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Analysis of The Influence of Safety Culture, Safety Leadership, And Safety Knowledge on Safety Performance in Coal Mining Companies in Berau

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Abstract:

Occupational safety is crucial for workers in the mining industry, who are involved in tasks such as machine maintenance, heavy equipment mechanics, and welding. These activities carry a high level of risk because coal mining workers operate a lot of heavy machinery, leading to significant risks of workplace accidents or occupational diseases. This final project aims to assess the impact of Safety Culture, Safety Leadership, and Safety Knowledge on Safety Performance to reduce workplace accidents. The research employs Multiple Linear Regression. The data analysis results indicate that Safety Leadership, Safety Knowledge, and Safety Culture all have a significant positive effect on Safety Performance. This means that improvements in Safety Leadership, Safety Knowledge, and Safety Culture correspond to improvements in Safety Performance, thereby reducing workplace accidents.

Keywords*: Safety Leadership, Safety Knowledge, Safety Culture, Safety Performance, Multiple Linear Regression.*

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1. Introduction

Safety plays an important role in production. Consumers today consider this factor as one of the criteria when choosing products or services (Shneiderman, 2020). A company that can produce high-quality products must also pay attention to safety factors in every stage of the process (Tseng et al., 2021). The process here can be associated with the steps involved in producing both products and services.

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The mining industry is an industry that processes natural resources by taking and processing mining materials to produce final products needed by humans. Mining materials are classified into three: metals such as gold, copper, tin; industrial minerals such as granite, andesite, sand; and energy minerals such as coal, oil and gas (Kalisz et al., 2022). Every industry must have important safety procedures in its work environment. A comfortable and safe work environment is needed by workers to work optimally so as to support increased worker performance and productivity and reduce the incidence of occupational diseases and work accidents (Mora et al., 2020). Work accidents such as injuries, respiratory system disorders, and even death can occur in the mining industry. So it must be used as a basis for behaving and behaving in a safety culture in the company. Work safety culture has the ability and is an important component that discusses individual safety, performance safety, and several things prioritized by safety organizations (Bisbey et al., 2021).

Safety culture is becoming more important in the mining sector because mining activities have a high level of risk and potential hazards. The production process uses many types of mobile heavy equipment, which causes a high rate of work accidents due to the interaction between large vehicle units and workers at work, potential landslides in the work area, and many other hazards in the gold mining work area (Jiangshi Zhang et al., 2020). Therefore, safety culture as an organizational culture is needed to reduce and prevent work accidents that have an impact on motivation and job satisfaction so that it affects employee performance (Neal and Griffin, 2004).

Based on data from the Ministry of Energy and Mineral Resources (ESDM), there were 881 cases of mining accidents that occurred in Indonesia in 2013-2021. Of these, the most mining accidents occurred in 2019, namely 159 cases. The number then continued to decline to 104 cases in 2021. Meanwhile, the majority of mining accidents that occurred in 2021 had severe severity. The number was recorded as many as 57 cases. There were 36 minor mining accidents last year. Meanwhile, there were 11 mining accidents that caused deaths last year. In addition, work accidents usually occur due to two factors, where these factors consist of humans and the environment. Human factors, are unsafe behaviors made by humans, such as deliberate violations of mandatory safety regulations or lack of skills of workers.

PT. XYZ is one of the Company's contractors in Berau Regency, East Kalimantan engaged in the coal mining industry. Employees of PT. XYZ is engaged in repairs such as engine *maintenance*, heavy equipment mechanics and welding. This job has a tendency to a high level of risk. This is because coal mining workers work using a lot of heavy equipment so that they have a big risk of either work accidents or occupational diseases. Working with great risk requires employees to recognize *Safety Culture, safety leadership*, and *safety knowledge* to achieve *safety performance* in employees to prevent work accidents. Both work accidents that result in injury and death.

Safety *performance measurement* in companies is only done by looking at competency variables. The result of measuring *safety performance* in the company seen from the competency variable is the achievement of 100%. Meanwhile, in the company there are still accidents and violations that occur. One of the accidents that occurred was the puncture of a worker's finger with a hot iron when installing nuts or bolts while violations that still often occur are non-compliance of workers in the use of PPE (personal protective equipment). So that the results of *the safety performance* assessment at the company are inversely proportional to the actual situation in the field. So this study needs to be done to measure *safety performance*

with other variables that look at the indicators of *safety leadership, safety knowledge*, and *safety culture* where these three variables are variables that can affect *safety performance* in the company namely safety culture, safety leadership, and safety knowledge.

Problem Statement :

"How the influence of *Safety Culture, safety leadership*, and *safety knowledge* on *safety performance* using the multiple linear regression method on PT. XYZ as well as recommendations from the results of influence?"

Research Objectives :

The goal to be achieved in this final project research is to determine the influence of *Safety Culture, safety leadership*, and *safety knowledge* on *safety performance* so as to minimize the occurrence of work accidents.

2. Theoretical Background

Safety Leadership

According to Jiangchi Zhang et al. (2020), safety behavior is influenced by many factors, one of which is *safety leadership*. This *safety leadership* factor is considered a key factor to minimize the occurrence of worker errors. This is because *safety leadership* is a form of interaction carried out by the leader to his subordinates so that it can affect the achievement of safety goals both within the scope of the organization and individual subordinates (Lyubykh et al., 2022).

According to Jiangchi Zhang et al. (2020) the results of the study show that there is a significant relationship between *safety leadership* and *safety performance*. This is because *safety leadership* is a form of motivation, encouragement, and coordination to solve safety and health problems from superiors or supervisors of each work unit to workers (Zhao et al., 2021).

Safety Knowledge

According to Winarto et al. (2020), knowledge is the ability to know and describe information obtained from the results of vision and hearing. Vision and hearing results are obtained through learning, information media both print and electronic and one's experience. Knowledge is the result of knowing, and this happens after people sense a certain object. Employees with extensive *safety knowledge* tend to know what risks will be obtained if they do not pay attention to K3. Employees with narrow *safety knowledge* tend to be unaware of K3 behavior when doing practice because they do not know exactly what risks will be faced if they do not pay attention to *safety knowledge* (Ahmad, 2022). *Safety knowledge* can be improved by the way the company provides special socialization about K3 and the desire from within the employee to pay attention to K3 (Aziz and Anggraeni, 2021).

According to Putra et al. (2022), *safety knowledge* has a significant effect on *safety performance*. This means that the safety of knowledge can directly prevent work accidents in the company. The more information about the K3 value received by Workers, the more

Workers can find out the sources of hazards that are at risk of causing work accidents. This information could be in the form of training or an experience mentoring process regarding the value of K3 among workers.

Safety Culture

According to Solmaz et al. (2020), *safety culture* itself has a definition of an organization's collective practice and the characteristics of the group and organization itself. Safety culture includes the application of safety values, effective, beneficial and safe attitudes, the creation of a healthy and safe work environment, and the application of legal systems and management methods (Tappura et al., 2022). And there is some consensus that safety culture establishes the framework within organizations that defines worker behavior as well as worker performance (Arzahan et al., 2022).

According to F. Saleem et al. (2021) research, based on the results of multiple linear regression analysis, it shows that *work culture safety* has a positive and significant influence on *safety performance*. The significant influence between *safety culture* on *safety performance* means that the higher the application of *safety culture* in a company, the higher the impact on employee *safety performance*.

***Safety Leadership* (X1)**

According to Syakur et al. (2020), every organization has a culture that has a significant influence on behavior for members of the organization. A strong organizational culture will provide stability to the organization. Robbins et al. (2015) define organizational culture as a system of sharing meaning carried out by members that distinguishes the organization from other organizations. Based on world-class best practices, gold mining companies have implemented safety systems, procedures and regulations that are adhered to as part of a safety culture that includes all systems, procedures, workers and even guests visiting the mine site.

On the other hand, motivation becomes one of the most researched topics in the study of organizational behavior. Robbins et al. (2015) define motivation as a process that explains a person's strength, direction, and perseverance in an effort to achieve a goal. The theory of motivation is best known as Abraham Maslow's hierarchy of needs theory. Maslow hypothesized that in every human being there is a hierarchy of needs consisting of five things: physical/physiological, security, social, reward, and self-actualization (Mkpojiogu et al., 2022). In addition, job satisfaction reflects the extent to which a person likes his job. Transformational leaders should be able to set an example as a role model for their employees, be able to encourage employees to behave creatively, innovatively and be able to solve problems with new approaches. In addition, transformational leaders should also care about the problems faced by employees and always provide motivation in order to improve performance so that job satisfaction will be created for their employees (Shafi et al., 2020). If the leader cannot set an example as a role model for his employees, this problem allows job dissatisfaction from employees and can result in company goals cannot be met optimally.

According to Peker et al. (2022), Supervisor behavioral integrity relates to engaging in work-related behavior through two different processes. First, behavioral integrity conveys the message that the boss is sincere in his words, which further engenders employee trust in his superior. Both theory and research provide support for the role of employee trust in supervisors

in explaining safety and performance behavior. Second, behavioral integrity also conveys the message that safety is valued under different circumstances, thus encouraging predictability in employee tasks.

Safety leadership has three indicators according to bin Zulkifly et al. (2022) Namely *safety motivation*, *safety concern* and *safety policy*. *Safety motivation* is an encouragement given by the leader to his subordinates to behave safely. *Safety motivation* from this leader can be in the form of giving awards to workers who provide examples of safety behavior at work, giving praise to workers who have safety behavior at work, providing incentives or bonuses for workers who apply safety behavior at work, encouraging workers to report every work accident without punishment, encouraging workers to provide advice on safety at work, The leader's trust in each worker, and encouragement to workers to participate in meetings that discuss safety at work (Fruhen et al., 2022). Furthermore, *safety policy* is a clear determination of mission, responsibility, and vision from the leadership to set safety behavior standards for workers to be better. Safety policy can be in the form of providing an explanation of safety regulations at work, the leader's concern for a safe work environment, making regulations on work safety by the leader, and explaining the purpose of safety regulations at work. And the last is *safety concern* is the attention given by leaders to workers related to the enforcement of safety rules and policies that support the development of work safety in doing their work (Cheng et al., 2020). *Safety concern* from the leader can be in the form of emphasis on workers about the importance of using protective equipment, the leader's interest in worker safety behavior at work, the leader's concern for the development of safety at work, the leader's cooperation with other divisions in order to realize safety at work, and the leader's attention to the safety of each worker (Xue et al., 2020).

***Safety Knowledge* (X2)**

According to Winarto et al. (2020), Knowledge is the ability to know and describe information obtained from the results of vision and hearing. Vision and hearing results are obtained through learning, information media both print and electronic and one's experience. Knowledge is the result of knowing, and this happens after people sense a certain object. Employees with extensive K3 knowledge tend to know what risks will be obtained if they do not pay attention to K3. Employees with narrow K3 knowledge tend to be unaware of K3 behavior when doing practice because they do not know exactly what risks will be faced if they do not pay attention to K3. K3 knowledge can be increased by the way the company provides special socialization about K3 and the desire from within the employee to pay attention to K3.

According to Fan et al. (2021) stated that knowledge or cognitive is an important domain in the formation of one's actions *(overt behavior*) because someone who behaves based on knowledge will be more lasting than behavior that is not based on knowledge. From this statement, it is concluded that employees who have K3 knowledge will affect the performance of these employees.

Meta-analytical findings have shown that proximal individual factors (e.g. *safety knowledge*) are more closely related to safety behavior. Safety knowledge refers to the extent to which safety-related workers' understanding includes safety-related operating facts, regulations, and procedures (Neal and Griffin, 2004). Research conducted found that individuals who are more knowledgeable about target behavior (safety) engage in improved cognitive processes about that behavior that can result in changes in the evaluation of target behavior. With *safety*

knowledge, it is expected to show an increase in *safety behavior* by increasing awareness and understanding of the reality of work and workplace safety so that the risk of accidents will be lower (Yu et al., 2021).

Safety knowledge is knowledge about safety. Where *Safety knowledge* is measured by 3 indicators from Vinodkumar and Bhasi, namely: a) knowledge of using safety equipment; b) knowledge of the types of *hazards* and c) understanding *of emergency* actions (Putranti et al., 2023). Knowledge of using safety equipment is the worker's understanding of safety equipment and equipment, for example, helmets, masks, goggles and *safety* shoes (Mursid and Herawati, 2023). Knowledge of the types of *hazards. Hazard* is anything that can potentially become a danger even *an accident* or *incident.* Knowledge of this type of hazard focuses on the extent to which workers understand about hazards in the workplace (Uddin et al. 2020). And the last is understanding actions during *emergencies*, this indicator focuses on workers, how workers respond in dealing with emergencies.

***Safety Culture* (X3)**

According to Badia (2021), the term safety culture first appeared in a report prepared by the International Atomic Energy Agency (IAEA) following the nuclear accident known as the Chernobyl disaster in 1986. Since then, investigations into major accidents and safety failures, such as the Piper Alpha oil platform explosion *and* the Clapham Junction *rail disaster*, have revealed errors in the organisational structure and safety management system. A public inquiry report argued that a poor safety culture was the cause of accidents.

Safety is a vital aspect in all industrial sectors because it concerns human welfare and life. Safety has become a social and moral responsibility. The norm in today's society is the right of every employee to go home safely every day and employees should not be treated as objects to achieve company goals. A company's reputation is at stake when it does not implement appropriate safety measures to protect the safety and well-being of its employees. In addition, because safety can be enforced in law, the lack of a safe environment can lead to claims and claims that can incur additional costs, delay projects, cause adverse media information, and threaten the company's financial condition. Employee well-being and life as well as social and moral responsibility are not the only reasons for organizations of various industries to consider safety (Macassa et al., 2021).

According to (Casey et al., 2022) in general, each model and theory of *safety culture* focuses on three dimensions, namely psychological, organizational, and behavioral dimensions. All three act as preventive measures to reduce accidents and to build a safety culture and can be applied in various industries. In its development, safety culture is also used to explain everything related to safety, errors and errors in various fields. Some experts have explained the meaning of safety culture. Safety culture is a combination and reflection of the behaviors, beliefs, perceptions and values spread among workers in relation to safety. Meanwhile, the *International Safety Advisory Group* defines *safety culture* as a combination of character and behavior within the organization and individuals that make safety issues a top priority.

According to (Bisbey et al., 2021) Safety culture is part of organizational culture that is influenced by the behavior of its members in the framework of safety performance. Safety culture indicators that are thought to affect the level of compliance with PPE use include

knowledge, attitudes towards regulations, personality, equipment availability, training, and motivation.

According to Nævestad et al. (2020), *Safety culture* itself has a definition of an organization's collective practices and the characteristics of the group and organization itself. Safety culture includes the application of safety values, effective, beneficial and safe attitudes, the creation of a healthy and safe work environment, and the application of legal systems and management methods. And there is some consensus that safety culture establishes the framework within organizations that defines worker behavior as well as worker performance. There are also many definitions of safety culture that emphasize organizational, systemic, and individual aspects. All of these definitions are similar, but presented in a way that offers different levels of thought or action to ensure work.

Safety culture has also been considered an active indicator in much of the safety literature today and is a crucial and fundamental resolution method for lowering accident rates in the industry. There are four *safety culture* indicators, namely attention in the determination of K3 policies, these indicators focus on the extent to which K3 rules and procedures are understood and run smoothly. Furthermore, openness in K3 this indicator focuses on the extent to which workers obtain information related to K3. Furthermore, the description of worker competence of this indicator focuses on the extent of knowledge, *skills* and responsibilities of workers regarding K3. And finally, ensuring a conducive work environment, this indicator focuses on the extent to which companies create a safe and healthy work environment (Atikasari et al., 2022).

***Safety Performance* (Y)**

Nguyen et al. (2020) stated that employee performance is a function of the interaction between ability and motivation. Employee performance refers to a person's achievements measured based on standards or criteria set by the organization. Employee performance is the result of performance that can be achieved by a person or group of people in an organization both qualitatively and quantitatively, in accordance with their respective authorities, duties, and responsibilities in an effort to achieve the goals of the organization concerned legally, not violating the law, and in accordance with morals or ethics.

According to M. S. Saleem et al. (2022), *Safety Performance* is work behavior related to the safety of workers in doing their work. The role of the workforce is also needed to support the successful implementation of safety and work success, namely by displaying safety performance. *Safety performance* is a model of occupational safety behavior from Neal and Griffin (2004) which is based on performance theory (*job performance*) (Neal and Griffin 2004). States that the *performance* component shows large dimensions of behavior relevant to a given task. This model combines two dimensions of *safety performance*, namely compliance and participation. Compliance is the involvement and adherence to safety procedures and carrying out work in a safe manner, preparing and using appropriate safety equipment in work.

The Relationship between Safety Leadership and Safety Performance

According to Jiangchi Zhang et al. (2020), there is a significant relationship between *safety leadership* and *safety performance*. This is because *safety leadership* is a form of motivation,

encouragement, and coordination to solve safety and health problems from superiors or supervisors of each work unit to workers Other research explains that *safety leadership* has a significant and positive direct influence on employee *safety performance*. This shows that *safety leadership* can provide examples of behavior towards employees to work harder, more efficiently and take responsibility for improving *safety performance*. Based on the calculation of safety leadership variables on safety performance, *a p-value* of 0.009 (0.009 < 0.05) was obtained which shows that safety leadership variables are proven to have a positive and significant influence on safety performance. Therefore, properly executed safety leadership will affect safety performance which will improve as well.

The relationship between Safety Knowledge and Safety Performance

According to Putra et al. (2022), *safety knowledge* gives a significant effect on *safety performance*. This means that the safety of knowledge can directly prevent work accidents in the company. The more information about the K3 value received by Workers, the more Workers can find out the sources of hazards that are at risk of causing work accidents. This information could be in the form of training or an experience mentoring process regarding the value of K3 among workers. This is an effective way to share implicit knowledge because experienced workers can check and ensure that the knowledge passed on to new workers is clearly assimilated.

The relationship between Safety Culture and Safety Performance

According to Otitolaiye et al. (2021) research, *work culture safety* has a positive and significant influence on *safety performance*. The significant influence between *safety culture* on *safety performance* means that the higher the application of *safety culture* in a company, the higher the impact on employee *safety performance*.

3. Methodology

This research was conducted using primary data to obtain data sources from respondents. The collection technique in the form of questionnaires (questionnaires) is submitted and distributed to respondents which are then filled out by respondents. The sample used in the study was employees of PT. XYZ Berau Regency. The questionnaires were distributed from October 10-20, 2024 and in this study, a total of 35 respondents were used which represents the total number of employees working in the company.

Data Quality Test

a. Validity Test

The Validity Test is used to assess whether a questionnaire is considered valid or not. The validity of a questionnaire can be fulfilled if the questions contained in the questionnaire can effectively describe the aspect to be measured. Validity testing uses a correlation test between the score (value) of each item of the statement instrument with the total score of the questionnaire.

b. Reliability Test

Reliability testing is an approach to assessing the quality of a questionnaire as an indicator of a variable. A questionnaire is considered reliable or trustworthy if the answers given by 35 respondents to the statement remain consistent or stable over time. Reliability testing in this study is by using the Cronbach alpha formula.

Multiple Linear Regression Analysis

In this study, researchers used data analysis techniques using multiple linear regression. Multiple linear regression analysis is an analysis tool for forecasting the value of the influence between two or more independent variables (X) on one dependent variable (Y) in order to prove whether there is a functional or causal relationship between two or more independent variables (X) on one dependent variable (Y) (Araiza-Aguilar et al., 2020).

Multiple linear regression is almost the same as simple linear regression, except that in multiple linear regression there is more than one estimator variable. The purpose of multiple linear regression analysis is to measure the intensity of the relationship between two or more variables and contain predictions / estimates of the value of Y over the value of X. Form a multiple linear regression equation that includes two or more variables.

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 \quad (1)$$

Information:

Y = Dependent variable

$a = Constanta$

b_1, b_2, b_3= Coefficient of regression

x_1, x_2, x_3= Independent variables

Partial Test (T Test)

Statistical t tests are used to test whether hypotheses are accepted or rejected, as well as to determine the partial influence caused by the independent variables of the study. The t test is carried out using SPSS with the provision that t-count > table then the independent variable has a partial effect on the dependent variable, the hypothesis is accepted. Conversely, if the value of t-count < t-table then there is no influence caused by the dependent variable, so the hypothesis is rejected.

4. Empirical Findings/Result

Data collection of research results with Likert scale instruments and carried out through various phases in order to know how much influence the independent variables are namely spiritual intelligence, self-control, socioeconomic parents, circle of friends on the dependent variable,

namely financial management. Below are the results of data processing using the SPSS 26 application.

Data Quality Test

Test Validity

To determine the validity of the questionnaire items, a validity test was conducted using SPSS version 26. With a significance level of 5% and a sample size of 35, the r-table value was established at 0.334. Each questionnaire item was assessed for validity, and the results indicated that all items were valid. Specifically, the attributes SP1, SP2, SP3, SP4, SP5, and SP6 had r-count values of 0.677, 0.586, 0.605, 0.708, 0.775, and 0.694, respectively, all exceeding the r-table value. Similarly, attributes SL7, SL8, SL9, SL10, SL11, and SL12 showed r-count values of 0.884, 0.887, 0.858, 0.00, 0.952, and 0.878, respectively, also surpassing the r-table value. Furthermore, attributes SK13, SK14, SK15, SK16, SK17, and SK18 demonstrated r-count values of 0.916, 0.937, 0.914, 0.941, 0.941, and 0.895, respectively, confirming their validity. Lastly, attributes SC19, SC20, SC21, and SC22 with r-count values of 0.922, 0.931, 0.971, and 0.848, respectively, were validated, as all their r-count values were greater than the r-table value of 0.334. Therefore, it was concluded that all questionnaire items were valid.

Reliability Test

The reliability of the instrument was evaluated to determine its consistency and dependability. Using SPSS version 26, the Cronbach's Alpha coefficient was calculated. A construct is deemed reliable if Cronbach's Alpha is greater than or equal to 0.60. The analysis revealed a Cronbach's Alpha value of 0.957 for 22 items, indicating high reliability. Consequently, it was concluded that the questionnaire items are reliable and can be used for similar research in other contexts.

Normality Test

The normality test was performed to ensure that the data distribution is normal. This was visually assessed using a P-Plot diagram. The diagram indicated that the data points were distributed along the line, suggesting a normal distribution of the model.

Multicollinearity Test

A multicollinearity test was conducted to identify any perfect or near-perfect correlations between the independent variables. According to the results, the Variance Inflation Factor (VIF) values were all below 10, indicating no multicollinearity issues among the variables. Specifically, the VIF values for Safety Leadership (X1), Safety Knowledge (X2), and Safety Culture (X3) were 2.492, 6.134, and 8.931, respectively.

Heteroscedasticity Test

The heteroscedasticity test was conducted using SPSS version 26 to detect any inequality of variance in the residuals of the regression model. The results showed that the significance

levels of the independent variables were greater than the alpha value of 0.10, indicating no heteroscedasticity issues. Specifically, the significance levels for Safety Leadership (X1), Safety Knowledge (X2), and Safety Culture (X3) were 0.470, 0.536, and 0.299, respectively.

Autocorrelation Test

The Durbin-Watson test was employed to detect autocorrelation in the data. The test results showed a Durbin-Watson value of 2.191, which is greater than the critical value of 1.2437. This indicates that there is no autocorrelation in the data, thus H0 is accepted.

Multiple Regression Test

The use of multiple linear regression analysis in this study aims to prove the influence of *safety leadership, safety knowledge* and *safety culture* on *safety performance*. statistical calculations in multiple linear regression analysis used in this study are using SPSS *version* 26 application.

Table 1. Multiple Linear Regression Test Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.251	.534		22.932	.000
	Safety Leadership (X1)	.241	.018	.506	13.681	.000
	Safety Knowledge (X2)	.219	.028	.447	7.693	.000
	Safety Culture (X3)	.108	.052	.147	2.103	.044

a. Dependent Variable: Safety Performance (Y)

Source : data processed using SPSS *version* 26

The results of the regression equation above can be seen as follows:

$$Y = 12.251 + 0{,}241x_1 + 0{,}219x_2 + 0{,}108x_3$$

Where has a constant value of 16.245. Regression coefficient of *safety leadership variable* (X1). Variable Coefficient of 0.241 (positive) This means that if *safety leadership* increases by 1 unit, then the *value of safety performance* will increase by 0.241 units. The regression coefficient of *the safety knowledge* variable (X2) has an influence (positive) with a coefficient of 0.219 (positive). If the value *of safety knowledge* increases by 1 unit, then the value *of safety perfornance* will also increase by 0.219 units. The regression coefficient of *the safety culture* variable (X3) is 0.108 (positive), meaning that if *the safety culture* variable increases by 1 unit, the *value of safety perfornance* will also increase by 0.108.

Correlation Coefficient

The correlation coefficient aims to measure the strength or weakness of *safety leadership, safety knowledge* and *safety culture* variables on the *safety performance of* PT employees. XYZ.

Table 2. Correlation Coefficient Calculation Results

Correlations

		Safety Leadership (X1)	Safety Knowledge (X2)	Safety Culture (X3)	Safety Performance (Y)
Safety Leadership (X1)	**Pearson Correlation**	1	.606**	.752**	.888**
	Sig. (2-tailed)		.000	.000	.000
	N	35	35	35	35
Safety Knowledge (X2)	**Pearson Correlation**	.606**	1	.908**	.887**
	Sig. (2-tailed)	.000		.000	.000
	N	35	35	35	35
Safety Culture (X3)	**Pearson Correlation**	.752**	.908**	1	.933**
	Sig. (2-tailed)	.000	.000		.000
	N	35	35	35	35
Safety Performance (Y)	**Pearson Correlation**	.888**	.887**	.933**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	35	35	35	35

**. Correlation is significant at the 0.01 level (2-tailed).

Source : data processed using SPSS *version* 26

Multiple correlation analysis is used to determine the degree or strength of influence between the independent variable (X) and the bound variable (Y) simultaneously. The results of the correlation calculation can be positive or negative. If the value of the coefficient is positive, it shows that the two variables are interrelated.

Coefficient of Determinant (R2)

The coefficient of determination is used to see the extent to which the independent variable or independent variable has an effect on the dependent variable. The coefficient of determination can be seen from the following table:

Table 3. Results of Determination Coefficient

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.991[a]	.983	.981	.193

a. Predictors: (Constant), Safety Culture (X3), Safety Leadership (X1), Safety Knowledge (X2)

Source : Questionnaire data processed using SPSS *version* 26

From the table above, it is known that the coefficient of determination of R *Square* 98.3% means that *the variables of safety leadership, safety knowledge*, *safety culture* simultaneously have a positive effect on the *Safety Performance of* PT. XYZ.

T Test (Partial Test)

This test was conducted to determine the significance of the influence of variables of the influence of *safety leadership, safety knowledge* and *safety culture* on the *safety performance*

of PT. XYZ, the test is carried out by comparing the t-table value (SPSS output result) with the t-table value. The value of t-table is determined based on α = 0.05 with degrees of freedom at df = n – 3.

Table 4. T test results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	12.251	.534		22.932	.000
	Safety Leadership (X1)	.241	.018	.506	13.681	.000
	Safety Knowledge (X2)	.219	.028	.447	7.693	.000
	Safety Culture (X3)	.108	.052	.147	2.103	.044

a. Dependent Variable: Safety Performance (Y)

Source : Data processed using SPSS *version* 26

Based on the table above, the value of t-calculate *safety leadership* = 13.681 and the value of t-table = 1.696 (α = 0.05; df 35 – 4 = 31) it can be determined that: t-count > t-table or 13.681> 1.699 then Ho is accepted, meaning that *Safety Leadership* has a significant effect on *the Safety Performance of* PT. XYZ.

The value of t-calculate *safety knowledge* in the table above is 7.693 and the value of t-table = 1.696 (α = 0.05; df 35 – 4 = 31) can be determined that: t-count > t-table or 7.693 > 1.696 then Ho is accepted, meaning that *Safety Knowledge* has a significant effect on *the Safety Performance of* PT. XYZ.

The t-count value *of safety culture* in the table above is 2.103 and the value of t-table = 1.696 (α = 0.05; df 35 – 4 = 31) it can be determined that: t-count > t-table or 2.103 < 1.663 then Ho is rejected, meaning that *Safety Culture* has a significant effect on *the Safety Performance of* PT. XYZ.

F Test (Stimulant Test)

Table 5. F Test Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	66.339	3	22.113	596.483	.000[b]
	Residual	1.149	31	.037		
	Total	67.488	34			

a. Dependent Variable: Safety Performance (Y)

b. Predictors: (Constant), Safety Culture (X3), Safety Leadership (X1), Safety Knowledge (X2)

Source : data processed using SPSS *version* 26

The results of the F test in the table above, show that the value of F-count = 596.5, while F-table = 2.91 (α = 0.05: df1 =4 -1 = 3 and df2 = 35-4 = 31). Then it can be determined F-count > F-table or 596.5 > 2.91. So it can be concluded that together the *variables of safety leadership, safety knowledge* and *safety culture* have a significant effect on the variables *of safety performance of* PT. XYZ.

5. Discussion

Based on the results of the calculation above, the following can be known **:**

1. The Effect of *Safety Leadership* (X1) on *Safety Performance* (Y)

Regression coefficient of *safety leadership variable* (X1). Variable Coefficient of 0.241 (positive) This means that if *safety leadership* increases by 1 unit, then the *value of safety performance* will increase by 0.241 units.

Safety *leadership* variables. It is known that t-calculate variable *safety leadership* of 13.681 > t-table (1.696) and Sig. (0.000) < 0.05 means that *safety leadership* partially has a significant positive effect on *safety performance*. This is in line with research conducted by (Agustina, et al. 2019) which states that there is a significant relationship between *safety leadership* and *safety performance*. This is because *safety leadership* is a form of motivation, encouragement, and coordination to solve safety and health problems from superiors or supervisors of each work unit to workers.

This proves that leaders who prioritize work safety will set standard behaviors and motivate employees and emphasize awareness of the importance of equipment and safety regulations. The results obtained in this study in accordance with the conditions in the field can be seen in the picture below:

Source: Enterprise secondary data, 2024

Figure 1. *Briefing*

PT. XYZ conducts *briefings* or commonly called talks 5 minutes every day before starting work or commonly abbreviated as P5M. Work team leaders provide encouragement in the form of *briefings* for workers who are carried out before doing work to comply with safe work procedures and use security tools such as PPE that are carried out before carrying out work activities. In addition, team leaders routinely conduct field monitoring to check how to work and discuss problems reported by workers in the workplace.

2. The Effect of *Safety Knowledge* (X2) on *Safety Performance* (Y)

The regression coefficient of *the safety knowledge* variable (X2) has an influence (positive) with a coefficient of 0.219 (positive). If the value *of safety knowledge* increases by 1 unit, then the value *of safety perfornance* will also increase by 0.219 units.

Safety *Knowledge variables*. It is known that t-calculate variable *safety knowledge* of 7.693 > t-table (1.696) and Sig. (0.000) < 0.05 means that *safety knowledge* partially has a significant positive effect on *safety performance*. This is in line with research conducted by (Putra et al. 2022) which states that *safety knowledge* has a significant effect on *safety performance*. This means that the safety of knowledge can directly prevent work accidents in the company.

This proves that someone who has good safety knowledge will understand how to do safety things well, know in detail safety equipment and work procedures so that it affects one's safety behavior. The results obtained in this study in accordance with the conditions in the field can be seen in the picture below:

Source: Enterprise secondary data, 2024

Figure 2. *Safety Talk*

PT. XYZ conducts *safety talk* which is done 1 time a week on Wednesdays. *Safety talk* is a socialization about the importance of using PPE and always maintaining safety for yourself and others. This is to provide knowledge to workers how important work safety is. Workers assess that workers have understood what hazards may occur in the workplace by identifying hazards and risk assessments such as studying the level of risk that may occur in their workplace, such as high, medium or small hazard risk levels and reporting them to the relevant management for follow-up. Employers assess that they have been active in maintaining occupational safety and health and reducing the risk of accidents or incidents in the workplace.

3. The influence of *Safety Culture* (X3) on *Safety Performance* (Y)

The regression coefficient of *the safety culture* variable (X3) of 0.108 (positive) means that if the *safety culture* variable increases by 1 unit, the *safety perfornance* value will also increase by 0.108.

Safety *culture* variables. It is known that t-calculate *safety culture* of 2.103 > t-table (1.696) and Sig. (0.044) < 0.05 means that *safety culture* partially has a significant negative effect on *safety performance*. This is in line with research conducted by (Kusuma and Arwiyah, 2018) which states that *work culture safety* has a positive and significant influence on *safety performance*. The significant influence between *safety culture* on *safety performance* means that the higher the application of *safety culture* in a company, the higher the impact on employee *safety performance*.

This proves that someone who applies a work safety culture, understands responsibility for K3 and the security of the work environment affects a person's safety behavior. The significant influence between Work Safety Culture on employee performance means that the higher the application of work safety culture in a company, the higher the impact on employee performance.

Source: Enterprise secondary data, 2024

Figure 3. Observation and inspection via CCTV *support*

Based on observations, it shows that workers at PT. XYZ has concern for safety values by complying with established K3 rules and procedures, has competence in terms of operation and maintenance of tools and machines and reports any incidents or damage that exist in the work area. It can be seen in the picture above that workers make observations and field inspections before doing work to improve worker comfort when doing work. In addition to observation and inspection via CCTV *support.* PT. XTZ also performs a *safety recall* which can be seen in the image below

Source: Enterprise secondary data, 2024

Figure 4. *Safety Recall*

Safety recall is the delivery after it has occurred *incident, accident*Or *nearmiss* The goal is that the same incident will not happen again. *Safety recall* carried out at unexpected times and in emergencies. This is due to reports from workers that an incident occurred. These events can be *incident, accident*Or *nearmiss*. *Safety recall* carried out for repair and control efforts.

4. The Influence of *Safety Leadership*, *Safety Knowledge*, and *Safety Culture* on *Safety Performance* Simultaneously

The result of the F test shows the F-count value obtained at 596.5 and the F-table value = 2.91 means the F-count value > the F-table value. The significant value *of safety leadership, safety knowledge* and *safety culture* of 0.000 F-count value greater than F-table and significant value smaller than 0.05 shows that *safety leadership, safety knowledge* and *safety culture* simultaneously affect the *safety performance of* PT. XYZ.

5. Conclusion

Based on the results of the processing of analytical data that has been carried out in this research, it can be concluded that from 3 variables, namely *safety leadership* (X1), *safety knowledge* (X2), and *safety culture* (X3) have a significant positive effect on *safety performance* (Y) where the higher the value of the variable (X1), *safety knowledge* (X2), and *safety culture* (X3), the variable value *safety performance* (Y) will be higher.

To improve safety performance, several recommendations can be proposed, including: improved relationship *between safety leadership* and *safety performance*, encourage workers to carry out safe work procedures, conduct *briefings* on each *ship* on regular work activities, equitable distribution of occupational safety and health policies and procedures, improved relationship between *safety knowledge* and *safety performance*, ensure proper implementation of occupational safety and health policies and procedures, increase responsibility in maintaining a safe work environment to minimize work accidents, report the identified hazard risks and conduct guidance in identifying hazards, improved relationship between *safety culture* and *safety performance*, consistent monitoring of reporting to avoid hazards in the field, perform additional work environment measurements such as dust measurements, improve worker competence by *training* on the operation of tools and machines.

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