety communication patterns and the formation of risk awareness in a systematic manner. The entire interview transcript was analyzed using NVivo 12 software, which made it easy to organize data, code tagging, and search for themes. The analysis starts from the open coding process to find the initial concept, then axial coding to connect categories, and selective coding to produce the main theme that is relevant to the research objectives. Researchers continue to reflect and compare data to ensure consistency of interpretation. The final results of the analysis provide an in-depth look at how safety communication is formed, practiced, and influences worker risk awareness in the manufacturing industry.

RESULT AND DISCUSSION

Leadership Involvement in Safety Communication

The results of the study show that leadership involvement is a key pillar in the formation of a safety communication culture in the industrial work environment. Leadership that is present in person through safety walk activities, participation in safety briefings, and quick response to near-miss reports has been proven to be able to increase the legitimacy of safety messages in the workforce. This is reflected in a manager's statement that emphasizes the importance of leadership presence: "*Management routinely attends safety briefings every week when we see supervisors come down and talk about real dangers in the field, colleagues take them more seriously.*" (M-01, September 5, 2025). One supervisor added that quick follow-up is a driving factor for the courage to report: "*If the boss is quick to respond when there is a near-miss report, people are brave enough to speak up.*" (P-03, September 12, 2025). Operators also feel the psychological impact of the involvement: "*When the production head comes in and asks the operator directly about the equipment, I feel valued so I am more vigilant.*" (O-06, September 18, 2025).

The observational results support these findings, where leaders are consistently present in safety activities and provide feedback on risk reports. These findings are in line with the literature that emphasizes that visible leadership is able to strengthen the safety climate and increase the internalization of risk among workers (Wattenbarger, 2024; Kadher et al., 2024). In this context, leadership involvement is not only symbolic, but becomes an organizational cue that influences perceptions and safety norms.

Analytically, this theme shows that the role of leadership not only functions as a supervisor, but also forms norms of safe behavior through example, social closeness, and strengthening safety values. The presence of leaders creates collective expectations

about the standards of behavior that must be adhered to, reduces hierarchical distances, and builds mutual trust so that workers are more comfortable communicating risks in the field. Thus, leadership involvement plays an important role in creating a stable and sustainable safety communication environment.

Open and Non-Punitive Hazard Reporting Mechanism

The second theme highlights how a safe, fast, and non-punitive hazard reporting system increases worker participation in reporting potential hazards and near-misses. The company provides anonymous reporting channels through physical forms as well as digital channels, which has been proven to increase the number of reports and strengthen a culture of transparency. Operator experience shows the effectiveness of this policy: "*We now have an anonymous form in the report box; I once reported a leak in the hose, and no one told me to stop, instead there was a follow-up.*" (O-02, September 7, 2025). A manager confirmed that the reporting orientation is focused on learning, not punishment: "*The purpose of reporting is learning so more operators are reporting.*" (M-02, September 9, 2025). The supervisor also emphasized the existence of a routine follow-up process: "*The supervisor follows up on the report at the morning meeting; It makes people see that the report is important, not just a formality.*" (P-01, September 15, 2025).

Analysis of the company's documents shows that the reports are systematically classified and followed by corrective actions, while observations safety briefing show the discussion of the report along with the technical solution. This shows that reports are used as a learning mechanism and not as an individual error assessment tool (Morais et al., 2022). Thus, the reporting system functions as a means of increasing risk awareness and improving work processes.

In depth, this non-punitive reporting mechanism creates a sense of psychological security for workers to report mistakes and potential dangers without fear (Barugu, 2023). Existence feedback loop that clearly reinforces collective mindfulness, i.e. mutual vigilance against potential sources of risk (Subrahmanyam & Sarkis, 2025). By placing reporting as a collective learning activity, organizations build a culture of communication that is adaptive and responsive to risk, thus fostering stronger risk awareness.

Consistency of Safety Messages and Easy-to-Understand Media Use

The third theme highlights the importance of consistency in safety messages conveyed through easy-to-understand communication media for workers with diverse levels of literacy. Illustrated instructional posters, *visual checklists*, and concise *briefing* materials have been shown to be more effective in aiding in understanding safe work procedures. One operator explained: "*The poster with pictures of the work steps helped me remember the procedure faster than reading a long form.*" (O-04, September 11, 2025). Supervisors emphasized the role of cross-media consistency: "*The 'lockout–tagout' message appeared on all media briefings, posters, and bulletin boards.*" (P-04, September 14,

2025). The manager added that language and symbol adaptations for migrant workers were also carried out: "*Our safety materials were adapted so that the migrant operators could understand.*" (M-01, September 5, 2025).

The results of the observations showed that instructional posters were available at most workpoints and helped improve visual compliance. Message consistency not only strengthens safety message retention, but also reduces misunderstandings between worker levels. The organizational communication literature emphasizes that multimodal communication and message redundancy plays an important role in stabilizing safety knowledge and behavior (Olajiga et al., 2024).

In depth, these findings indicate that standardized visual media functions as cognitive scaffolding that strengthens the process of internalizing safety information. Clear, repeatable, and easy-to-understand representation of messages helps workers store information in long-term memory and reduce operational errors due to miscommunication. Thus, the effectiveness of safety communication depends not only on the frequency of delivery, but also on the design of messages that suit the cognitive needs of the worker.

Dialogical Communication, Routine, and Safety Learning Integration

The fourth theme shows that safety communication that is dialogical and carried out regularly through *toolbox talks*, *near-miss* discussions, and question and answer sessions plays an important role in increasing workers' risk understanding and awareness. Operators believe that real-case discussions help them see risks more concretely: "*In toolbox talk, we often discussed real cases last week that made me aware of dangers that I didn't consider important before.*" (O-05, September 16, 2025). One supervisor asserts that dialogue spaces improve understanding: "*When operators can ask questions, they understand the risks better.*" (P-02, September 13, 2025). Meanwhile, managers emphasize that mentoring programs accelerate the adaptation of new workers: "*Mentoring after briefings helps new workers recognize potential dangers more quickly.*" (M-02, September 9, 2025).

Observations show that the toolbox talk routinely takes place with active participation of workers, while company data confirms the existence of a structured mentoring program. These findings reinforce the view that two-way communication creates a process of collective interpretation of risk and supports long-term safety behavior change (Aderamo et al., 2024).

Analytically, dialogical communication strengthens the ability of workers to make sense-making, which is the process of understanding and interpreting risks based on real experience and joint discussions. Communication routines form a habit of reflection on potential hazards, while mentoring expands the transfer of safety knowledge across generations of workers. Thus, an interactive and continuous communication process not only conveys safety information, but also integrates it into daily work practices.

CONCLUSION

This study confirms that the development of a culture of safety communication in the industrial environment does not only depend on the existence of formal procedures, but especially on the quality of interaction, leadership involvement, and consistency of safety messages that workers receive in daily activities. Active leadership involvement through safety walks, attendance at safety briefings, and quick responses to risk reports have been proven to strengthen the legitimacy of safety messages and increase workers' seriousness in recognizing potential hazards. In addition, an open and non-punitive reporting mechanism creates a sense of psychological security for workers, so that hazard reports are used as a means of collective learning, not a form of abuse or sanction. Consistent and easy-to-understand communication media also plays an important role in helping to internalize safety procedures for workers with diverse levels of literacy and work experience.

Furthermore, communication that is dialogical, routine, and integrated with safety learning activities has been proven to significantly increase risk awareness. Real-case discussions, toolbox talks, and mentoring programs allow workers to build a collective understanding of risk and deepen their understanding of operational hazards. Thus, strengthening a safety communication culture is a strategic element in creating a workplace that is safe, adaptive, and responsive to potential risks. These findings provide important implications for the industry sector, that increasing risk awareness cannot be achieved through a purely technical approach, but requires a transformation of organizational culture that places safety communication as a sustainable and participatory core practice.

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REFERENCES

Aderamo, A. T., Olisakwe, H. C., Adebayo, Y. A., & Esiri, A. E. (2024). Behavioral safety programs in high-risk industries: A conceptual approach to incident reduction.

Comprehensive Research and Reviews in Engineering and Technology, *2*(1), 64–82.

Barugu, R. P. (2023). *Patient Safety and Risk Management at Healthcare Organisations*. Lithuanian University of Health Sciences (Lithuania).

Braun, V., & Clarke, V. (2021). To saturate or not to saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales. *Qualitative Research in Sport, Exercise and Health*, *13*(2), 201–216.

Chionis, D., & Karanikas, N. (2022). Risk perception and risk communication from a systems perspective: A study on safety behavioural intervention frameworks and functions. *Systemic Practice and Action Research*, *35*(5), 711–746.

Donkoh, S., & Mensah, J. (2023). Application of triangulation in qualitative research. *Journal of Applied Biotechnology and Bioengineering*, *10*(1), 6–9. https://doi.org/10.15406/jabb.2023.10.00319

Faruque, M. O. (2024). The Effects of Organizational Commitment, Knowledge, Attitude, and Awareness on Risk Management Effectiveness in Labs. *Educational Administration: Theory and Practice*, *30*(6), 3100–3114.

Hinsberg, K., Nadesan, M., & Lamanna, A. (2024). Communicative framework development for construction risk governance: An analysis of risk and trust perception for organizational sustainability. *Sustainability*, *16*(13), 5794.

Kadher, Y., Alzubi, A., Berberoğlu, A., & Öz, T. (2024). Perceived leadership support, safety citizenship, and employee safety behavior in the construction industry: The role of safety learning. *Buildings*, *14*(10), 3260.

Kavalela, E. N. N., Ismail, S. B., & Mohd, W. N. M. B. W. (2024). Investigating the Impact of Safety Management Communications on Safety Culture in Construction Industry: Mediating Role of Behavioural Safety and Perceived Working Environment. *International Journal of Academic Reserach in Economics and Management Sciences*, *13*(3).

Morais, C., Yung, K. L., Johnson, K., Moura, R., Beer, M., & Patelli, E. (2022). Identification of human errors and influencing factors: A machine learning approach. *Safety Science*, *146*, 105528.

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, *22*, 16094069231205788.

Naji, G. M. A., Isha, A. S. N., Alazzani, A., Saleem, M. S., & Alzoraiki, M. (2022). Assessing the mediating role of safety communication between safety culture and employees safety performance. *Frontiers in Public Health*, *10*, 840281.

Olajiga, O. K., Olu-lawal, K. A., Usman, F. O., & Ninduwezuor-Ehiobu, N. (2024). Conceptual framework for effective communication strategies in high-risk industries: Insights from the energy sector. *World Journal of Advanced Engineering Technology and Sciences*, *11*(2), 80–90.

Rice, C., & Searle, R. H. (2022). The enabling role of internal organizational communication in insider threat activity–evidence from a high security organization. *Management Communication Quarterly*, *36*(3), 467–495.

Samarasinghe, H., & Heenatigala, S. (2024). Insights from the field: A comprehensive analysis of industrial accidents in plants and strategies for enhanced workplace safety. *ArXiv Preprint ArXiv:2403.05539*.

Shrivastava, S., Pazzaglia, F., Sonpar, K., & McLoughlin, D. (2022). Effective communication during organizational change: a cross-cultural perspective. *Cross Cultural & Strategic Management*, *29*(3), 675–697.

Subrahmanyam, S., & Sarkis, N. (2025). Mindfulness and Sustainability Leadership: Integrating Awareness and Action for a Resilient Future. In *Strategic Approaches to Mindful Leadership and Change Management* (pp. 349–382). IGI Global Scientific Publishing.

Van Nunen, K., Reniers, G., & Ponnet, K. (2022). Measuring safety culture using an integrative approach: The development of a comprehensive conceptual framework and an applied safety culture assessment instrument. *International Journal of Environmental Research and Public Health*, *19*(20), 13602.

Viera, C. A. (2023). Case study as a qualitative research methodology. *Performance Improvement Journal*, *62*(4), 125–129.

Wattenbarger, J. C. (2024). *Examining Workplace Safety Through Effective Leadership Styles: A Qualitative Study of the High-Risk Private Industry*. California Baptist University.

Zara, J., Nordin, S. M., & Isha, A. S. N. (2023). Influence of communication determinants on safety commitment in a high-risk workplace: a systematic literature review of four communication dimensions. *Frontiers in Public Health*, *11*, 1225995.