

Safety Leadership Culture and Employee Behavior in Cement Plant Group Operations

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ABSTRACT

Keywords:

*Thematic Analysis;
safety golden rules;
Nvivo 12 pro*

Given the high level of risk in the cement industry, occupational safety is an important component. The purpose of this study was to investigate how employee behavior at the Tuban Group Operation is influenced by safety leadership culture. Interviews were conducted with several employees who had different responsibilities within one unit, and the data were collected using a qualitative approach with thematic analysis supported by NVivo 12 Pro software. The findings of the study indicate that two main factors—internal factors consisting of commitment, communication, coordination, attention, and leaders' role modeling, and external factors consisting of compliance with standard operating procedures (SOPs), company policies, and safety golden rules—have a significant impact on employee perceptions of the safety culture built by leaders at the Semen Group Operation Tuban factory. Both factors encourage safe behavior in the workplace, increase employee awareness, and create a positive safety climate. This study can serve as a guide for creating a sustainable and comprehensive safety-oriented workplace culture that supports the development of a more effective safety leadership approach.

INTRODUCTION

Given the high-risk nature of the work and the potential hazards that can endanger employee safety, occupational safety is a critical component in the cement industry. As one of the largest cement producers in Indonesia, the company understands that establishing a strong safety culture benefits not only the company's reputation and operational effectiveness but also the protection of its workers. The implementation of a strong safety culture not only safeguards employees but also contributes to operational efficiency and enhances the company's reputation (Yazdi 2025; Ying et al. 2025). Because competent leaders can influence employee behavior in complying with safety procedures, a safety leadership culture becomes a central concern in situations like this (Cooper 2015; Nævestad et al. 2018; Pilbeam et al. 2016).

The way leaders convey safety values and set a positive example for employees is referred to as a safety leadership culture. Leaders who demonstrate a commitment to safety can foster a positive safety climate, in which employees feel more comfortable reporting problems and participating in safety initiatives (Kim et al. 2019; Sankar et al. 2024; Yazdi 2025). At the Tuban Cement Factory, where the complex and hazardous work environment requires extra attention to safety, this is particularly relevant. The safety situation at the Tuban

Cement Factory demonstrates that challenges persist despite the implementation of various safety measures (Septiani et al. 2023; Wiharja et al. 2025). The number of workplace accidents at this factory remains at an alarming level, according to data from the annual report of one of the cement factories in Tuban (2023).

Previous research has extensively examined the relationship between leadership and safety outcomes. Ghasemi et al. (2025) and Ta et al. (2022) conducted a meta-analytic review demonstrating that both transformational and transactional leadership styles significantly influence safety behaviors, with transformational leadership showing stronger effects on safety participation and transactional leadership more strongly predicting safety compliance. Seo et al. (2022) developed a framework linking safety climate to safety performance, showing that safety knowledge and motivation mediate the relationship between safety climate and safety behaviors. Lee et al. (2019) provided a comprehensive review of thirty years of safety climate research, highlighting the critical role of leadership in shaping safety climate perceptions.

Reason (1997) laid the foundation for understanding organizational accidents and emphasized that leadership commitment is essential for developing a robust safety culture. Wong et al. (2021) and Garay et al. (2023) evaluated safety management and culture interventions, identifying effective strategies for improving safety outcomes. Katz-Navon and Erez (2005) demonstrated that when leaders create a positive safety climate, employees feel more empowered to report problems and engage in safety initiatives. Further emphasized that a mature safety culture involves strong teamwork and rapid responses to safety concerns (Alsabri et al. 2022; Bisbey et al. 2021; Siuta et al. 2022).

More recent studies have explored safety leadership in various industrial contexts. Ali et al. (2024) emphasized that understanding safety psychology is crucial for building a safe workplace, highlighting the importance of leadership in shaping employee safety attitudes and behaviors. Research on the cement industry specifically has identified that the complex and hazardous work environment requires particularly strong safety leadership to prevent accidents and injuries (Mwaruta et al. 2023; Ssemuddu et al. 2025). Studies have shown that effective safety leadership not only reduces accident rates but also improves overall operational performance and employee well-being.

Despite the wealth of research on safety leadership, several gaps remain. First, most studies have been conducted in Western industrial contexts, with limited research examining safety leadership in Indonesian manufacturing settings, particularly in the cement industry. Second, while quantitative studies have established correlations between leadership styles and safety outcomes, fewer studies have employed qualitative approaches to understand the nuanced ways in which employees perceive and experience safety leadership in their daily work. Third, existing research has not adequately explored how both internal factors (leadership characteristics such as commitment, communication, and role modeling) and external factors (compliance with SOPs, company policies, and safety golden rules) interact to shape employee perceptions of safety culture. Fourth, the specific context of the Tuban Cement Factory, with its unique combination of high-risk operations and Indonesian cultural context, has not been previously examined.

The novelty of this research lies in its qualitative exploration of safety leadership culture in the Indonesian cement industry using thematic analysis with NVivo 12 Pro software.

This study offers an employee-centered perspective on how safety culture is perceived by workers at different organizational levels, capturing lived experiences beyond leader self-reports. It identifies and maps the specific internal and external factors shaping safety culture in the Tuban Cement Factory context, integrating both psychosocial and formal regulatory aspects of safety leadership. By employing advanced qualitative analysis techniques to visualize relationships between themes, this research provides a nuanced understanding of how safety leadership culture operates in practice while generating context-specific insights for developing culturally appropriate safety interventions in Indonesian industrial settings.

This study aims to investigate how employee behavior at Tuban Group Operation is influenced by safety leadership culture. Specifically, this research seeks to identify the key factors shaping employee perceptions of safety leadership, understand how internal and external factors interact to influence safety behaviors, and provide guidance to company leaders in creating a safer work environment. The benefits of this research are multiple. For academic knowledge, it contributes to the expansion of safety leadership literature in the Indonesian industrial context. For practitioners, the findings offer insights for developing more effective safety leadership strategies. For the company, this research provides evidence-based recommendations for improving safety culture and reducing workplace accidents. For policymakers, the results can inform the development of safety regulations and standards tailored to the Indonesian manufacturing sector. By understanding the impact of safety leadership on employee performance, more effective strategies for improving safety outcomes can be developed, ultimately contributing to the protection of workers and the enhancement of operational effectiveness in the cement industry.

The study provides a valuable lens for examining how leadership, safety culture, and employee engagement intersect in high-risk industrial environments, highlighting the importance of both psychosocial and organizational factors in achieving optimal safety and productivity outcomes.

METHOD

This research employed a qualitative approach with a case study design, chosen because it aimed to deeply understand employees' perceptions of safety leadership culture at the Tuban Cement Factory. To gain a comprehensive understanding of how leaders in the company perceived the safety culture they had established, a qualitative approach was used. The research period began on June 16, 2025. It was expected that reflections on employee experiences, opinions, and attitudes toward safety, as developed by leaders in the Tuban Group Operation company, would be obtained through interviews with various participants holding different responsibilities. Understanding safety psychology is crucial for building a safe workplace (Geller, 2001). Using NVivo 12 Pro qualitative analysis software, thematic analysis techniques were employed to examine the interview data in an attempt to identify emerging patterns or themes. This analysis was expected to help identify the key elements influencing safety leadership culture and employee behavior at the cement plant.

RESULTS AND DISCUSSION

In this study, we selected several employees with varying backgrounds and job responsibilities as participants. The data obtained from the interviews, in the form of voice

interviews, converted into transcripts and imported into NVivo 12 Pro software. The researchers then analyzed the resulting themes or coding.

This is a Word Query that displays text that appears frequently in interviews and words frequently used by participants in the interview process.



Figure 1. Words that frequently appear in interviews with participants
Source: NVivo 12 Pro word query analysis of interview transcripts, 2025

From the data above, we can see that the words frequently mentioned during interviews were safety, work, leader, and safety. Through exploration of the word query feature, we learned that the concept of safety culture developed by the participating leaders is one of a leader who consistently emphasizes safety, safety at work, and being a leader both in themselves and in ensuring the safety of other employees.

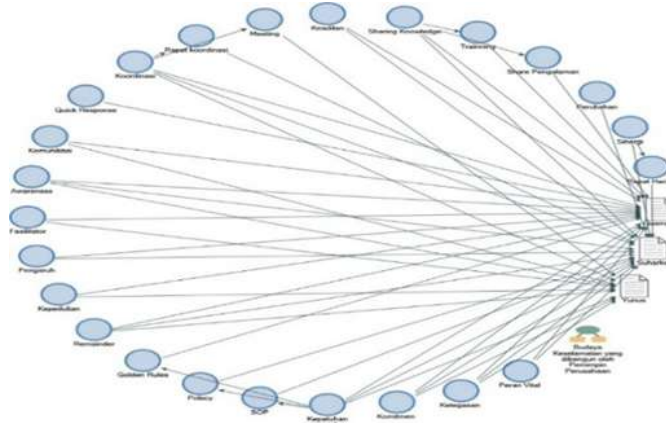


Figure 2. Project Map of Participant Perceptions Regarding Leadership
Source: NVivo 12 Pro project map visualization based on interview coding, 2025

The coding results were interpreted using a project map visualization, as shown in Figure 2 above. Each participant shared their perspective on how a safety culture created by a leader influences the behavior of all employees in their respective work areas.

Because leaders have a leadership mandate in occupational safety, the themes that emerged indicated that a safety culture needs to have conditions that are perceived by participants.

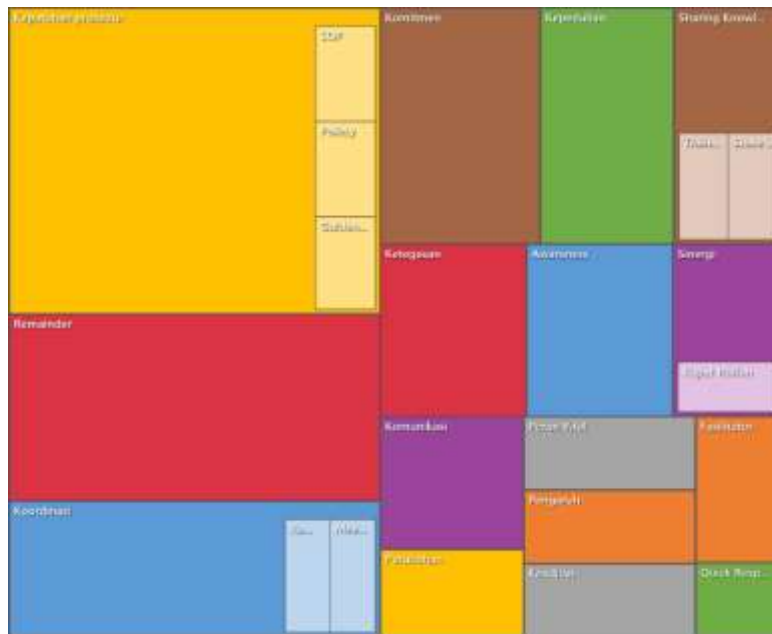


Figure 3. Hierarchy chart comparing the number of code references

Source: NVivo 12 Pro hierarchy chart analysis of coded themes, 2025

From the theme data obtained, Procedural Compliance has the largest size, indicating the most dominant theme, with sub-themes supported by the existence of SOPs (Standards of Procedure), central leadership policies, and the existence of the Safety Golden Rule which serves as a guide for all employee elements to act safely. From the code or theme that is quite dominant, the safety reminder factor that a leader must have is very prominent, accompanied by personal commitment and concern for the leader as well as how to communicate and coordinate. This shows that safety culture is not only formed from the formal aspects of SOPs and policies, but also the quality of leadership. Compliance with safety procedures is the foundation of safety culture and reflects the effectiveness of the managerial system (Clarke, 2013).

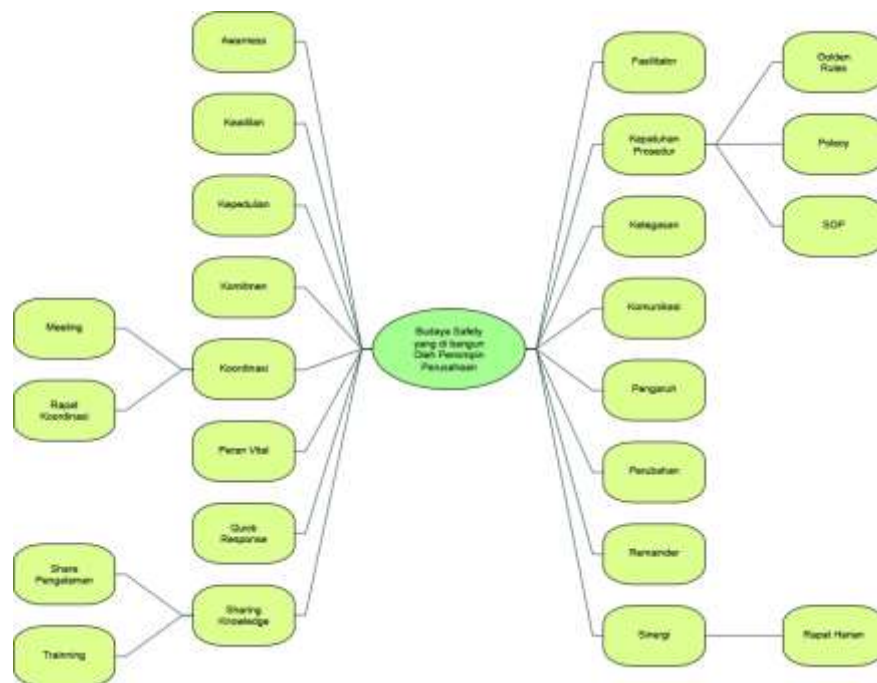


Figure 4. Concept Map of safety culture criteria built by management

Source: NVivo 12 Pro concept map visualization of participant perceptions, 2025

A concept map depicting the key components of safety leadership culture established by company leaders is presented in Figure 3, which is the result of NVivo coding by participants. Within this main theme, subthemes are divided into two directions, from left to right, with perceptions on the left being Psychosocial and Operational Safety Aspects, and on the right being Psychosocial and Operational Safety Aspects.

Psychosocial and Operational Aspects of Safety

The fact that awareness increases workers' understanding of the values of safety, fairness, care, and dedication in the workplace demonstrates a leadership style that focuses on equality and leadership. For leaders tasked with coordinating safety with coworkers and subordinates, this is typically done during meetings and coordination sessions. Open communication, incident reporting, and continuous learning all contribute to a strong safety culture. According to Reason (1997), one of the most important roles of a leader is to serve as a role model for employees and other subordinates. Rapid response is a theme that reflects a leader who responds quickly to incidents or dangerous situations. Hudson (2001) states that a safety culture involves strong teamwork and rapid response.

Aspects of the Regulatory System and Formal Leadership

A safety leader promotes safety and serves as a standard for compliance with protocols, including policies, standard operating procedures (SOPs), and safety golden rules. A leader must also foster a culture of open and honest communication, be firm in enforcing safety regulations, and possess the ability to influence others to change their behavior for the better. A leader's ability to initiate change, demonstrate dedication to progress, and set an example of ongoing safety is the next theme. Finally, a role model must be able to collaborate with all staff members, departments, and lines of business.

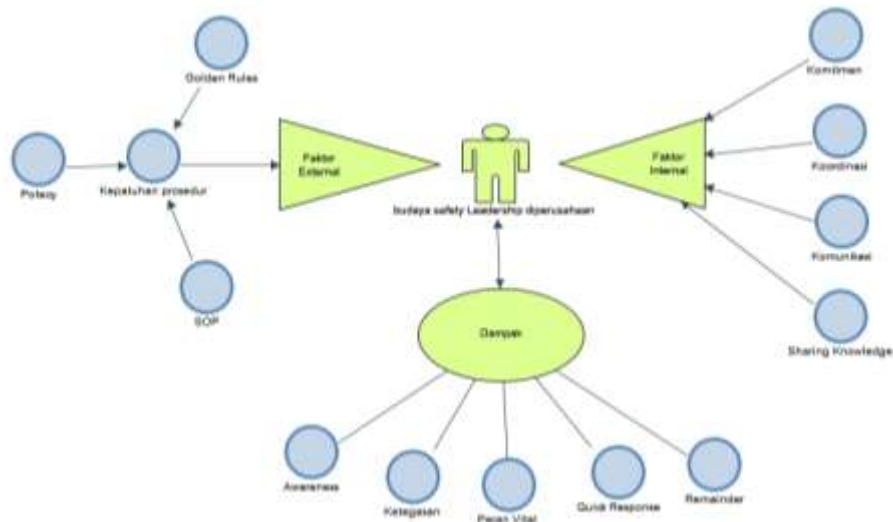


Figure 5. Concept map of safety culture built by leaders

Source: NVivo 12 Pro concept map visualization of integrated themes, 2025

This visualization illustrates how leadership in workplace safety is not just about following rules and procedures; it also relies heavily on the leader's communication style, teamwork, and role modeling .

Employees form perceptions based on how leaders:

1. Implementing safety policies (external)
2. Modeling and facilitating safe (internal) behavior

This Concept Map illustrates how the safety leadership culture in cement companies is formed from two main factors from the mapping results, namely:

External Factors

These factors are structural or policy-based and originate from outside the individual, but influence safety behavior:

Procedure Compliance, which is formed by:

1. Safety Policy
2. SOP (Standard Operating Procedure)
3. Golden Rules (The Main Rules of Safety)

Internal Factors

This factor is more about the psychological and social aspects within the organization, especially from the leaders:

1. Commitment: consistency and integrity in implementing safety values.
2. Coordination: collaboration between teams in managing risks.
3. Communication: openness and assertiveness in conveying safety messages.
4. Sharing Knowledge: the process of sharing safety information openly.

Impact on Safety Leadership Culture

The combined results of internal and external factors shape employee perceptions of the effectiveness of the safety culture established by leaders. These impacts are seen in the following forms:

1. Awareness of the importance of work safety.
2. The leader's firmness in enforcing safety rules.
3. The vital role of leadership as a safety role model.
4. Quick Response to emergency situations or unsafe incidents.
5. Reminder – there is a constant reminder of potential risks and safety procedures.

CONCLUSION

This study found that employee safety behavior at the high-risk Tuban Group Operation factory is strongly influenced by leadership's safety culture, with both external and internal factors shaping employee perceptions. External factors include compliance with Standard Operating Procedures (SOPs), safety policies, and Golden Rules, while internal factors encompass leadership characteristics such as commitment, concern for employees, effective coordination and communication, role modeling, and rapid, synergistic responses across work lines. Internal factors, by fostering awareness and encouraging safe behaviors, contribute to a positive safety climate, demonstrating that effective leadership is as critical as formal policies for establishing a strong safety culture. These findings provide valuable guidance for management to enhance leadership-based safety strategies and develop human-centered training programs. For future research, quantitative studies could examine the statistical relationships between internal and external factors and safety performance, longitudinal research could track the evolution of safety leadership culture over time, and comparative studies across similar industries in Indonesia could identify best practices to support the development of a sustainable safety culture that protects employees while improving operational performance and company reputation.

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