

Impact of 5R Culture on Employee Performance in HSE Department Using Multiple Linear Regression

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Abstract

The Department of Health, Safety, and Environment (HSE) has a strategic role in ensuring occupational safety, health, and environmental protection, especially in B3 waste management. However, in practice, problems such as low work efficiency, a less organized work environment, and non-compliance with safety procedures are still found. One approach that can be applied to overcome this problem is the 5S work culture (Seiri, Seiton, Seiso, Seiketsu, and Shitsuke). This study aims to analyze the influence of 5S culture on the activities of HSE Department employees at PT Trigunapratama Abadi. The research uses a quantitative approach with a descriptive and verifiable design. Primary data were obtained through a Likert scale questionnaire distributed to HSE employees and analyzed using multiple linear regression with the help of SPSS software. The results showed that simultaneously the 5S culture did not have a significant effect on employee activities, with a significance value of the F test of 0.701. Partially, each of the 5S variables also did not show a significant influence on employee activities. A determination coefficient value (R Square) of 0.397 indicates that the 5S culture is able to explain 39.7% of the variation in employee activities, while the rest is influenced by other factors outside the study model. Nevertheless, the implementation of the 5S culture remains important as the basis for the formation of orderly, disciplined, and safety-oriented work behavior.

Keywords: *5S culture, employee activity, health safety and environment, multiple linear regression, hazardous waste*

Abstrak

Departemen *Health, Safety, and Environment* (HSE) memiliki peran strategis dalam menjamin keselamatan kerja, kesehatan, dan perlindungan lingkungan, khususnya dalam pengelolaan limbah B3. Namun, dalam praktiknya masih ditemukan permasalahan seperti rendahnya efisiensi kerja, lingkungan kerja yang kurang tertata, serta ketidakpatuhan terhadap prosedur keselamatan. Salah satu pendekatan yang dapat diterapkan untuk mengatasi permasalahan tersebut adalah budaya kerja 5S (Seiri, Seiton, Seiso, Seiketsu, dan Shitsuke). Penelitian ini bertujuan untuk menganalisis pengaruh budaya 5S terhadap aktivitas karyawan Departemen HSE di PT Trigunapratama Abadi. Penelitian menggunakan pendekatan kuantitatif dengan desain deskriptif dan verifikatif. Data primer diperoleh melalui kuesioner skala Likert yang disebarakan kepada karyawan HSE dan dianalisis menggunakan regresi linear berganda dengan bantuan perangkat lunak SPSS. Hasil penelitian menunjukkan bahwa secara simultan budaya 5S tidak berpengaruh signifikan terhadap aktivitas karyawan, dengan nilai signifikansi uji F sebesar 0,701. Secara parsial, masing-masing variabel 5S juga tidak menunjukkan pengaruh signifikan terhadap aktivitas karyawan. Nilai koefisien determinasi (R Square) sebesar 0,397 menunjukkan bahwa budaya 5S mampu menjelaskan 39,7% variasi aktivitas karyawan, sedangkan sisanya dipengaruhi oleh faktor lain di luar model penelitian. Meskipun demikian, penerapan budaya 5S tetap penting sebagai dasar pembentukan perilaku kerja yang tertib, disiplin, dan berorientasi keselamatan.

Kata Kunci: *budaya 5S, aktivitas karyawan, kesehatan keselamatan dan lingkungan, regresi linear berganda, limbah B3*

1. Introduction

The Department of Health, Safety, and Environment (HSE) has a strategic role in ensuring safety, occupational health, and environmental protection in a company [1]. HSE employees are responsible for identifying and controlling risks, ensuring the implementation of safety procedures, and maintaining compliance with applicable regulations [2]. However, in practice, various problems are still often found, such as low work efficiency, unorganized work environment conditions, and non-compliance with occupational safety standards [3]. This condition can increase the potential for work accidents and reduce

employee productivity [4]. Therefore, a systematic approach is needed that is able to create a safe, orderly, and efficient work environment, especially in HSE departments [5].

One of the approaches that is considered effective in improving the quality of the work environment is the application of the 5R principle (Concise, Neat, Clean, Careful, and Diligent), which is an adaptation of the 5S method originating from Japan [6]. The 5R method aims to organize the workplace systematically, eliminate waste, and build a disciplined and sustainable work culture [7]. Several previous studies have shown that the application of 5R is able to improve work efficiency and reduce potential hazards in the work environment [8]. Research conducted by [9] shows that the application of the 5R principle in the production area of PT X Batam City is in the category of quite good, with Concise and Neat results of 75%, Resik 100%, and Carat and Diligence of 57% each. However, the aspect of occupational safety is still at a moderate level (50%), which indicates that there are still unsafe conditions and actions [10]. The research focuses more on the production area, so it has not specifically examined the effectiveness of the implementation of 5R on the activities of employees in HSE departments who have different job characteristics and risks.

In addition, most previous studies have tended to only measure the overall rate of 5R adoption without deeply linking it to work behavior, safety awareness, and efficiency of HSE employees' activities [11]. In fact, the HSE department has a dual role, not only as an implementer of occupational safety, but also as a supervisor and controller of the safety culture in the company [12]. Therefore, more specific research is needed to analyze the application of the 5Rs to the activities of HSE department employees and their impact on work efficiency and occupational safety. The novelty of this research lies in the focus of the study directed directly at the HSE department, by integrating the 5R analysis and occupational safety aspects as a unit of interrelated work systems.

Based on this description, the purpose of this study is to analyze the application of the 5R principle to employee activities in the HSE department and identify its effect on work efficiency and work safety. The results of this study are expected to provide theoretical contributions in the form of the development of studies on the application of 5R culture in the context of HSE, as well as practical contributions to companies as a basis for the formulation of policies and strategies for continuous improvement in the management of safety, occupational health, and the environment.

2. Materials and Methods

This study uses a quantitative approach with a descriptive and verifiable research design, which aims to analyze the application of the 5R principle (Concise, Neat, Resik, Careful, and Diligent) to the activities of employees of the Department of Health, Safety, and Environment (HSE) at PT Trigunapratama Abadi. The object of the research is focused on the work activities of HSE employees related to work efficiency, discipline, and compliance with occupational safety procedures. The quantitative approach was chosen because this study objectively measures the relationship between variables through statistically analyzable numerical data [13].

The type of data used in this study is primary data, namely data obtained directly from respondents. Data collection was carried out by survey technique using questionnaires distributed online through Google Form media to HSE Department employees [14]. Before the questionnaire was compiled, the researcher conducted a literature study by reviewing relevant scientific journals and reference books, especially those that discuss the application of the 5R principle, employee activities, and multiple linear regression analysis methods [15]. In addition, field studies were also conducted to observe working conditions and variables relevant to the implementation of 5R in the company environment.

The research instrument in the form of a questionnaire was prepared based on the indicators of the 5R principle and employee activities, using a five-level Likert scale, ranging from a score of 1 (very dissatisfied) to a score of 5 (very satisfied). The data obtained is then processed using Microsoft Excel and SPSS (Statistical Product and Service Solution) software, which are used to simplify the data processing process and increase the accuracy of the analysis results.

The data analysis techniques used in this study include classical assumption tests and multiple linear regression analysis. The classical assumption test was carried out as a prerequisite before regression analysis, which consisted of a normality test using the Kolmogorov–Smirnov method, a multicollinearity test by looking at the value of the Variance Inflation Factor (VIF), and a heteroscedasticity test through scatterplot graph analysis between the residual value and the prediction value. Furthermore, multiple linear regression analysis was used to determine the influence of independent variables, namely the 5R principle, on dependent variables in the form of HSE employee activities. This regression model is used to measure

the magnitude of the influence of each independent variable and predict the relationship between the variables studied. The following are the stages of the research flow.

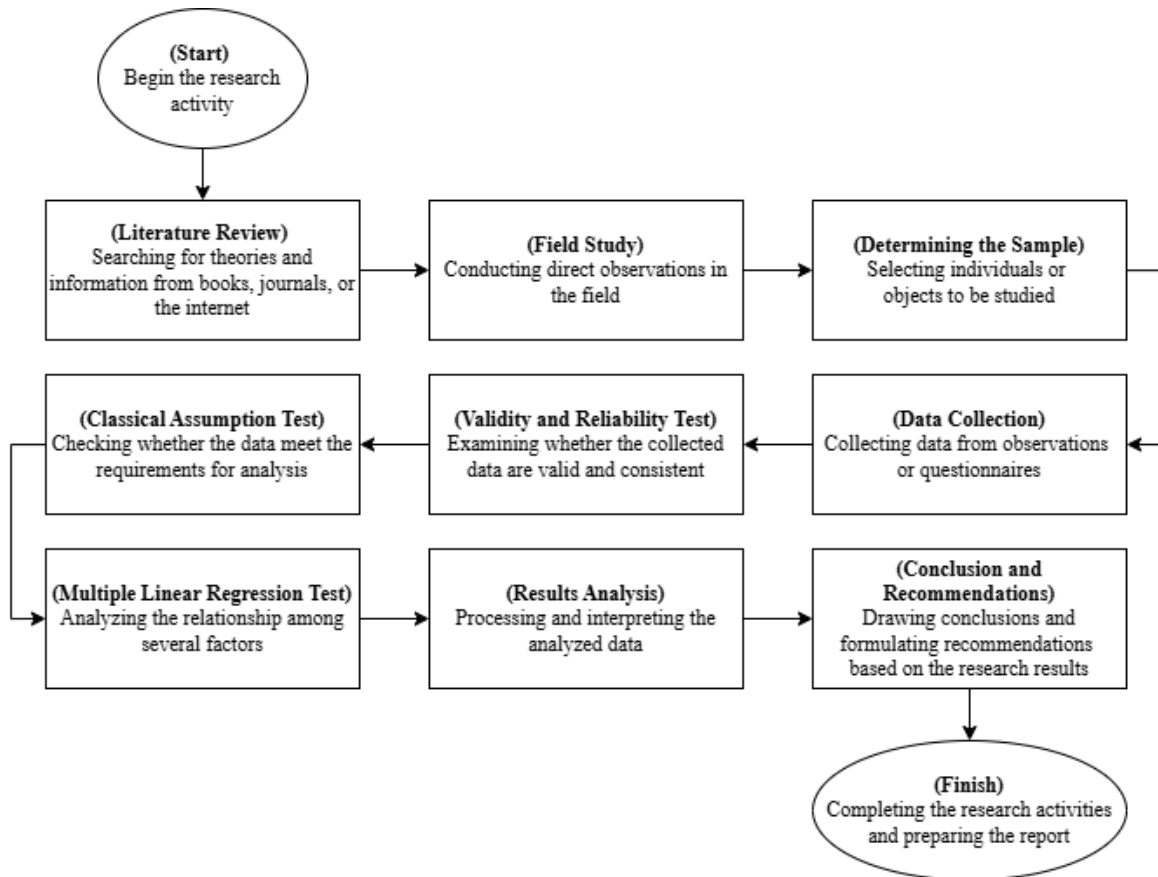


Fig. 1: Tahapan Alur Penilitin
Source: Author’s Processing Results, (2025)

3. Results and Discussion

Data Collection

The data obtained from this questionnaire is raw data, namely data from respondents who work in the HSE (Health, Safety, and Environment) Department. In other words, this data has not gone through an analysis process such as multiple linear regression tests and other prerequisite tests. Through this preliminary data, researchers can identify the extent of the influence of variable X on variable Y.

The following is the data obtained from the questionnaire using google form, to be further processed in the form of a table.

Table 1a. Results of the Employee Activity Questionnaire

They respond	Seiri (X1)					Total X1	Seiton (X2)					Total X2	Seiso (X3)					Total X3
	X1.1	X1.2	X1.3	X1.4	X1.5		X2.1	X2.2	X2.3	X2.4	X2.5		X3.1	X3.2	X3.3	X3.4	X3.5	
1	1	1	3	2	1	8	2	3	1	3	1	10	3	1	2	2	2	10
2	2	1	1	1	1	6	1	1	1	1	1	5	1	1	1	2	2	7
3	1	1	1	1	1	5	1	1	1	2	1	6	2	1	2	1	1	7
4	3	1	2	1	1	8	1	3	1	2	1	8	1	1	2	3	3	10
5	2	1	1	2	1	7	1	2	1	1	1	6	3	1	1	1	1	7
6	2	2	2	2	2	10	3	2	1	3	1	10	1	2	3	1	2	9
7	1	2	4	1	3	11	2	1	1	2	1	7	2	2	3	3	2	12
8	1	1	1	1	1	5	1	1	1	1	1	5	1	1	2	3	1	8
9	3	2	1	3	2	11	2	3	2	2	1	10	2	2	4	5	1	14
10	2	1	1	2	1	7	1	3	1	1	1	7	1	1	4	3	2	11
11	1	1	1	1	1	5	1	1	1	1	1	5	1	1	3	2	2	9
12	2	3	3	2	3	13	3	2	1	2	2	10	3	3	2	3	3	14
13	1	2	2	1	2	8	2	1	2	2	1	8	2	2	3	3	2	12

Source: Author’s Processing Results, (2025)

Table 1b. Results of the Employee Activity Questionnaire

Seiketsu (X4)					Total X4	Shitsuke (X5)					Total X5	Employee Activities (Y)					Total Y
X4.1	X4.2	X4.3	X4.4	X4.5		X5.1	X5.2	X5.3	X5.4	X5.5		Y.1	Y.2	Y.3	Y.4	Y.5	
5	4	2	5	4	20	3	3	5	4	5	20	5	3	5	4	5	22
3	3	3	4	5	18	5	4	5	5	5	24	5	5	4	3	3	20
2	2	2	2	2	10	2	2	2	2	2	10	2	2	2	2	2	10
4	1	5	5	5	20	4	4	4	4	5	21	4	5	5	5	5	24
1	1	3	2	3	10	3	3	5	4	3	18	4	3	1	3	5	16
1	2	3	3	3	12	2	3	2	2	2	11	2	2	3	3	4	14
3	1	2	4	4	14	4	4	4	4	4	20	4	4	4	4	4	20
1	2	3	1	2	9	2	2	1	2	2	9	1	2	2	1	2	8
4	5	5	4	5	23	5	5	4	5	5	24	4	5	5	5	4	23
2	3	2	4	3	14	2	3	3	2	2	12	4	3	3	2	2	14
1	2	2	3	4	10	2	3	1	2	3	11	2	3	2	2	2	11
2	4	1	3	4	14	3	4	4	2	3	16	3	4	3	3	4	17
1	3	1	3	2	10	4	3	3	4	2	16	3	2	3	3	2	13

Source: Author's Processing Results, (2025)

Data Processing

a. Validity Test

The validity test is the initial stage that is carried out before multiple linear regression analysis. Based on the results of data processing using SPSS, a table r value of 0.3160 was obtained at a significance level of 5%. The test results showed that all question items in variables X1, X2, X3, X4, X5, and Y had a calculated r value greater than the r table, so that all research instruments were declared valid. Thus, the instruments used are feasible to measure research and analysis variables can be proceeded to the reliability test stage.

Table 2. Validity Test Results

No	Questions	R count	R Table	Conclusion
1	X1.1	0.413	0.3160	Valid
2	X1.2	0.484	0.3160	Valid
3	X1.3	0.477	0.3160	Valid
4	X1.4	0.438	0.3160	Valid
5	X1.5	0.467	0.3160	Valid
6	X2.1	0.479	0.3160	Valid
7	X2.2	0.427	0.3160	Valid
8	X2.3	0.430	0.3160	Valid
9	X2.4	0.472	0.3160	Valid
10	X2.5	0.369	0.3160	Valid
11	X3.1	0.411	0.3160	Valid
12	X3.2	0.484	0.3160	Valid
13	X3.3	0.306	0.3160	Valid
14	X3.4	0.400	0.3160	Valid
15	X3.5	0.360	0.3160	Valid
16	X4.1	0.474	0.3160	Valid
17	X4.2	0.400	0.3160	Valid
18	X4.3	0.409	0.3160	Valid
19	X4.4	0.405	0.3160	Valid
20	X4.5	0.499	0.3160	Valid
21	X5.1	0.391	0.3160	Valid
22	X5.2	0.360	0.3160	Valid
23	X5.3	0.507	0.3160	Valid
24	X5.4	0.516	0.3160	Valid
25	X5.5	0.417	0.3160	Valid

No	Questions	R count	R Table	Conclusion
26	Y.1	0.459	0.3160	Valid
27	Y.2	0.492	0.3160	Valid
28	Y.3	0.430	0.3160	Valid
29	Y.4	0.464	0.3160	Valid
30	Y.3	0.377	0.3160	Valid

Source: Author's Processing Results, (2025)

b. Reliability Test

The reliability test is an advanced stage after the validity test which aims to determine the level of consistency of the research instrument. Based on the results of data processing using SPSS software, as presented in Table 4.5 Reliability Test Results, a Cronbach's Alpha value of 0.839 was obtained, which is greater than the critical value of 0.60. The results show that all question items in variables X1, X2, X3, X4, X5, and Y have a good level of consistency and are declared reliable. Thus, the research instrument can be used consistently to measure the variables being studied and is suitable to proceed to the stage of multiple linear regression analysis.

Table 3. Reliability Test Results

Cronbach Alpha Value	Critical Values	Conclusion
0.839	0.60	Reliabel

Source: Author's Processing Results, (2025)

c. Classic Assumption Test

1) Normality Test

The normality test was carried out to determine whether the residual data in the regression model was normally distributed as one of the requirements for multiple linear regression analysis. Based on the test results using the One-Sample Kolmogorov–Smirnov Test method shown in **Figure 2** Results of the Kolmogorov–Smirnov Normality Test, an Asymp value was obtained. Sig. (2-tailed) is 0.040. This value is below the significance level of 0.05, which indicates that statistically the residual data do not fully meet the assumption of normality. However, based on the Monte Carlo Sig. (2-tailed) value of 0.035 with a 99% confidence interval, residual data is still acceptable for further analysis, given the number of samples used and alternative approaches in normality testing. Therefore, the regression model can still be continued to the next stage of analysis.

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual	
N		37	
Normal Parameters ^{a,b}	Mean	.0000000	
	Std. Deviation	2.91952511	
Most Extreme Differences	Absolute	.148	
	Positive	.064	
	Negative	-.148	
Test Statistic		.148	
Asymp. Sig. (2-tailed) ^c		.040	
Monte Carlo Sig. (2-tailed) ^d	Sig.	.035	
	99% Confidence Interval	Lower Bound	.031
		Upper Bound	.040

Fig. 2. Normality Test

Source: Author's Processing Results, (2025)

2) Multicollinearity Test

Multiple linear regression analysis was used to determine the influence of 5R culture on the activities of employees of the Department of Health, Safety, and Environment (HSE) in B3 waste management at PT Trigunapratama Abadi. Based on the test results presented in **Figure 3** of the Multiple Linear Regression Test Results, the variables Compact (X1), Neat (X2), and Resik (X3) showed a significance value of 0.398 each; 0,461; and 0.475, which is greater than 0.05, so that these three variables have not had a significant effect on the activities of HSE employees. The Treatment variable (X4) has a significance value of 0.058

with a positive beta coefficient, which indicates a tendency to have a positive effect even though it is not significant at the level of 5%. Meanwhile, the Diligent variable (X5) showed a positive and significant influence with a significance value of 0.028 and a beta coefficient of 0.377, indicating that discipline, compliance with procedures, and consistency of work behavior were the dominant factors influencing the activities of HSE employees in B3 waste management. These results confirm that aspects of sustainable work behavior and culture play an important role in supporting the effectiveness of HSE performance.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5.680	3.198		1.776	.085		
	X1	.409	.477	.274	.857	.398	.191	5.247
	X2	-.384	.514	-.247	-.747	.461	.178	5.620
	X3	-.158	.219	-.124	-.723	.475	.662	1.510
	X4	.369	.188	.336	1.965	.058	.665	1.504
	X5	.398	.172	.377	2.307	.028	.727	1.376

Fig. 3: Multicollinearity Test
Source: Author's Processing Results, (2025)

3) Heterokedasticity Test

Figure 4 shows the results of the heterokedasticity test data processing carried out by regressing the residual value for each independent variable (X1 to X5). Based on the coefficient table, all independent variables have a significance value (Sig.) greater than 0.05, which indicates that there is no significant influence between independent variables on residual values. Thus, it can be concluded that the regression model used in this study does not experience heterokedasticity problems, so that the variance of error is constant and the regression model is feasible to use for further analysis in testing the influence of 5R culture on the activities of HSE Department employees.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.065	2.131		-.031	.976
	X1	-.455	.318	-.557	-1.429	.163
	X2	.347	.342	.409	1.013	.319
	X3	.104	.146	.148	.710	.483
	X4	.036	.125	.060	.285	.777
	X5	.081	.115	.140	.702	.488

Fig. 4: Heteroscedasticity Test
Source: Author's Processing Results, (2025)

d. Multiple Linear Regression Test

Figure 5 displays the Model Summary of the results of multiple linear regression analysis using SPSS which describes the model's ability to explain dependent variables. The value of the correlation coefficient (R) of 0.630 indicates a fairly strong relationship between the independent variable (X1–X5) and the dependent variable (Y). The R Square value of 0.397 indicates that 39.7% of the variation in employee activities can be explained by the variables Concise, Neat, Resik, Careful, and Diligent, while the remaining 60.3% is influenced by other factors outside the research model. Meanwhile, the Adjusted R Square value of 0.300 indicates that after adjusting for the number of variables and samples, the model's ability remains in the sufficient category, and the Std. Error of the Estimate value of 3.14617 indicates the level of model prediction error that is still acceptable in this study.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.630 ^a	.397	.300	3.14617

Fig. 5: Uji Regresi Linear Berganda
Source: Author's Processing Results, (2025)

e. Uji Hypothesis

1) F Test (Simultaneous)

Based on the **Figure 6** Test F (Simultaneous), the results of data processing showed a significance value of 0.701, which is greater than the significance level of 0.05. This indicates that simultaneously the variables X1 (Concise), X2 (Neat), X3 (Resik), X4 (Careful), and X5 (Diligent) did not have a significant effect on employee activities at PT Trigunapratama Abadi.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.425	5	3.085	.701	.627 ^b
	Residual	136.333	31	4.398		
	Total	151.758	36			

Fig. 6: Simultaneous F Test
Source: Author's Processing Results, (2025)

2) T Test (Partial)

Based on the **Figure 7** Statistical (Partial), the results of data processing showed that partially all independent variables, namely X1 (Concise), X2 (Neat), X3 (Resik), X4 (Care), and X5 (Diligent), had a t-count value that was smaller than the t-table of 1.687 and a significance value above 0.05. This indicates that each 5R variable does not have a significant effect on employee activities at PT Trigunapratama Abadi. Thus, it can be concluded that there are no individual 5R cultural variables that are able to explain the significant change in HSE Department employee activity in the regression model used.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.065	2.131		-.031	.976
	X1	-.455	.318	-.557	-1.429	.163
	X2	.347	.342	.409	1.013	.319
	X3	.104	.146	.148	.710	.483
	X4	.036	.125	.060	.285	.777
	X5	.081	.115	.140	.702	.488

Fig. 7: Partial t-test
Source: Author's Processing Results, (2025)

4. Conclusion

This study aims to analyze the influence of the 5R (Concise, Neat, Clean, Careful, and Diligent) work culture on the activities of employees of the Department of Health, Safety, and Environment (HSE) at PT Trigunapratama Abadi in B3 waste management using the multiple linear regression method. The results of the analysis showed that simultaneously the 5R culture had no significant effect on employee activities, which was shown by the significance value of the F test of 0.701. Partially, each of the 5R variables also did not show a significant effect on employee activity, although there was a tendency for a positive relationship in some variables. A determination coefficient value (R Square) of 0.397 indicates that the 5R culture is able to explain 39.7% of the variation in employee activity, while the rest is influenced by other factors outside the research model. Although the influence of statistics has not been significant, the implementation of the 5R culture still has an important role as the foundation for the formation of orderly,

disciplined, and safety-oriented work behavior in the HSE environment. Therefore, it is recommended that companies not only emphasize the technical implementation of the 5R, but also strengthen aspects of behavior coaching, continuous supervision, and the integration of an occupational safety culture. Further research is expected to add other variables such as leadership, management commitment, and safety culture to obtain a more comprehensive Figure of the factors that influence the activities and performance of HSE employees.

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