

THE INFLUENCE OF OCCUPATIONAL HEALTH AND SAFETY (K3), WORKLOAD AND PHYSICAL WORK ENVIRONMENT ON EMPLOYEE PERFORMANCE AT PT PERKEBUNAN NUSANTARA IV PABATU

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Abstract

This study aims to analyze the influence of Occupational Health and Safety (OHS), Workload, and Physical Work Environment on Employee Performance at PT Perkebunan Nusantara IV Pabatu. The research employed a quantitative approach with a population of 282 employees in the harvesting division and a sample of 74 respondents, determined using the Taro Yamane formula. Data were collected through questionnaires and analyzed using multiple linear regression with the help of SPSS 25. The results indicate that, partially, OHS and Workload do not have a significant effect on Employee Performance, with significance values of 0.356 and 0.389, respectively. However, the Physical Work Environment variable has a significant effect on Employee Performance, with a significance value of 0.012. Simultaneously, the three variables (OHS, Workload, and Physical Work Environment) have a significant influence on Employee Performance, with an F-value of 3.403 and a significance level of 0.022. The adjusted R² value of 0.090 indicates that 9% of the variation in Employee Performance can be explained by these three variables. These findings highlight the importance of managing the physical work environment effectively to improve performance, although attention to OHS and workload remains essential as part of a comprehensive human resource management strategy.

Keywords: *Occupational Health and Safety, Workload, Physical Work Environment, Employee Performance, PT Perkebunan Nusantara IV Pabatu*

INTRODUCTION

Employee performance is a person's effort to achieve work goals that are produced in terms of quantity and quality.(Sherlina & Kusumah, 2024). Meanwhile, the factors that influence employee performance are internal factors that exist within themselves such as ability, expertise, personality and motivation, while external factors come from within the Company, for example, Company leadership. (Wildan & Sa'adah, 2021) Occupational health and safety, workload, and physical work environment play an important role in determining employee performance. This study aims to explore how these factors interact and influence productivity and job satisfaction in the organizational and corporate environment. A good physical work environment can affect employee performance in the company. Therefore, the company must be able to create a good, healthy and comfortable work environment to increase employee performance productivity.(Subhan et al., 2023)researched that a conducive physical work environment can improve employee financial, time, and energy efficiency.

health and safety can also affect employee performance. With the implementation of good K3, employees feel safer and more secure so that their safety is more effective and efficient. In addition, workload has a significant influence on employee performance because each job has a physical, mental and social burden, which must be managed wisely by each employee. Therefore, the Company must have a role in managing Occupational Safety and Health (K3), Workload, and Physical Work Environment effectively, the aim of which is to improve employee performance. This study was conducted to see the effect of

Occupational Health and Safety (K3), Workload, and Physical Work Environment on Employee Performance at PT. Perkebunan Nusantara IV Pabatu.

Based on the results of the pre-survey of 74 respondents in the harvesting sector, it was found that occupational health and safety (K3), workload, and the physical work environment has a significant influence on employee performance. Some of the problems that arise include the implementation of K3 that is not optimal (such as work safety procedures that are not optimal, which triggers employee negligence in working which causes injury), and motivational support in managing workloads that is not optimal, and an inefficient work environment makes employees lose concentration. Safety is protection for workers so that they are not injured due to work accidents. (Rosento RST1, 2021). In addition, workload is a task given to employees at a certain time by using the abilities and potential of employees. Workload is a situation where employees must complete tasks within the time specified by the company (Handayani et al., 2023). So employee work productivity will increase when the company can pay attention to the workload that employees feel. In addition to K3 and workload, the work environment is also said to be ideal if it has sufficient lighting, wall colors that are not too striking, complete work equipment, and a good work environment situation can affect employees both physically and psychologically (Wangi et al., 2020). A positive work environment will improve employee ethics leading to greater productivity and performance. Therefore, if the procedure is not implemented properly, it will affect employee performance at PT Perkebunan Nusantara IV Pabatu. Conversely, if K3 is carried out in accordance with good procedures, the risk of work accidents and injuries will also be reduced.

This research is important to analyze the influence of occupational health and safety (K3), workload, and physical work environment on employee performance. By understanding these factors, the Company's performance will be more effective and can increase employee performance productivity at PT Perkebunan Nusantara IV Pabatu.

Occupational Safety and Health are conditions in work that are healthy and safe for the work, the company and the community and the environment around the factory or workplace. According to (Hasi et al., 2020), the objectives of occupational safety and health (K3) are as follows: So that every employee is guaranteed occupational safety and health both physically, socially, and psychologically, So that every work equipment and tool is used as well as possible and the production results are maintained for safety, and there is a guarantee of maintenance and improvement of employee nutritional health which aims to increase enthusiasm, work harmony, and work participation, and avoid health problems caused by the environment or working conditions, So that every employee feels safe and protected at work. Occupational safety and health is also an effort to prevent any unsafe acts or conditions, which can result in accidents (Candrianto, 2020). Occupational safety and health indicators according to (Surjosuseno, 2018), including: Health Financing, Health Services, Equipment, Procedures, Storage of goods, Work authority, Negligence.

All efforts to achieve company goals must have an increased workload to achieve these goals because every job is a burden for those concerned, the burden can be physical and mental (Fidianingsih et al., 2023). The employee's workload has been determined in the form of company work standards that are in accordance with the type of work. A workload that is too difficult or easy will have an impact on work inefficiency. A workload that is too easy will result in excess labor. This excess can cause companies to pay more employee salaries with the same productivity so that the number of employees employed is small, which can cause physical and psychological fatigue of employees (Nurohma et al., 2023). Workload indicators according to (Maghfira et al., 2023) namely: Working conditions, Use of working hours, Targets to be achieved. According to (Uma & Swasti, 2024), the work environment is everything around the worker that will have an impact on him in completing his work. Furthermore, according to Nabella et al., (2021) the work environment is all the tools and materials encountered, a person's work environment, how they work, and how to organize work individually or in groups. According to (Wibowo & Widiyanto, 2019) Work environment indicators are: Lighting, Air temperature, Noise.

CONCEPTUAL FRAMEWORK

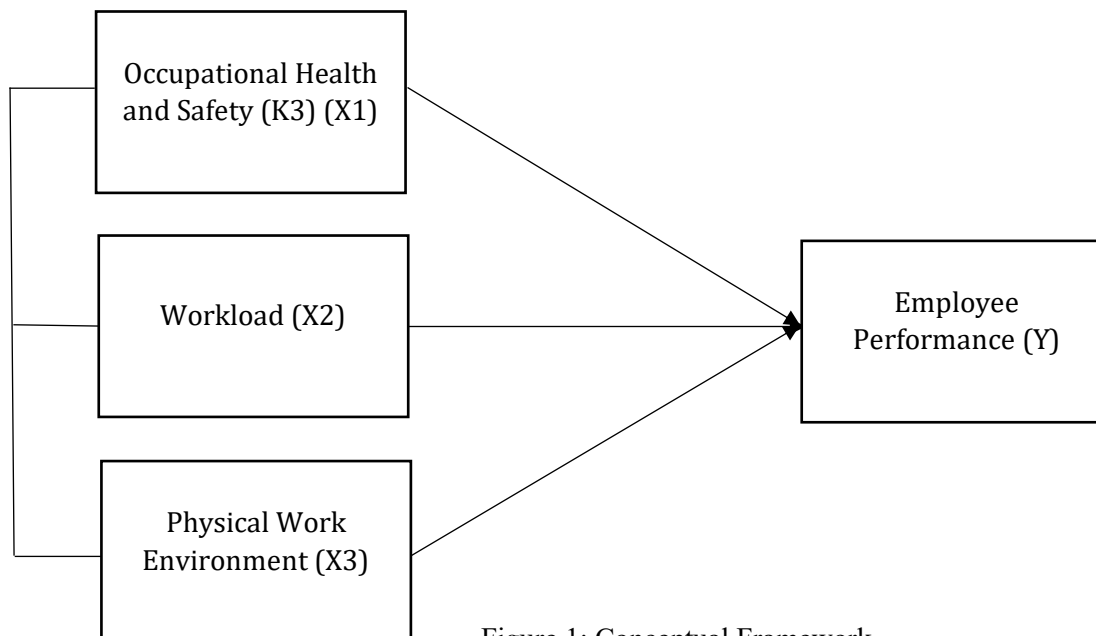


Figure 1: Conceptual Framework
Source: Processed data (2024)

OPERATIONAL DEFINITION

Occupational health and safety (K3) (X1) simultaneously has a significant positive influence on employee performance (Y). Both complement each other and together create optimal conditions for employees to work effectively and efficiently. Workload (X2) can be concluded to have a significant effect on employee performance (Y). Excessive workload can cause stress, fatigue, and decreased motivation, all of which have a negative impact on performance. The physical work environment (X3) has a significant effect on employee performance (Y). Overall, a good work environment will benefit the Company as a whole. The relationship between occupational health and safety (K3) (X1), workload (X2), and the physical work environment (X3) has a close relationship to employee performance (Y). The three complement each other and together create optimal conditions for employees to work effectively and efficiently.

RESEARCH METHODS

This study was conducted using quantitative methods and aims to analyze the influence of independent variables on dependent variables. In this study, the physical work environment, work safety, and workload are independent variables, and employee performance is the dependent variable. Quantitative research is a research method that is inductive, objective, and scientific, and the data obtained are in the form of numbers, such as scores or values. (Raihan & Mukminin, 2023). The nature of this research is development. Development according to (Ritonga et al., 2022) is an effort to improve technical, theoretical, moral, and conceptual according to one's own abilities through education and training. The research tool is used to collect data that is done quantitatively to test the established hypothesis. This research was conducted at PT Perkebunan Nusantara IV Pabatu which is located in Kedai Damar Village, Tebing Tinggi District, Serdang Bedagai Regency.

The population in this study were employees in the harvesting sector of PT Perkebunan IV Pabatu, totaling 282 people in 7 harvesting areas. The sample of this study used the formula *Taro Yaman* with 74

respondents and responses used using a Likert scale. According to (Sugiyono, 2019) Data analysis method is related to calculations to answer the formulation of the problem and testing the proposed hypothesis. Data analysis in this study is quantitative analysis using the Probability Sampling technique, which is a sampling technique that provides an equal opportunity for each element (member) of the population to be selected as a sample member. By using three independent variables and one dependent variable, namely, Occupational Health and Safety (K3) (X1), workload (X2), and physical work environment (X3), and the dependent variable is Employee Performance (Y). This type of research is categorized as field research, the focus of the study is workers in the harvesting sector at PT Perkebunan Nusantara IV Pabatu. Primary and secondary data are the data sources used. Questionnaires, interviews, and documentation are data collection methods. In addition, data analysis is processed using version 25 software which includes instrument testing, classical assumption testing, validity and reliability testing, multiple linear regression testing, partial testing, T-tests are also carried out

RESULTS AND DISCUSSION

Instrument Test

Instrument Test

Measuring tools in research are usually called research instruments. According to The Greatest Showman (2015) Research instruments are tools used to measure natural and social phenomena that are observed. Instrument testing is carried out using 2 tests, namely validity and reliability tests.

a. Validity Test

This test was conducted on 30 respondents, so $df = 30 - k = 27$, with $\alpha = 5\%$, the r table value was obtained as 0.367 (Ghozali, 2016), then the calculated r value will be compared with the r table value as in table 1 below:

Table 1.
Validity Test Results

Variable Y (Employee performance)			
Statement	rhitung	rtable	Validity
1	0.605	0.367	Valid
2	0.671	0.367	Valid
3	0.590	0.367	Valid
Variable X1 (Occupational Health and Safety)			
Statement	rhitung	rtable	Validity
1	0.473	0.367	Valid
2	0.715	0.367	Valid
3	0.597	0.367	Valid
4	0.820	0.367	Valid
5	0.609	0.367	Valid
6	0.610	0.367	Valid
7	0.505	0.367	Valid
Variable X2 (Workload)			
Statement	rhitung	rtable	Validity
1	0.507	0.367	Valid
2	0.578	0.367	Valid
3	0.756	0.367	Valid
Variable X3 (Physical Work Environment)			
Statement	rhitung	rtable	Validity
1	0.576	0.367	Valid

2	0.545	0.367	Valid
3	0.866	0.367	Valid

Table 5 shows that all points of the statement are good variables. employee performance, variable competence, variable motivation and variable Work enthusiasm has a calculated r value that is greater than the table r value, so it can be concluded that all statements for each variable are valid.

b. Reliability Test

Reliability is an index that shows the extent to which a measuring instrument can be trusted or relied upon. According to Sugiyono (2013:64) A factor is declared reliable if Cronbach Alpha is greater than 0.6. Based on the results of data processing using SPSS 25.00, the following results were obtained:

Table 2.
Reliability Test Results

Variables	Cronbach's Alpha	Constants	Reliability
Variables Employee performance (Y)	0.711	0.6	Reliable
Occupational Health and Safety Variable (X1)	0.743	0.6	Reliable
Workload Variable (X2)	0.708	0.6	Reliable
Physical Work Environment Variable (X3)	0.750	0.6	Reliable

Based on the reliability test using Cronbach Alpha, all research variables are reliable because Cronbach Alpha is greater than 0.6, so the results of this study indicate that the measurement tool in this study has met the reliability test (reliable and can be used as a measuring tool).

Classical Assumption Test

Normality Test

The Normality Test aims to test whether in the regression model, the confounding variables or residuals have a normal distribution (Ghozali, 2016:154). Data normality testing can be done using two methods, graphs and statistics.

Table 3. One Sample Kolmogorov Smirnov Test
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		74
Normal Parameters ^{a,b}	Mean	,0000000
	Std. Deviation	,71235729
Most Extreme Differences	Absolute	,077
	Positive	,074
	Negative	-,077
Test Statistics		,077
Asymp. Sig. (2-tailed)		,200c,d
Monte Carlo Sig. (2-tailed)	Sig.	,730e
	99% Confidence Interval Lower Bound	,597
	Upper Bound	,863

- a. Test distribution is Normal.
- b. Calculated from data.
- c. Lilliefors Significance Correction.

- d. This is a lower bound of the true significance.
- e. Based on 74 sampled tables with starting seed 2000000.

From the output it can be seen that the significance value (Monte Carlo Sig.) of all variables is 0.730. If the significance is more than 0.05, then the residual value is normal, so it can be concluded that all variables are normally distributed.

Multicollinearity Test

The multicollinearity test aims to determine whether there is a correlation between independent variables in the regression model. The multicollinearity test in this study is seen from the tolerance value or variance inflation factor (VIF).

Table 4. Multicollinearity Test Results
Coefficients^a

Model	Collinearity Statistics	
	Tolerance	VIF
1 (Constant)		
Occupational Health and Safety	,862	1,160
Workload	,876	1,141
Physical Work Environment	,983	1,018

a. Dependent Variable: Employee Performance

Based on the output, it can be seen that the tolerance value of Variable X1 Occupational health and safety is 0.862, Variable X2 Workload is 0.876 and Variable X3 Physical work environment is 0.983 where all are greater than 0.10 while the VIF value of Variable X1 Occupational health and safety is 1.160, Variable X2 Workload is 1.141 and Variable X3 Physical work environment is 1.018 where all are less than 10. Based on the calculation results above, it can be seen that the tolerance value of all independent variables is greater than 0.10 and the VIF value of all independent variables is also less than 10 so that there is no correlation symptom in the independent variables. So it can be concluded that there is no multicollinearity symptom between independent variables in the regression model.

Heteroscedasticity Test

The heteroscedasticity test aims to test whether the regression model shows inequality of variance from the residuals of one observation to another. A good regression model is one that is homoscedastic or does not have heteroscedasticity. One way to detect the presence or absence of heteroscedasticity is by Glejser. Based on the results of data processing, the heteroscedasticity test in this study is shown in the following table:

Table 5. TestGlacier
Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,938	1,109		,846	,400
	Occupational Health and Safety	,003	,009	,041	,327	,745
	Workload	,030	,075	,050	,404	,688
	Physical Work Environment	-,064	,035	-,214	-1,821	,073

a. Dependent Variable: ABS_RES

Table 5 shows the significance value of variable X1 Occupational Health and Safety of 0.745, variable X2 Workload of 0.688 and variable X3 Physical Work Environment of 0.073 where all three are greater than 0.050 so it can be concluded that there are no symptoms of heteroscedasticity.

Multiple Linear Regression

Multiple linear regression testing explains the magnitude of the role of more than one independent variable on the dependent variable. Data analysis in this study uses multiple linear regression analysis using SPSS 25.00 for windows. The analysis of each variable is explained in the following description.

Table 6.
Multiple Linear Regression Results
Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
1 (Constant)	9,185	2,074	
Occupational Health and Safety	,016	,017	,112
Workload	,122	,141	,103
Physical Work Environment	,170	,066	,291

a. Dependent Variable: Employee Performance

Source: Data processed from the appendix (2025)

Based on these results, the multiple linear regression equation has the following formulation: $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \epsilon$, so that the equation obtained is: $Y = 9.185 + 0.016X_1 + 0.122X_2 + 0.170X_3 + \epsilon$

The description of the multiple linear regression equation above is as follows:

- The constant value (a) of 9.185 indicates the magnitude of the Y variable. Employee performance if variables X1 Occupational Health and Safety, X2 Workload and variable X3 Physical Work Environment are equal to zero.
- The regression coefficient value of variable X1 Occupational health and safety (b1) of 0.016 indicates the magnitude of the role of variable X1 Occupational health and safety on variable Y Employee performance assuming variable X2 Workload, and variable X3 Physical work environment are constant. This means that if the variable factor X1 Occupational health and safety increases by 1 unit of value, then it is predicted that the variable Y Employee performance will increase by 0.016 units of value assuming variable X1 Occupational health and safety, and variable X2 Workload are constant.
- The value of the regression coefficient of the variable X2 Workload (b2) of 0.122 indicates the magnitude of the role of variable X2 Workload on variable Y Employee performance with the assumption that variable X1 Occupational health and safety and variable X3 Physical work environment are constant. This means that if the variable factor X2 Workload increases by 1 unit of value, then it is predicted that variable Y Performance will increase by 0.122 units of value with the assumption that variable X1 Occupational health and safety and variable X2 Workload are constant.
- Regression coefficient value of variable X3 Physical work environment (b3) of 0.170 indicates the magnitude of the role of variable X3 Physical work environment on variable Y Employee performance with the assumption of variable X1 Occupational health and safety and variable X2 Workload constant. This means that if the variable factor X3 Physical work environment increases by 1 value unit, then it is predicted that variable Y Employee performance will increase by 0.170 value units with the assumption of variable X1 Occupational health and safety and variable X2 Workload constant.

Coefficient of Determination (R²)

The coefficient of determination is used to see how much the independent variable contributes to the dependent variable. The greater the value of the coefficient of determination, the better the ability of the independent variable to explain the dependent variable. If the determination (R^2) is greater (approaching 1), then it can be said that the influence of the independent variable is large on the dependent variable. The value used in viewing the coefficient of determination in this study is in the adjusted R square column. This is because the adjusted R square value is not susceptible to the addition of independent variables. The coefficient of determination value can be seen in Table 7 below:

Table 7. Coefficient of Determination

Model Summary

Model	R	R Square	Adjusted R Square
1	,357a	,127	,090

- a. Predictors: (Constant), Physical Work Environment, Workload, Occupational Health and Safety
b. Dependent Variable: Employee Performance

Source: Data processed from appendix 4 (2024)

Based on table 7, it can be seen that the adjusted R square value is 0.090 or 9%. This shows that the variable X1 Occupational health and safety, X2 Workload, and X3 Physical work environment can explain the Y variable Employee performance by 9%, the remaining 91% (100% - 9%) is explained by other variables outside this research model, such as Work Motivation, employee incentives, work facilities and others.

Research result

t-Test (Partial)

The t-statistic test is also called the individual significance test. This test shows how far the independent variable partially influences the dependent variable. In this study, partial hypothesis testing was carried out on each independent variable as in Table 8. below:

Table 8. Partial Test (t)

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	9,185	2,074		4,429	,000
Occupational Health and Safety	,016	,017	,112	,929	,356
Workload	,122	,141	,103	,866	,389
Physical Work Environment	,170	,066	,291	2,588	,012

- a. Dependent Variable: Employee Performance

Hypothesis Test of the Influence of X1 Occupational Health and Safety on Employee Performance
From table 8, the t-count value is 0.929. With $\alpha = 5\%$, t-table (5%; nk = 71), the t-table value is 1.993. From this description, it can be seen that t-count $0.929 < t\text{-table } 1.993$, likewise with the significance value of $0.356 > 0.05$, it can be concluded that the first hypothesis is rejected, meaning Variable X1 Occupational health and safety has no effect on the Y Variable Employee Performance.

Hypothesis Test of the Effect of X2 Workload on Employee Performance Y

From table 8, the t-count value is 0.866. With $\alpha = 5\%$, t-table (5%; nk = 71), the t-table value is 1.9960. From this description, it can be seen that t-count $0.866 < t\text{-table } 1.993$, likewise with the significance value of $0.389 > 0.05$, it can be concluded that the second hypothesis is rejected, meaning Variable X2 Workload has no effect on the Y Variable Employee Performance.

Hypothesis Test of the Influence of X3 Physical Work Environment on Employee Performance

From table 8, the t-count value is 2.588. With $\alpha = 5\%$, t-table (5%; nk = 71), the t-table value is 1.993. From this description, it can be seen that t-count $2.588 > t\text{-table } 1.993$, and the significance value is $0.012 > 0.05$, so it can be concluded that the third hypothesis is accepted, meaning Variable X3 Physical work environment on the Y Variable Employee Performance.

F Test (Simultaneous)

This test basically shows whether all independent variables included in this model have a joint influence on the dependent variable. The results of the F test can be seen in table 9 below:

Table 9. Simultaneous Test Results (F)

		ANOVA				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,402	3	1,801	3,403	,022b
	Residual	37,044	70	,529		
	Total	42,446	73			

a. Dependent Variable: Employee Performance

b. Predictors: (Constant), Physical Work Environment, Workload, Occupational Health and Safety

From table 9, the F count value is 3.403. With $\alpha = 5\%$, numerator df: k, denominator df: nk-1 (5%; Df1: 2; Df2: 70), the F table value is 2.74. From this description, it can be seen that the F count is $3.403 > F\text{ table } 2.74$, and the significance value is $0.022 < 0.05$, so it can be concluded that the third hypothesis is accepted, meaning Variables X1, X2, and X3 have a simultaneous effect on variable Y (employee performance)..

Discussion

The Influence of Occupational Health and Safety (X1) on Employee Performance

From The t-test results show that the Occupational Health and Safety (OHS) variable does not have a significant effect on employee performance, with a significance value of $0.356 (> 0.05)$ and a t count of $0.929 (< t\text{table } 1.993)$. This indicates that the first hypothesis (H1) is rejected. This indicates that suboptimal OHS implementation or lack of attention to occupational safety and health aspects can cause employees to feel dissatisfied, which ultimately impacts their performance.

The Effect of Workload (X2) on Employee Performance

From the t-test analysis, it shows that the Workload variable does not have a significant effect on employee performance, with a significance value of $0.389 (> 0.05)$ and t count of $0.866 (< t\text{table } 1.993)$. Therefore, the second hypothesis (H2) is rejected. This can be caused by employee adaptation to the workload given or the presence of other factors that are more dominant in influencing performance, such as motivation or work environment.

The Influence of Physical Work Environment (X3) on Employee Performance

From the t-test, it shows that the Physical Work Environment variable has a significant effect on employee performance, with a significance value of $0.012 (< 0.05)$ and a t count of $2.588 (> t\text{table } 1.993)$. Thus, the third hypothesis (H3) is accepted. This means that a comfortable and safe physical work

environment can increase concentration, reduce stress, and increase employee productivity.

The Simultaneous Influence of K3 (X1), Workload (X2), and Physical Work Environment (X3) on Employee Performance (Y)

The results of the F test show that simultaneously, the variables of K3, Workload, and Physical Work Environment have a significant effect on employee performance, with an Fcount value of 3.403 ($> F_{table} 2.74$) and a significance of 0.022 (< 0.05). Therefore, the fourth hypothesis (H4) is accepted. Partially, K3 and Workload do not have a significant effect, but simultaneously, the three variables contribute to employee performance. This shows that the combination of these factors can affect employee performance as a whole.

CONCLUSION

Based on the research that has been conducted, it can be concluded that the influence of Occupational Health and Safety (K3), Workload, and Physical Work Environment on Employee Performance at PT Perkebunan Nusantara IV Pabatu. Based on the results of multiple linear regression analysis, it is known that partially the K3 variable does not have a significant effect on employee performance, with a significance value of 0.356. Furthermore, the Workload variable also shows an insignificant effect on employee performance, with a significance value of 0.389. Meanwhile, the Physical Work Environment variable is proven to have a significant effect on employee performance with a significance value of 0.012. Simultaneously, the results of the F test show that the three independent variables together have a significant effect on employee performance, with a calculated F value of 3.403 and a significance of 0.022. The coefficient of determination (Adjusted R^2) is 0.090, which means that 9% of the variation in employee performance can be explained by the three variables in this model, while the remaining 91% is influenced by other factors outside the study. The results of the reliability test show that all variables have a Cronbach's Alpha value above 0.6 so that they are declared reliable. In addition, the normality test shows that the data is normally distributed with a Kolmogorov-Smirnov significance value of 0.730. Thus, it can be concluded that optimal physical work environment management is a factor that plays an important role in improving employee performance, while improvements in the K3 and workload aspects still need to be considered as part of the strategy to improve the quality of human resources in the company.

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