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Research Paper

Assessment of Security, Health, Safety, and Environmental Sustainability Risk for Toll Road Construction Workers

Tatan Sukwika[a1], **Amud Zabhara**[b]

[a,b] *Department of Environmental Engineering, Sahid University, Jakarta, Indonesia*

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ABSTRACT

Preventing accidents and work-related diseases is an important factor that must be considered in construction activities. The problem that has occurred recently is that the majority of work accidents occur due to human negligence and unsafe actions. Therefore, it is necessary to commit worker awareness in addition to safety, health, security and environmental sustainability (SHSE), where SHSE also pays attention to non-worker factors or sustainability after construction to maintenance around the construction site environment. The research aims to analyze the influence of worker behaviour on SHSE risk assessments in case studies on the Becakayu Section II-A toll road construction project—quantitative descriptive research method involving 90 workers as respondents. The research results show that SHSE is partially influenced significantly by the variables Employee Knowledge, Employee Attitude, and Employee Action. At the same time, Worker Knowledge, Worker Attitudes and Worker Actions simultaneously have a significant effect on SHSE in the construction of the Becakayu Toll Road section II-A. The research conclusions underline that workers with high knowledge are aware of SHSE behaviour, workers' attitudes towards SHSE still require strong commitment, and workers' actions regarding SHSE need to increase awareness of using personal protective equipment to reduce the risk of occupatinal accidents.

[1] Corresponding author
Email Address: tatan.swk@gmail.com

1. Introduction

National Strategic Projects aim to increase economic growth in an area. National Strategic Projects in Road Infrastructure are national and toll road construction projects. According to the Toll Road Regulatory Agency (2020), the Becakayu Toll Road (Bekasi-Cawang-Kampung Melayu) was built as an elevated road that stretches from the Tambun-Bekasi area to the Kampung Melayu area and has a length of 21.04 km.

Recently, there have been many industrial accidents, most caused by human negligence. Therefore, Law Number 2 of 2017 concerning Construction Services explains that the policy focus is not limited to on OSH (occupational safety and health) for construction workers. However, it is also necessary to pay attention to other broader aspects, namely Safety, Health, Security, and Environmental Sustainability (SHSE). SHSE does not only focus on factors unrelated to workers or post-construction sustainability but is concerned with maintaining conflict around the construction site environment. The large number of construction accidents that occur shows that there is still neglect of safety in construction. Therefore, serious coordination between the government and stakeholders is needed in the construction sector so that SHSE development can be implemented in all construction projects (Baka et al., 2022; Purwanti et al., 2023; Soeharto, 2016; Yuvendra et al., 2022).

Many construction workers still need to pay attention to their work's occupational health and safety aspects, so project accidents often occur (Mudzakir et al., 2023; Sánchez et al., 2017). Diaphragm work on the Kalimalang arterial road is at high risk for project workers and road users who could be hit by falling material and also be hit by splashes of concrete mix during the casting process (Arya et al., 2020; Irianto et al., 2022). Therefore, it is necessary to carry out an analysis of the risks in the project. The factors that create a problem in this research are (1) National construction project accidents throughout 2018 were, 57,313 out of 157,313 work accidents. Thus, work accidents on construction projects are still relatively high. (2) Diaphragm work on the Kalimalang arterial road is highly risky for road users and project workers.

Previous studies by Lensun et al. (2022) and Juarsa et al. (2023)found that there is an influence between worker behaviour on security, safety and health risk assessments, risk control efforts carried out based on the OSH hierarchy, namely technical engineering, administration and use of personal protective equipment or PPE (Kartikasari & Sukwika, 2021; Sulistyowati & Sukwika, 2022). Research conducted by La and Chaiddir (2022) and Baka et al. (2022) shows that the attitude of construction workers influences K3 risk assessment. Based on the background of the problem and research gaps from previous research, it is important to study the influence of the implementation of occupational safety and health management and work environmental conditions on work safety behaviour in the Becakayu section II-A toll road construction project.

2. Research Method

2.1. Types of Methods and Data Sources

The research method is descriptive with quantitative methods. Data collection uses a questionnaire tool to test predetermined hypotheses. The research was conducted on workers at the Becakayu Section II-A Toll Road Construction Project. The research was conducted from November 2022 to February 2023. Data was collected by observing and distributing questionnaires directly to project managers as sample respondents. Quantitative analysis using a Likert scale by explaining the indicators of each variable with the terms strongly agreed (SA) given a weight=5, Agree (A)=4, neutral (N)=3, disagree (D)=2 and strongly disagree (SD)=1.

2.2. Population and Samples

The population is the entire unit of analysis, which is the target of the research or characteristics that are the centre of attention, containing information that one wants to know (Sugiyono, 2019; Sukwika, 2023a). The population of this study is Company employees involved in completing the Becakayu Section II-A Toll Road construction project, supervisory consultants.

By considering the characteristics of the existing population and the objectives of this study, the determination of respondents to be sampled was carried out using a purposive sampling method. Purposive sampling is a method for data sources with certain attention (Sugiyono, 2019; Sukwika, 2023a). Respondents selected from the population must meet the following criteria: (1) Contractor Service Employees involved in the Becakayu Section II-A Toll Road Construction Project; (2) Work experience of more than two years; (3) Supervisory consultant; (4) Willing to be a respondent to this research.

If the population is not known, then sample selection can use the Lemeshow formula. Where: n = number of samples; Zα = standard value of the distribution according to the value α = 5% = 1.96; P = maximum estimate of 0.50; E = the amount of error that can be accepted is 10% = 0.10 (Alma & Sunarto, 2007; Sukwika, 2023a). The Zα value obtained from the normal distribution table is 1.96. The allowable error (E) is 10%, and the highest estimate (P) is 0.50. Based on previous calculations, the sample size for this study was 89.04, which was then rounded to 90 individuals. Here is the calculation:

$$n = \frac{(Z\propto^2 P\,(1-P)}{E^2} \qquad \text{n} = \frac{(1{,}96^2\ 0{,}5\ (1-0{,}5)}{1^2} = 89{,}04$$

2.3. Data Analysis Technique

Validity and Reliability Test. Factor validity is related to the accuracy and accuracy of the measuring instrument in carrying out its measuring function. This validity analyses the relationship between factors in each variable (Sukwika, 2023a; Utami et al., 2020)—validity measurements using Pearson Product Moment Correlation calculations from the SPSS Version 25 program. The criteria for testing item validity are as follows: (1) If the value of rcount< rtable, then the item is invalid. (2) If the value of rcount>rtable, then the item is valid. Reliability test measurements on research instruments use the Cronbach Alpha formula. The reliability testing criteria are: (a) If the alpha value is > 0.60, then the instrument is declared reliable; (b) If the alpha value is <0.60, then the instrument is not reliable (Sugiyono, 2019; Sukwika, 2023a).

2.4. Hypothesis testing

Hypothesis testing uses inferential statistical analysis, including multiple regression and correlation analysis, t-test and f-test, and the coefficient of determination. An explanation of the analysis tests is presented in more detail as follows:

2.5. Multiple Linear Regression Test. The multiple linear regression method is applied in this research to measure how big the relationship is between two or more variables. Also, it shows the direction of the relationship between variables, whether they have a positive or negative relationship. The dependent variable used in this research is the implementation of SHSE (Y). Meanwhile, the independent variables used in this research are worker knowledge (X_1), worker attitudes (X_2) and worker actions (X_3). A simple linear regression analysis model can be formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \text{Ɛ}$$

Information:

Y = SHSE (security, health, safety, and environmental sustainability)

X1 = Worker's knowledge ; X2 = Worker's Attitude ; X3 = Worker's Action

α = Constant ; β = Coefficient of Variable X ; Ɛ = Error

The following variables were tested: Worker Knowledge (X_1) including $X_{1.1}$ The importance of implementing SHSE in Development, Work Procedures & Safety Signs, $X_{1.5}$ Training The importance of knowledge of implementing sustainable maintenance of the environment around the project. Worker Attitudes (X_2) include $X_{2.1}$ Implementation of SHSE Related Standard Regulations, 5 Actions against Violations of the Use of PPE. Worker Actions (X_3) include $X_{3.1}$ Atmosphere and working relationships in the workplace or after project

completion. SHSE (Y) includes Y_1 The company installs safety signs and provides evacuation routes in the event of an emergency, Y_2 Environmental management standards by statutory provisions, Y_3 Construction of toll roads causes damage to public facilities in areas crossed by the project, damage to facilities and damage to roads, Y_4 Environmental damage caused by development is air pollution, noise pollution, erosion along rivers, and aridity due to cutting of green belts, Y_5 Improvement of environmental conditions after development.

Coefficient of Determination Test (R^2). The coefficient of determination measures the extent to which the independent variable explains the variation in the independent variable. The value of the coefficient of determination ranges from 0 to 1 ($0<R^2<1$). The small R^2 value, it means the ability of variations in the independent variable to explain the independent variables provides almost all the information needed to predict variations in the dependent variable (Ghozali, 2019; Sukwika, 2023b). If the coefficient of determination = 0, it means that there is no relationship between the independent variable and the dependent variable; vice versa for the coefficient of determination = 1, then there is a perfect relationship

F Test (Simultaneous) and T-Test (Partial). Statistical tests are intended to determine how big the influence of independent variables in groups (simultaneous) individually (partially) is in explaining the dependent variable. Testing was carried out using a significance level of 0.05. Rejection or acceptance of the hypothesis is based on the following criteria (Sukwika, 2023b): (a) If the significance value is ≤ or = 0.05, it states that the independent variable affects the dependent variable; (b) If the significance value is ≥ 0.05, it states that the independent variable does not affect the dependent variable.

3. Results and Discussions

3.1. Results

Worker Knowledge (X_1). The Worker's Knowledge variable (X_1) averages 3.791, which is in the high category because it exceeds the range of 3.41 to 4.20. The most influential indicator is X1.5, which refers to understanding sustainable maintenance of the environment around the project. Notoatmojo (2014) defines knowledge as the result of sensory perception or understanding obtained through the five senses. Notoatmojo (2014) states that behaviour rooted in knowledge tends to be more sustainable than behaviour that lacks knowledge.

Worker Attitude (X_2). The Worker Attitude variable (X_2) generally averages 3.862, included in the high category because it exceeds the value of 3.41 to 4.20. The most influential indicator is indicator $X_{2.2}$, namely a positive atmosphere and strong working relationships in the workplace. Notoatmojo (2014) defines attitude as agreeing or disagreeing with someone's likes or dislikes. Work attitudes include positive or negative assessments made by individuals towards their work environment, including workers' attitudes towards a conducive working atmosphere and relationships in the workplace, which are strongly agreed with by respondents. Lensun et al. (2022) and Baka et al. (2022) stated that workers' positive attitudes towards the SHSE program result from company efforts to prioritize worker safety and health. The positive relationship between the attitude towards implementing the SHSE program and the company shows that the program is perceived positively, effectively, safely and by procedures, thereby creating a sense of confidence in the company's concern for its workers.

Worker action (X_3). The Worker Action variable (X_3) generally averages 3.683, included in the high category because it exceeds the value range of 3.41 to 4.20. The dominant indicator is $X_{3.3}$, which refers to paying attention to safety signs and complying with standard operational procedures in the workplace. According to Notoatmojo (2014), action is the practical application of knowledge and attitudes, which are interconnected and lead to real action. Other people can easily observe this action, also called overt behaviour. Mustofa et al. (2023), Purwanti et al. (2023), and Wary et al. (2023) emphasize the importance of workers understanding the meaning of safety signs in the workplace and actively participating in safety

discussions. The main causes of work safety problems are unsafe behaviour, which accounts for 88%, and unsafe environmental conditions, which accounts for 10%.

Security, Health, Safety and Sustainability (SHSE) (Y). The Security, Safety, Health and Sustainability (SHSE) (Y) variable generally has an average value of 3.853, which is included in the high category because it exceeds the range of 3.41 to 4.20. The main indicator is indicator Y4, specifically environmental damage due to development, such as air pollution, noise pollution, river erosion and loss of green space. Construction services that implement Sustainable Construction practices, for example, implement a Construction Safety Management System (CSMS) and fulfil Security, Health, Safety, and Sustainability (SHSE) Standards to create high-quality infrastructure (Baka et al., 2022; Sánchez et al., 2017; Wary et al., 2023). Effective construction project management requires understanding environmentally friendly building practices to minimize negative environmental and occupational health impacts. This condition includes considering the health and comfort aspects of the project environment, such as air quality planning and reducing noise generated by construction activities. Environmental management in construction projects focuses on reducing waste generation during construction activities.

3.1.1. Testing the Validity of Research Instruments

This validity test is conducted to measure whether the data obtained after the research is valid using the measuring instrument (questionnaire). The questionnaire items are declared valid as a data collection tool. Validity testing ensures that the compiled questionnaire will be good at measuring symptoms to produce valid data. One method that can be used to carry out a validity test is to correlate the value of each question item with the total score of all questions (data is in the data attachment). A question item is said to be valid if the value of the Pearson correlation coefficient is greater than the value of the Pearson correlation coefficient in the table (rcount>rtable). A validity test with a sample size of n = 90 and a significance level ($\propto = 0.05$) shows that the rtable value is 0.207. The results of the r-xy calculation can be seen in Table 1.

The results of the product-moment correlation calculation in the table above show that the score for each statement is significantly correlated with the total score, indicated by the calculated r being greater than the rtable. It can be concluded that all question items are valid so that they can be used as a data collection tool for this research. From Table 2, it is known that the Alpha-Cronbach value for all variables is greater than 0.6. In this way, all questionnaire items are declared reliable and suitable for data collection.

3.1.2. Classic Assumption Test Results

So that the estimates obtained do not deviate from the multiple linear regression equation model, they must meet the following classical assumptions:

Normality test. The normality test aims to test whether the residual values have a normal distribution in the regression model. A good regression is if the data is normal or close to normal. Normality test results can be seen from the One-Sample Kolmogorov-Smirnov Test in the Sig section. The basis for Decision-making: (a) If the probability value (Sig.) <0.05, then the distribution is not normal; (b) If the probability value (Sig.) > 0.05, then the distribution is normal. Based on Table 3, it can be concluded that the residual value is normally distributed because the probability value (Sig.) is 0.200 > 0.05. Further, below is the normality test using the PP Plot. In Figure 1, it is shown that if the data spreads in the direction of the diagonal line, then it can meet the assumption of normality. The regression model does not meet the normality assumption if the data spreads far from the diagonal line. Below are the results of the normality test. The graph above shows that the data is spread around the diagonal line, and the distribution follows the diagonal line; this means the data is normally distributed. Thus, the regression model is suitable for use in research.

Table 1. Validity Test Results

Variable	Item	Correlation Value (R-Count)	R-Tabel (n = 90; A = 5%)	Description
Worker Knowledge (X1)	$X_{1.1}$	0.768	0.207	Valid
	$X_{1.2}$	0.828	0.207	Valid
	$X_{1.3}$	0.717	0.207	Valid
	$X_{1.4}$	0.794	0.207	Valid
	$X_{1.5}$	0.768	0.207	Valid
Worker Attitude (X2)	$X_{2.1}$	0.787	0.207	Valid
	$X_{2.2}$	0.792	0.207	Valid
	$X_{2.3}$	0.736	0.207	Valid
	$X_{2.4}$	0.803	0.207	Valid
	$X_{2.5}$	0.739	0.207	Valid
Worker Action (X3)	$X_{3.1}$	0.910	0.207	Valid
	$X_{3.2}$	0.895	0.207	Valid
	$X_{3.3}$	0.831	0.207	Valid
	$X_{3.4}$	0.847	0.207	Valid
Security, Health Safety, and Sustainability (SHSE) (Y)	Y_1	0.778	0.207	Valid
	Y_2	0.762	0.207	Valid
	Y_3	0.802	0.207	Valid
	Y_4	0.783	0.207	Valid
	Y_5	0.649	0.207	Valid

Table 2. Reliability Test Results

Variable	*Alpha-Cronbach*	Description
Employee Knowledge (X_1)	0.834	Reliabel
Worker Attitude (X_2)	0.825	Reliabel
Worker Actions (X_3)	0.892	Reliabel
Security, Health Safety, and Sustainability (SHSE) (Y)	0.806	Reliabel

Table 3. Normality Result

One-Sample Kolmogorov-Smirnov Test		
		Standardized Residual
n		90
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.97726976
Most Extreme Differences	Absolute	.059
	Positive	.057
	Negative	-.059
Test Statistic		.059
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

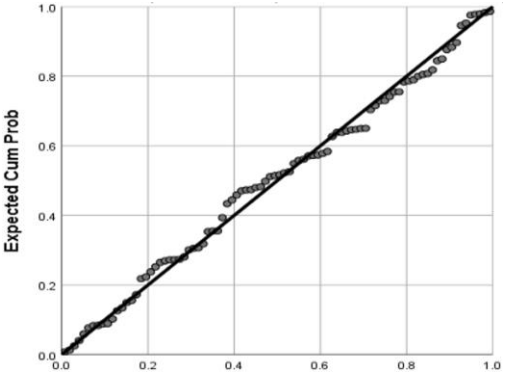

Figure 1. P-P Plot Normalitas Test

Multicollinearity Test. The presence of multicollinearity was assessed using the Volume Inflation Factor (VIF). Multicollinearity is needed to determine whether there are similarities between independent variables in a particular model. Multicollinearity problems arise when a strong relationship or influence exists between two or more variables. If the VIF of an independent variable is less than 10, it indicates no multicollinearity. On the other hand, if the VIF is greater than 10, it means multicollinearity. The results of the multicollinearity test analysis are presented in Table 4, which contains data for variable X_1.

Glejser Heteroscedasticity Test. Heteroskedasticity can be assessed using the Glejser Test, which involves the regression of independent variables against the absolute value of their residuals. Decision-making is based on the significance value between the independent variables and the absolute residual. If the significance value is greater than 0.05, it indicates no heteroscedasticity problem. Conversely, if the significance value is less than 0.05, then heteroscedasticity occurs. In Table 5, it is known that all significance values are greater than 0.05, meaning that heteroscedasticity does not happen in the regression model.

Table 4. Multicollinearity Result

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-3.236	2.502		-1.293	.199		
	Employee Knowledge (X_1)	.208	.074	.215	2.818	.006	.625	1.601
	Worker Attitude (X_2)	.308	.071	.305	4.333	.000	.732	1.366
	Worker Actions (X_3)	.419	.075	.404	5.551	.000	.683	1.464

Multiple Linear Regression Analysis. Multiple linear regression analysis determines how much influence independent variables have, namely worker knowledge, worker attitudes and worker actions on SHSE (Y). The recapitulation of Multiple Regression Analysis Results can be seen in Table 6.

Table 5. Heteroscedasticity Test

Coefficients[a]

Model		Unstandardized Coefficients		Stand-ardized Coeffi-cients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.294	1.547		1.483	.142
	Employee Knowledge (X_1)	.004	.046	.011	.083	.934
	Worker Attitude (X_2)	.043	.044	.123	.985	.327
	Worker Actions (X_3)	-.066	.047	-.183	-1.420	.159

a. Dependent Variable: Absolute Residual

Table 6. Multiple Linear Regression Analysis

Coefficients[a]

Model		Unstandardized Coefficients		Stand-ardized Coeffi-cients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.236	2.502		-1.293	.199
	Employee Knowledge (X_1)	.208	.074	.215	2.818	.006
	Worker Attitude (X_2)	.308	.071	.305	4.333	.000
	Worker Actions (X_3)	.419	.075	.404	5.551	.000

a. Dependent Variable: Absolute Residual

From the table above, the regression equation is as follows:

$$\boldsymbol{Y = -3.236 + 0.208\ X_1 + 0.308\ X_2 + 0.419\ X_3}$$

Based on the regression equation, it is known that:

a) Constant value -3.236. It means that if the variables X_1, X_2, and X_3 are equal to 0 (zero), then Y is -3.236.
b) X_1 is positive 0.208. It means that X_1 positively influences Y, meaning that an increase in X_1 by 1 unit causes Y to increase by 0.308, and donversely, the regression coefficient is negative.
c) X_2 is positive 0.308. It means that X_2 positively influences Y. If X_2 increases by 1 unit, it causes Y to increase by 0.308, and donversely, the regression coefficient is negative.
d) X_3 is positive 0.419. It means that X_3 positively influences Y. If X_3 increases by 1 unit, it causes Y to increase by 0.419, and donversely, the regression coefficient is negative.

3.1.3. Hypothesis test

Coefficient of Determination (R^2). The coefficient of determination is used to measure the model's ability to explain changes in the dependent variable. It ranges between zero and one. A low R^2 value indicates that the independent variable cannot explain changes in the dependent variable. A high R^2 value indicates that the independent variable is very informative in predicting changes in the dependent variable (Sukwika, 2023b). In Table 7 it is known that the Adjusted R^2 value is 0.678, meaning that 67.8% of the Occupational Safety, Health and Sustainability (SHSE) Y variable is influenced by workers' knowledge, attitudes and actions. In comparison, the remaining 32.2% is influenced by other factors.

Table 7. Coefficient of Determination Test Result

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832[a]	.692	.678	1.83505

a. Predictors: (Constant), Predictors: (Constant), Worker Actions (X3), Worker Attitude (X2), Employee Knowledge (X1)
b. Dependent Variable: Security, Health Safety, and Sustainability (SHSE) (Y)

Table 8. F Test Result

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	643.371	4	160.843	47.765	.000[b]
	Residual	286.229	85	3.367		
	Total	929.600	89			

a. Dependent Variable: Security, Health Safety, and Sustainability (SHSE) (Y)
b. Predictors: (Constant), Worker Actions (X3), Worker Attitude (X2), Employee Knowledge (X1)

F Test (Simultaneous). F test to identify whether variables X_1 and X_3 jointly influence Y. Thus, it can be concluded that the hypothesis is supported. Simultaneously, worker knowledge, attitudes, and actions significantly affect SHSE in constructing Becakayu toll road section II-A.

T Test (Partial). The t-test determines the significance of each independent variable on the dependent variable, assuming the other variables remain constant. This test is carried out by comparing the t-count value with the t-table. The basis for decision-making is as follows: (1) If H_0 is true, then the variable coefficient is considered insignificant; (2) If H_1 is true, then the variable coefficient is considered significant. The t-test is used to test partial regression coefficients. The t-test results are displayed in Table 9.

Table 9. T Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.236	2.502		-1.293	.199
	Employee Knowledge (X1)	.208	.074	.215	2.818	.006
	Worker Attitude (X2)	.308	.071	.305	4.333	.000
	Worker Actions (X3)	.419	.075	.404	5.551	.000

Based on Table 9, the following is an explanation of the results of multiple linear regression analysis:

1. Variable X_1 Worker Knowledge shows a significant t-value of 0.006 < 0.05, meaning a significant influence variable exists. Worker knowledge significantly influences SHSE in the Becakayu Toll Road section II-A.
2. Variable X_2 Worker Attitude shows a significant t-value of 0.000 < 0.05, meaning that the variable has a significant influence. Worker Attitudes Workers significantly influence SHSE on the Becakayu Toll Road section II-A.
3. Variable X_3 Worker Action shows a significant t-value of 0.000 < 0.05, meaning that the variable has a significant influence. Worker actions that have a significant impact on SHSE in the Becakayu Toll Road section II-A.

3.2. Discussion

Based on the results of research hypothesis testing, it can be concluded that the worker knowledge variable has an effect on SHSE, the worker attitude variable has an effect on SHSE, and the worker action variable has an effect on SHSE because the T-statistics value is above 1.96 and the significant value is <0.05.

Influence of Employee Knowledge on SHSE. Research hypothesis 1 shows an influence between worker's knowledge factors on SHSE, showing a significant t value of 0.006 < 0.05, meaning there is a considerable influence of the variable X2. It implies that worker knowledge significantly influences SHSE; hypothesis I can be accepted.

The research results above show that the knowledge level influences worker's behaviour regarding SHSE. Work safety for workers must be prioritized. Knowledge and application of SHSE to prevent accidents, environmental pollution, and work-related diseases must receive full support/attention from leadership and management (Accident prevention). Highly knowledgeable workers can more easily achieve the targets of implementing SHSE, namely the targets of occupational health and safety, protecting workers, safeguarding company assets, and ensuring continuity of work and business (Lazuardi et al., 2022; Susanto et al., 2021). Testing hypothesis one shows that work knowledge significantly affects employee performance. This result is strengthened by the positive sign of the regression coefficient, which indicates that the better the worker's work knowledge, the greater the worker's performance.

The Influence of Workers' Attitudes on SHSE. Hypothesis II predicts a relationship between workers' attitudes towards SHSE with the highest level of influence. The analysis results show worker attitudes have the greatest influence, as indicated by the t-statistics value 4.333 (>1.96). It means that workers' attitudes significantly influence on SHSE, so hypothesis II is accepted. Workers' attitudes have the greatest influence on SHSE. It is important to pay attention to the behavioural aspects of workers who still consider SHSE behaviour trivial or lack awareness and are not disciplined in working on projects. Improving SHSE's work ethic and behaviour must be prioritized, even though it is not easy. Therefore, SHSE management and safety officers need to have a strong commitment who consistently emphasize the importance of compliance and implementation of SHSE for worker safety. Observation results show that workers' attitudes are shaped by their knowledge, thoughts, beliefs and commitment, which both workers and management influence. If workers have sufficient knowledge, but their attitudes are not in line with that knowledge, implementing SHSE will not be effective. This finding is supported by research by Kartikasari and Sukwika (2021) and Sulistyowati and Sukwika (2022), showing that there is a positive and significant relationship between workers' attitudes and their intention to comply with safety, occupational health and environmental policies through the use of personal protective equipment (PPE).

Influence of Employee Action on SHSE. This research shows that worker actions influence SHSE, the third-highest score. According to the results of the t-statistics value of 5.551 (>1.96), it is known that worker actions have the third largest influence. It means workers' actions significantly influence SHSE, so hypothesis III is accepted. The results of the research above show that workers' actions influence their behavior regarding SHSE.

When performing their jobs, workers should minimize the risk of workplace accidents by taking steps to use personal protective/safety equipment (PPE) and be behaviorally aware of OSH (Occupational Safety and Health). In the project, the problems caused by workers in terms of work accidents are the carelessness of the workers at work and the workers' indifference. Observation results indicated that many workers knew the regulations but needed to carry them out. An example that is often found is that when workers have to use protective equipment such as gloves or protective clothing, they neglect to use it because it makes them uncomfortable. Workers' attitudes toward unsafe practices can impact worker safety in the workplace. Another causal factor that drives the rate of work accidents is a lack of worker awareness and inadequate

worker quality and skills. Results from research by Baka et al. (2022), Lazuardi et al. (2022), and Purwanti et al. (2023) show that positive employee actions in implementing the SHSE program are related to employee commitment to the company.

3. Conclusion

Highly knowledgeable workers are aware of behaving SHSE and more easily achieve SHSE goals: occupational health and safety targets for other people, protecting company assets, protecting workers and ensuring continuity of work. Workers' attitudes towards SHSE are the main priority for improvement, namely increasing disciplined work ethic and SHSE behavior through strong management commitment, protecting company assets, protecting workers, and ensuring work continuity. Increasing employee understanding and awareness is important, especially complying with and implementing SHSE for worker safety. The SHSE program guarantees safety and reduces the risk of work accidents, efforts to control this through the provision of PPE. Suggestions for this research include: (1) Implementing the SHSE program must be based on commitment and awareness from company management and employees. (2) Management must establish SHSE as a policy integral to other project activities. (3) Company management must provide refresher occupational safety and health education to upgrade knowledge and abilities to prevent workplace accidents that behave safely from the threat of danger.

Conflict of Interest

We declare that we have no competing interest as the authors.

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Authors Contributions

Tatan Sukwika: Conceptualization, Methodology, Supervisio, Writing, Reviewing and Editing.

Amud Zabhara: Data curation, Writing draft preparation, Software, Validation.

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