

## **The Influence of Safety Performance for Hauling Operators at PT. XYZ**

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### **ABSTRACT**

*Occupational safety is a crucial issue in the mining industry, given the high risk of accidents that can occur in the field. The mining industry plays an important role in the economy of many countries, especially those rich in natural resources. The purpose of the research is to analyze the effect of safety culture and work environment on safety performance. This research uses quantitative analysis with survey methods. The sample in the study was 154 hauling operators and the analysis tool used SEM-PLS. The research results state that there is a positive and significant influence on safety culture and the work environment on safety performance. This suggests that the results of the study can provide a strong basis for companies to develop and strengthen safety culture programs that focus on increasing awareness and compliance with safety procedures among hauling operators. In addition, improvements in the design and condition of the work environment can create a safer and more comfortable working environment, which in turn will improve safety performance and operator productivity. The implications of the research show that a good safety culture and work environment significantly improve the safety performance of hauling operators at PT XYZ. To improve safety, the company should intensify safety training and rewards, improve working conditions, and adopt the latest safety technologies and procedures. With these measures, PT XYZ can reduce work incidents, increase productivity and strengthen its safety reputation.*

**Keywords:** Safety Culture, Work Environment, Safety Performance, Freight Operators.

### **ABSTRAK**

Keselamatan kerja merupakan isu krusial dalam industri pertambangan, mengingat tingginya risiko kecelakaan yang dapat terjadi di lapangan. Industri pertambangan memainkan peran penting dalam perekonomian banyak negara, terutama negara yang kaya akan sumber daya alam. Tujuan dari penelitian ini adalah untuk menganalisis pengaruh budaya keselamatan dan lingkungan kerja terhadap kinerja keselamatan. Penelitian ini menggunakan analisis kuantitatif dengan metode survei. Sampel dalam penelitian sebanyak 154 operator hauling dan alat analisisnya menggunakan SEM-PLS. Hasil penelitian menyatakan terdapat pengaruh positif dan signifikan budaya keselamatan dan lingkungan kerja terhadap kinerja keselamatan. Hal ini menunjukkan bahwa hasil studi ini dapat memberikan dasar yang kuat bagi perusahaan untuk mengembangkan dan memperkuat program budaya keselamatan yang berfokus pada peningkatan kesadaran dan kepatuhan terhadap prosedur keselamatan di kalangan operator pengangkutan. Selain itu, perbaikan desain dan kondisi lingkungan kerja dapat menciptakan lingkungan kerja yang lebih aman dan nyaman, yang pada akhirnya akan meningkatkan kinerja keselamatan dan produktivitas operator. Implikasi penelitian menunjukkan bahwa budaya keselamatan dan lingkungan kerja yang baik secara signifikan meningkatkan kinerja keselamatan operator pengangkutan di PT XYZ. Untuk meningkatkan keselamatan, perusahaan harus mengintensifkan pelatihan dan penghargaan keselamatan, meningkatkan kondisi kerja, dan mengadopsi teknologi dan

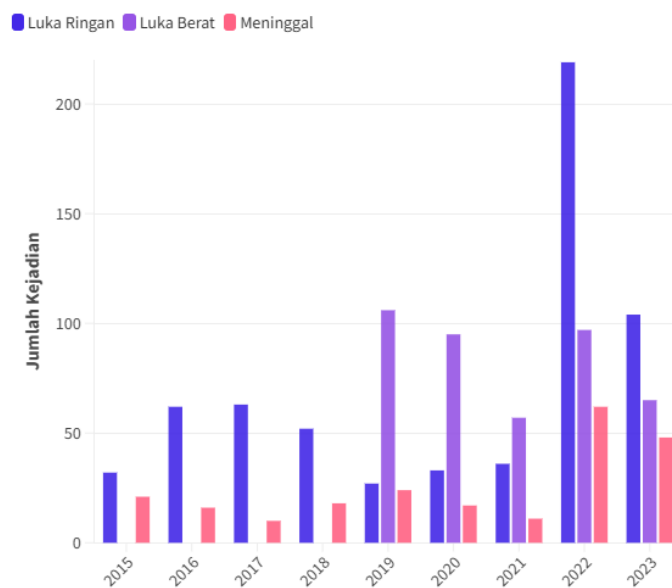
prosedur keselamatan terkini. Dengan langkah-langkah tersebut, PT XYZ dapat mengurangi insiden kerja, meningkatkan produktivitas dan memperkuat reputasi keselamatannya.

**Kata kunci:** Budaya Keselamatan, Lingkungan Kerja, Kinerja Keselamatan, Operator Pengangkutan.

## INTRODUCTION

Occupational safety is a crucial issue in the mining industry, especially given the high risk of accidents in the field. The industry plays an important role in the economies of many countries, especially those rich in natural resources. In the mining sector, transportation activities are essential to transport mining materials from extraction sites to processing facilities or further transportation points. The use of specialized heavy equipment and trucks designed to efficiently transport heavy loads has a significant impact on the overall productivity of mining operations. (Bodziony & Patyk, 2024). Efficiency in the transportation process is critical as delays or disruptions in transportation can cause significant operational delays and increased costs (Hrušovský et al., 2021).

Modern technology has revolutionized mining transportation with the introduction of automated trucks, GPS-based fleet management systems and advanced analytics software. These innovations have enabled mining companies to optimize routes, monitor vehicle conditions, and reduce fuel consumption, thereby improving operating efficiency (Bodziony & Patyk, 2024). However, safety remains a major concern due to the high risks involved for workers and the surrounding environment. The spread of dust enriched with heavy metals from mining activities can have detrimental effects on vegetation and ecosystems along toll roads, emphasizing the importance of measures to mitigate environmental impacts (Neitlich et al., 2022).



**Figure 1. Number of Mine Accidents 2015-2023**

According to data from the Ministry of Energy and Mineral Resources (ESDM), the total work accidents that resulted in casualties in the 2021-2023 period increased compared to previous years. In 2021 there were 104 cases with 11 fatalities, increasing to 378 incidents with 62 fatalities in 2022, and 217 incidents with 48 fatalities in 2023 (Modi.Esdm.Go.Id, 2024). At PT XYZ, there were various incident phenomena throughout 2023, mostly caused by deviations from standard procedures, neglect of safety rules, and wrong operator decisions. This reflects the lack of implementation of a strong safety culture and a work environment that does not support safe operations.

A strong safety culture, characterized by elements such as safety leadership, employee participation, safety communication, ongoing safety training, and an effective incident reporting system, can improve safety awareness and behavior among transportation operators (Naji et al., 2021). Proactive safety leadership and ongoing safety training are critical in improving employee engagement and open communication on safety issues (Olaniyi et al., 2023). Supportive work environment factors such as proper lighting, ventilation, workplace cleanliness, and provision of standard safety equipment also contribute significantly to safety performance (Olanipekun & Jiboku, 2021).

Based on the phenomena that occur, it can be concluded that the influence of safety culture and work environment on safety performance for hauling operators at PT XYZ can be seen from the various factors that cause the biggest accidents that have been identified. Deviation from standard practices and procedures, neglect of safety rules, and wrong decisions are the main contributions to accidents. This reflects the lack of a strong safety culture and a work environment that does not support safe operations. Increasing safety culture and improving a safer and more structured work environment is essential to improve safety performance for hauling operators at PT XYZ. Previous studies support that a strong safety culture is associated with improved safety performance across a range of industries from Abeje & Luo, (2023); Al-Bayati, (2021); Djanuar et al., (2024); Hu et al., (2021); Husainah et al., (2024); Stemn et al., (2019).

## **REVIEW OF LITERATURE**

### **Organizational Culture Theory**

Organizational Culture Theory, as pioneered by experts such as Schein 1992. Schein (1992), Organizational Culture is the basic pattern adopted by the organization to act and solve problems, develop personnel who are able to adapt to their environment, and unite organizational members (Deliana, 2020). Organizational Culture Theory studies how shared values, norms, beliefs, attitudes, and behaviors within an organization influence the interactions and operations of individuals within it (Aryani & Widodo, 2020). The theory emphasizes that organizational culture is more than just “the way we do things here” and significantly impacts overall organizational performance, including productivity, innovation, job satisfaction, and safety performance. Schein's model identifies three levels of organizational culture: artifacts (external physical manifestations and behaviors), values (shared beliefs and

principles), and basic assumptions (unconscious beliefs that underlie actions and decisions). Understanding this theory provides a solid foundation for understanding how organizational culture is formed, changed, and plays a critical role in achieving organizational goals (Khripunov, 2023).

### **Safety Performance**

Safety Performance in the context of carrier transportation refers to the comprehensive evaluation and measurement of safety practices implemented during transportation operations to ensure the safety and well-being of individuals involved in the carrier process (Kock et al., 2021). Safety Performance includes adherence to proper safety procedures, use of appropriate personal protective equipment, risk management during operations, and compliance with safety regulations (Khalid et al., 2021). In addition, safety performance assessment includes measuring the rate of accidents, incidents, or injuries that occur during transportation, which requires analyzing the causes of incidents and incident reporting, investigating to understand contributing factors, and implementing corrective actions to prevent future occurrences. safety performance indicators according to Demirkesen, (2020): 1) Safety Training, 2) Safety Commitment, 3) Safety Inspection and Monitoring, 4) Safety Leadership, 5) Safety Incentives.

### **Safety Culture**

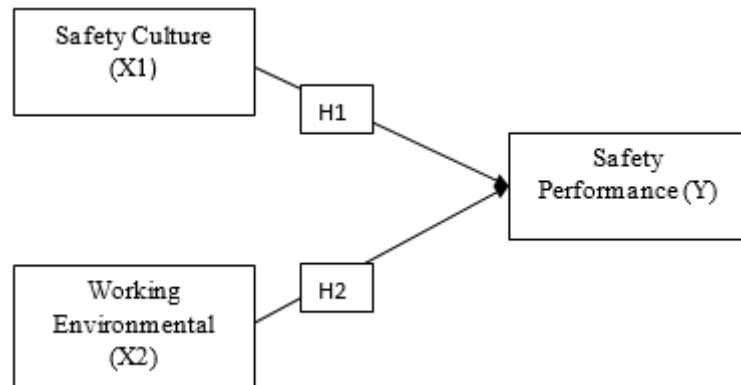
Work safety is an effort to be able to carry out work without accidents, creating a safe working atmosphere or environment, so that profitable results can be obtained free from all kinds of threats. Safety Culture refers to the attitudes, beliefs, perceptions, and values that employees have with respect to safety in the workplace (McLeod & Curtis, 2022). This includes the organization's commitment to safety, the priority given to safety by all levels of employees, and the extent to which safety is integrated into daily work practices. Safety culture indicators adapted from company regulations containing safety culture commitments for operators based on Minister of Mining Decree No.555.K/26/M.PE/1995 regarding general mining occupational safety and health are: 1) Safety equipment, 2) Time discipline, 3) Honesty in checking procedures, 4) Carrying out P2H procedures, 5) Obeying activity regulations in the vehicle, 6) Horn signals 1,2,3, 7) Aware of fatigue symptoms, 8) Speed balance, 9) Safety distance procedures, 10) Mine vehicle parking regulations.

### **Work Environment**

The work environment refers to the physical and psychological conditions in the workplace that include aspects such as facilities, cleanliness, lighting, and working relationships between individuals (Nurudia, 2024). This definition highlights that the work environment is not only limited to the physical space in which to work but also involves social and psychological interactions between individuals that can affect task execution and performance. A good work environment includes aspects that support employee well-being and productivity, such as adequate facilities, safe working conditions, and positive working relationships between individuals (Triono & Aditya, 2024). Indicators of the work environment according to Sugiono et al, (2020): 1)

Safety in Design, 2) Housekeeping, 3) Occupational Health and Safety/Industrial Hygiene.

### Hypotheses



**Figure 2. Model Hypothesis**

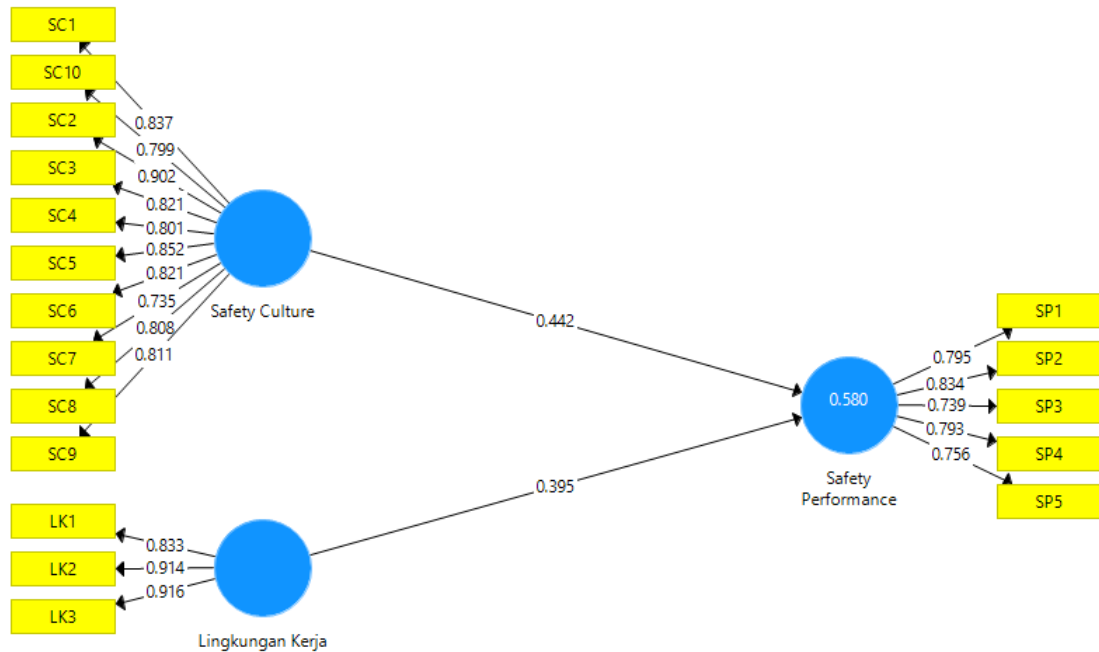
**H1: Safety Culture affects Safety Performance**

**H2: Work Environment affects Safety Performance**

### RESEARCH METHOD

This research is quantitative in nature using the survey method. The population consists of all research objects, namely hauling operators who are collected as data sources and samples. The population is based on the sampling method (Alhayar, 2020). The population in this study amounted to 250 respondents, which were later reduced using the Slovin formula. Based on the calculation of the Slovin formula with a tolerance limit of 5%, a research sample of 154 respondents was obtained. The data collection method uses a questionnaire distributed via google form. Quantitative data is carried out validation test, reliability test, R-square (R<sup>2</sup>) test, and hypothesis testing which is processed using SEM with Smart PLS software (Ghozali & Latan, 2017).

**RESULT AND DISCUSSION**



**Figure 3. Outer Model**

Source: Primary Data Processed (2024)

**Validity Test**

The outer loading values and average variance extracted (AVE) values can be used to analyze the convergent validity test. Ghozali & Latan, (2017) define a valid indication as one with an outer loading value greater than 0.7 and an AVE value greater than or equal to 0.5. The following table displays the outer loading values and AVE values for this study.

**Table 1. Outer Loading**

Variable	Indicator	Outer Loading	Ave	Description
Safety Culture	SC1	0,845	0,671	Valid
	SC2	0,902		Valid
	SC3	0,823		Valid
	SC4	0,785		Valid
	SC5	0,846		Valid
	SC6	0,819		Valid
	SC7	0,741		Valid
	SC8	0,811		Valid
	SC9	0,819		Valid
	SC10	0,788		Valid
Work Environment	LK1	0,852	0,791	Valid
	LK2	0,914		Valid
	LK3	0,901		Valid
Safety Performance	SP1	0,813	0,611	Valid

Variable	Indicator	Outer Loading	Ave	Description
	SP2	0,800		Valid
	SP3	0,731		Valid
	SP4	0,777		Valid
	SP5	0,786		Valid

Source: Primary Data Processed (2024)

The table shows that all research variables have an AVE value that exceeds the conventional criterion of 0.5.

### Reliability Test

Composite Reliability and Cronbach's Alpha values will be used to evaluate indicators' reliability in measuring latent variables. Cronbach's Alpha and Composite Reliability scores should be at least 0.7 (Ghozali & Latan, 2017). The following table displays Cronbach's Alpha and Composite Reliability values.

**Table 2.**  
**Composite Reliability and Cronbach's Alpha**

	Composite Reliability	Cronbach's Alpha
Working Environmental	0,918	0,867
Safety Culture	0,953	0,946
Safety Performance	0,889	0,843

Source: Primary Data Processed (2024)

Based on the table above, the Composite Reliability and Cronbach's Alpha values reveal variable values more than 0.7, implying that all variables are very reliable.

### R-Square Test

The following is the R-Square value in this study:

**Table 3.**  
**R-squared and Adjusted R-squared**

	R Square	R Square Adjusted
Safety Performance	0,580	0,574

Source: Primary Data Processed (2024)

Based on the data from Table 3, we can conclude that the combined effect of safety culture and working environment on safety performance with an Adjusted R-squared value of 0.580 is deemed moderate to strong.

**Hypothesis Test**

**Table 4. Hypothesis Value**

	<b>T Statistics ( O/STDEV )</b>	<b>P Values</b>	<b>Descriptio n</b>
Working Environmental -> Safety Performance	2,662	0,008	Significantl y
Safety Culture -> Safety Performance	3,368	0,001	Significantl y

Source: Primary data processed (2024)

**H1: The Effect of Safety culture on Safety Performance**

The results of hypothesis testing show the effect of Safety Culture on Safety Performance has a statistical T value greater than the T table ( $3.368 > 1.975$ ) and a P value of 0.001 or smaller than the 5% alpha standard ( $0.001 < 0.05$ ) indicating there is a significant effect of Safety Culture on Safety Performance. So it can be concluded that the influence is positive and significant. In other words, the first hypothesis (H1) is accepted. The results showed that Safety culture is an important factor in influencing safety performance in various industries, including the transportation sector in the mining industry. The relationship of safety culture to safety performance is based on the premise that a strong security culture, characterized by elements such as security leadership, employee participation, security communication, ongoing security training, and an effective incident reporting system, can increase security awareness and behavior among transportation operators (Naji et al., 2021). Research results supported by Al-Bayati, (2021); Hu et al., (2021); Stemn et al., (2019) shows that safety culture effect on safety performance.

**H2: The Effect of Working Environmental on Safety Performance**

The results of hypothesis testing show that the effect of the Work Environment on Safety Performance has a statistical T value greater than the T table ( $2.662 > 1.975$ ) and a P value of 0.008 or smaller than the 5% alpha standard ( $0.008 < 0.05$ ) indicating that there is a significant effect of the Work Environment on Safety Performance. So it can be concluded that there is a positive and significant influence. In other words, the Work Environment is able to improve Safety Performance, or the second hypothesis (H2) is accepted. The results showed that the belief that factors such as physical workplace conditions, adequate equipment, ergonomics, management and peer support can improve safety and performance among hauling operators. The results of this study are supported by Djanuar et al., (2024) and Husainah et al., (2024) shows that the work environment affects employee performance in the case of this study is the safety performance of hauling operators.

The results of the study can provide a strong basis for companies to develop and strengthen safety culture programs that focus on increasing awareness and compliance with safety procedures among hauling operators. In addition, improvements in the design and condition of the working environment can create a safer and more comfortable working atmosphere, which in turn will improve safety

performance and operator productivity. Furthermore, the findings can be used to inform company policies and operational standards that are more effective in minimizing the risk of occupational accidents. Thus, this research not only contributes to the improvement of work safety but also to operational sustainability and employee welfare at PT XYZ, on the other hand, employees who work as hauling operators are advised to comply with existing regulations and carry out all tasks in accordance with work SOPs to minimize work accidents.

## CONCLUSION

Based on research on the influence of safety culture and work environment on safety performance for hauling operators at PT XYZ, it was found that both had a positive and significant effect. A strong safety culture and a supportive work environment significantly improve the safety performance of hauling operators. The managerial implication of these findings is the importance of strengthening safety culture and improving the work environment to improve occupational safety and health. Management should demonstrate proactive leadership, provide ongoing safety training and encourage open communication on safety issues. Regular evaluation of work environment conditions and provision of adequate safety equipment are also necessary. By implementing these measures, PT XYZ can reduce workplace accidents and create a safer and healthier work environment.

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