The Influence Of Occupational Safety And Health (K3) On Employee Work Productivity With Multiple Linear Regression Methods At Pt. Udm

Novia Catur Iswanto [1], Soerahman [2] Abu Naim[3], Rahmat Saputra[4]
[1,2,3,4] Prodi Teknik Industri, Fakultas Teknik, Universitas Muhammadiyah A.R. Fachruddin
Email: catur1988@gmail.com , soerahman@unimar.ac.id , abunaim@unimar.ac.id , rasput000@gmail.com

Abstract

The goal of this study was to see how Occupational Safety and Health affected employee productivity. This type of study is quantitative research. In this study, 50 people were polled using a questionnaire technique. Techniques for data analysis that include multiple linear regression analysis, a partial test (t-test), and a simultaneous test (F-test). SPSS 25.0 is used in the computation method. According to the test results, occupational safety and health have a favorable and considerable impact on staff productivity at PT UDM. Occupational health and safety are important factors that influence employee work productivity. The results showed that the occupational health variable (X1) has the most significant influence on employee productivity (Y), according to the equation Y = 10.246 + 0.679X1 + 0.442X2+C. This is demonstrated by the highest multiple linear regression value of 10.246 with a significant value of 0.02 when compared to the work safety variable, which has a coefficient value of 0.679 with a significant value of 0.001. In other words, the occupational health program is the most important component in improving the work productivity of PT UDM employees.

Keywords: Occupational Safety and Health, Performance, Productivity

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A. INTRODUCTION

Every entrepreneur tries to increase the productivity of their employees so that the costs they incur are not in vain and the expected production results and targets can be achieved. In this description, employee work productivity is one of the most important factors. However, the issue in Indonesia is low staff productivity.

Technology is another component that can increase worker productivity, apart from wages and social security. Today, technology is an important component in contemporary production. The growth and development of various industries with the application of technology in the production process marks the era of industrialization. On the other hand, if technology is used in an unplanned way, it can have many negative effects, especially for employees who come into direct contact with it. The increasing number of workplace accidents and illnesses is one of the

consequences. Therefore, to prevent work accidents and work-related diseases, an occupational safety and health (K3) program must be implemented.

Every entrepreneur must plan a strategy to protect their human resources. This strategy includes occupational safety and health as part of labor protection and aims to ensure that production resources can be used safely and efficiently as well as smooth production processes, which are important factors in increasing productivity and production.

The high rate of workplace accidents in Indonesia shows that occupational safety and health (K3) issues are still often ignored. According to research conducted by the International Labor Organization (ILO), every day approximately 6,000 individuals are killed due to work accidents, equivalent to one individual every 15 seconds, or 2.2 million individuals every year. Additionally, an average of 160 workers suffer serious injuries every second, and another 270 million workers experience long- or short-term illnesses related to their work each year (ilo.org, 2013).

Table 1. Number of work-related accident cases 2017-2022

Year	Number of Accidents	%
2017	9,891	9 %
2018	10,000	10%
2019	21,735	19 %
2020	35,977	32 %
2021	24,910	22 %
2022	20,975	18%
Total	**113,448**	**100**

Source: ILO, 2013

Based on 2019 ILO data, the amount of workplace mishaps in Indonesia is still quite high, on average there are 99,000 workplace accidents cases per year. Around 70% of the total have disastrous consequences, notably death and chronic disability. Every 15 seconds, one worker dies as a result of a workplace accident, and 160 employees suffer from work-related illnesses.

At PT.UDM, the implementation of work activities has a fairly high level of risk of work accidents, especially in certain parts that require workers to come into direct contact with raw materials which are quite large in size and the machines used for production. Many employees have experienced accidents and work-related illnesses due to a lack of awareness between employers and employees regarding K3, K3 facilities and equipment that are not optimal, supervision of workers is still low, and

work stations are not well organized. Employers must, of course, pay more attention to this in order to lessen the amount of workplace accidents and illnesses, so that employee health can be well maintained to support employee work productivity. In Table 2 below is the amount of workplace mishaps at PT. UDM

Table 2. The number of work accidents on the PT production floor.
UDM
2017-2022

Year	Types of Accidents	Amount
2017	Light	3
	Currently	-
	Heavy	-
	Total	**3**
2018	Light	3
	Currently	2
	Heavy	-
	Total	**5**
2019	Light	3
	Currently	3
	Heavy	3
	Total	**9**
2020	Light	3
	Currently	5
	Heavy	4
	Total	**12**
2021	Light	**5**
	Currently	**3**
	Heavy	**5**
	Total	**13**
2022	Light	**5**
	Currently	**5**
	Heavy	**5**

Year	Types of Accidents	Amount
	Total	**15**

Source: HRD Data PT. UDM, 2022

The following will explain the categories of workplace mishaps on the production floor at PT. UDM

Table 3. Categories of Types of Work Accidents on the Production Floor at PT. UDM

No	Types of Work Accidents	Number of Work Accidents	Target
1.	Light	22	0
2.	Currently	18	0
3.	Heavy	17	0
	Total	**57**	**0**

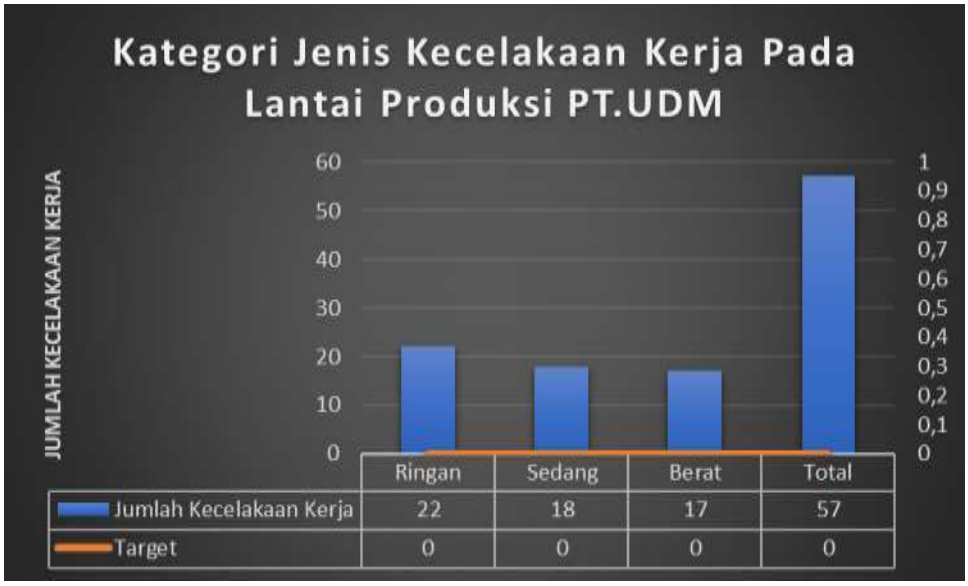


Figure 1. Work Accident Diagram at PT.UDM 2017-2022

According to Figure 1, work accidents at PT. UDM from 2017 to 2022 are classified as the following: light accidents (22), moderate accidents (18), and serious accidents (17).

Working capacity (ability) is determined by factors such as health, diet, gender, age, education, and skills. Each employee has their own ways of protecting themselves against health threats or disease in supporting their work. The following is data regarding the health of employees who are sick while working at PT.UDM as follows:

Table 4. Health Data of PT.UDM Employees for 2017-2022

No	Year	Inpatient	Outpatient	Get treatment	Information
1	2017	20	27	34	Hospital
2	2018	24	30	39	
3	2019	30	32	41	
4	2020	42	35	43	
5	2021	45	37	44	
6	2022	47	45	60	

Source: HRD Data PT. UDM

Figure 2. PT.UDM Employee Health Data for 2017 - 2022

The Occupational Safety and Health (K3) Program and the Pension Program have a favorable and significant effect on employee morale at PT. Indonesian Classification Bureau (Persero) Belawan Branch, according to (Lokot Muda, Harahap, and Andri R Tampubolon, 2017). The goal of this study is to look into the effect of workplace safety on the productivity of employees in PT. UDM's Production Division.

This research investigates how the implementation of occupational safety and health (K3) affects employee productivity. In this study, there are two independent and dependent variables. Employee productivity is the dependent variable, and workplace safety and health are the independent variables. The following figure shows the conceptual structure of the research:

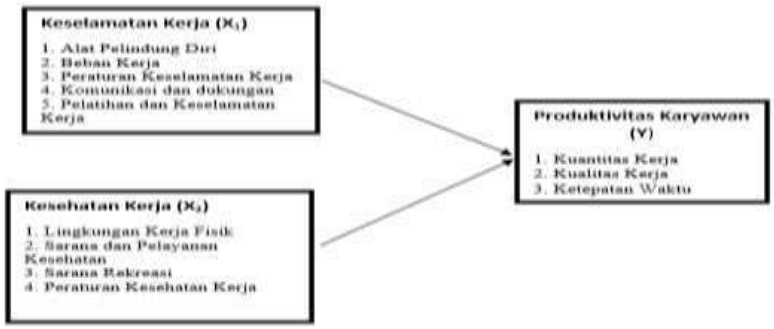


Figure 3. Research Conceptual Framework

Based on the previously stated problem formulation, the following are the solutions or temporary assumptions regarding the difficulties that occur in the company:

H0: Work safety has a significant influence on employee productivity Production Division at PT. UDM

H1: Occupational health has a significant effect on employee productivity Production Division at PT. UDM

H2: Occupational health variables have a dominant influence on productivity Production Division Employee at PT. UDM

B. METHOD

Types of research

This study employs quantitative methodologies. employing numerical research data and analyzing it with statistical data (Sugiyono, 2018). In accordance with the written approach, the data used in this research is used for research in the form of systematic, rational and measurable numbers.

Research Population and Sample

According to (Sugiyono, 2018), population is a broad category that encompasses not only humans or subjects, but also objects with specific attributes and characteristics. which the researcher selects to investigate and then draw conclusions. In this study, 1500 PT UDM consumers participated.

The sample is included in the population and its attributes. probability sampling, where this system does not provide equal or equal opportunity for every component or member of society (Sugiyono, 2018). A sampling method that does not rely on probability sampling uses the incidental sampling method, namely the method of determining samples taken by chance, or anyone who meets the researcher by chance or intentionally is deemed suitable to be used as a research sample and data source. Researchers followed the criterion established by (Roscoe, 982) in (Sugiyono, 2018), which specifies that if multivariate analysis is to be performed using correlation or multiple regression. For example, the sample size must be at least ten times bigger than the number of variables analyzed, which in this case is five. The number of

samples = 10 x 5 = four research variables (three independent). and there is one dependent), thus 10 divided by 4 equals 40. As a result, this study employs a sample of one hundred respondents who are PT UDM employees, ensuring that the minimal sample size is reached (Sugiyono, 2018) and (Roscoe, 1982). Data Type and Source: This study employs both primary and secondary data.

Data Types and Sources

According to (Sugiyono, 2018) the main data from this research was collected through a questionnaire distributed to participants. Indirect data came from secondary data. provide data collectors with data (Sugiyono, 2018). Secondary data used in this research are images or historical business related to this research.

Data analysis technique

Data analysis is used in quantitative study to test hypotheses or answer problem formulation. The data obtained from this research is quantitative data, so the data analysis method uses statistics and tools for calculating data using the Statistical Package for the Social Sciences, or SPSS version 25.

Validity test

Validity test according to (Sekaran and Bougie, 2009), refers to how well the tool is created to measure certain concepts that must be measured. Valid indicates the measuring instrument used to collect data. That (measure) is valid. The tool used in this research to test the validity of questionnaire items was tested with Pearson product moment correlation, according to (Sugiyono, 2018), The bare minimum required to be considered legitimate is if the correlation significance value is no more than 0.05.

Reliability Test

An instrument that is considered reliable is defined as an instrument that produces stable data even after measuring the same object repeatedly, according to Sugiyono (2018, p. 121). The Cronbach's alpha statistical test is employed in this study. Which variables' values are regarded as reliable? The Cronbach's alpha value was better than 0.6.

Classic assumption test

The goal of this traditional assumption test is to provide regression equations with blue qualities (Best Linear Classification). Baseless estimator, Tests for multicollinearity, heteroscedasticity, and normality.

Multicollinearity Test

Ghozali (2013) used the multicollinearity test to examine whether there was a correlation between the independent variables in the regression equation model. The

variation inflation factor (VIF) demonstrates the multicollinearity analysis method. If the VIF value is more than 0.1 and less than 10, multicollinearity does not exist.

Heteroscedasticity Test

The heteroscedasticity test is used to examine whether the regression equation exhibits inequitable changes in residuals from one observation to the next (Ghozali 2013, p.)139). The significance level for the test was set at 0.05. If a correlation is discovered, the importance of the residual and the independent variable increases.

With a value of 0.05, the problem does not exist. heteroscedasticity found in the regression model. The goal of the normality test is to determine whether if a variable or residual regression model is used, the distribution is normal. or not. The test is carried out by inspecting the graph. Normal probability plot created using calculations in According to (Gudono, 2011), this test can be observed from the points that spread following the diagonal line on the normal PP regression plot, where if these points. Following the diagonal line leads to the conclusion that the data is in a standard distribution.

Normality test

The normality test is carried out by looking at the Normal graph. This is done to find out whether our research data is normally distributed (Ghozali, 2013,). Probability plots and the Kolmogorov-Smirnov test if in a graph A normal probability plot shows a scattering of points. around the diagonal straight line and following the normality line is also located near and around the 450 line so the regression has a consistent distribution. Data in the Kolmogorov-Smirnov test If the residual significant level is greater than 0.05, it is said that the residual distribution is normal (α=5%).

Multiple linear regression analysis

Researchers use multiple linear regression analysis to anticipate how the value of the dependent variable varies when there are two or more independent factors. The value is improved or altered as a prediction. As a result, multiple linear regression analysis will be performed when there are at least two independent variables (Sugiyono, 2018). The multiple linear regression analysis method is used to obtain the impact of occupational safety and health on productivity.

Analysis of the Coefficient of Determination (R^2)

The coefficient of determination (R^2) is essentially a measure of how well a model can explain its dependent variable. An adjusted R^2 value that approaches or exceeds 1 implies that the independent variable (X) can supply nearly all of the data required to forecast changes in the dependent variable (Y). A drop in the adjusted R^2 value, on the other hand, indicates that the independent variable (X) may have an effect on the connected variable (Y).

F test

The F statistical test, in essence, determines if the independent variables (free) in the model influence the variables together (dependent).

t test

The t statistical test is used to determine the extent to which one explanatory or independent variable influences the overall explanation of the dependent variable. to assess the regression coefficients of variables that are partially independent.

C. RESULTS AND DISCUSSION

Classic Assumption Test Results Multicollinearity Test

The VIF value for the occupational safety and health variable is 0.1, as shown in Table 4.1. As a result, there is no multicollinearity between variables.

Table 5. Coefficients [a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	X2	,693	1,443
	X1	,693	1,443

a. Dependent Variable: Y1

Heteroscedasticity Test

Figure 5 shows that the dots are dispersed and do not form a distinct pattern. As a result, it is possible to conclude that heteroscedasticity does not exist in the regression model.

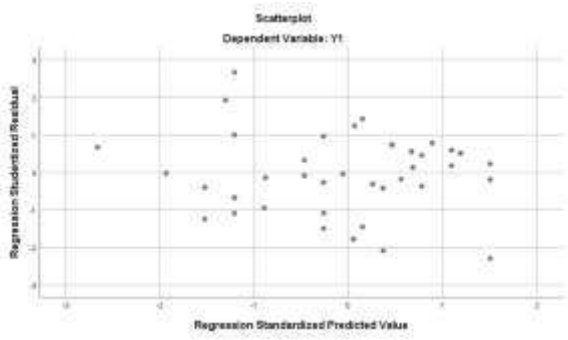


Figure 5. Heteroscedasticity test

Normality test

The Normal Probability Plot was used to perform the normality test in this study, which was then enhanced with the Kolmogorov Smirnov test.

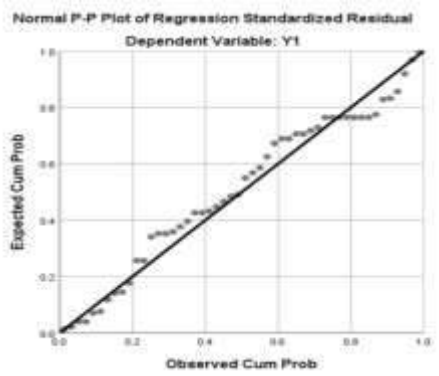


Figure 6. Normality Test

Figure 6 depicts how the points are gathered around the straight line. Furthermore, the Kolmogorov Smirnov test findings suggest a significance value of > 0.05 (α=5%), namely 0.439. As a result, the residuals of the regression model are regularly distributed.

Multiple Regression Analysis

At PT UDM, multiple linear regression analysis was used to investigate the impact of X1 and X2 variables on Y. The table below contains the results of various linear regression tests:

Table 6 Recapitulation of Multiple Linear Regression Analysis of the Effect of Occupational Safety and Health on Employee Productivity

Variable	B (Regression Coefficient)	Beta	t count	Sig t
Constant	10,246		2,375	0.022
Work safety	0.679	0.479	3,660	0.001
Occupational Health	0.442	0.265	2,023	0.049
N=50			F count = 18.536	
R = 0.664				
R Square = 0.441			Sig 0.000	
Adjusted R Square = 0.417				

Source: Data processed by SPSS.25, 2023

Based on the regression coefficient data, the following regression equation may be created:

$Y = Constant + aX_1 + bX_2$

$$Y = 10.246 + 0.679X1 + 0.442X2$$

Where:
Y: Employee Productivity
X1: Work Safety
X2: Occupational Health

The interpretation of this equation is:

a. $\beta o = 10.426$

The regression equation above has a βo value or constant value of 10.426. This shows a negative number, which means that when occupational safety and health are not cared for, employee productivity will be less.

b. $\beta 1 = 0.79$

Variable X1 has a positive coefficient value and has a considerable influence on variable Y. This is evident from the value of Based on this information, it is possible to conclude that any rise in workplace safety (X1) will be followed by an increase in employee productivity.

c. $\beta 2 = 0.442$

The coefficient value of variable X2 is positive and significant. This is demonstrated by the coefficient value of 0.442, and the significance figure of 0.007, indicating that it is less than $\alpha = 0.05$. Based on this data, it can be concluded that every rise in the occupational health variable (X2) leads to an increase in employee productivity.

Partially Significant Test Results (t Test)

Table 7 Partial Significant Test Results (t Test)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10,246	4,315		2,375	0.022
	X2	0.442	0.219	0.265	2,023	0.049
	X1	0.679	0.186	0.479	3,660	0.001

a. Dependent Variable: Y1

Coefficient of Multiple Determination (R^2)

The value of R^2 is 0.441, shows that the occupational safety and health variable can explain the employee productivity variable by 21.8% and the remaining 78.2% is caused by variables not investigated in this study.

Table 8. Coefficient of determination

Model Summary									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.664 [a]	0.441	0.417	2.47402	0.441	18,536	2	47	0,000
a. Predictors: (Constant), X1, X2									

The coefficient of determination (Adjusted R Square) in Table 8 above reveals that the two independent variables (work safety and work health) explain 42% of the variation in the Employee Productivity variable, while the remaining 58% is explained by variables not included in this model.

Discussion

From the test results above, the following research can be produced:

The Influence of Work Safety on the Productivity of Production Division Employees at PT. UDM"

The t value for the Work Safety variable (X1) is 3.660, while the t table is 1.676. As can be seen, t count > t table. In addition, the significant value of 0.001 < 0.05. As a result, it is possible to conclude that work safety has a substantial impact on the productivity of PT. UDM production division employees.

The findings of this study are consistent with those of Fendy Budianto (2014), who examined "The influence of occupational safety and 73 health on employee organizational commitment in the production section of PT. Sumber Kencana in Bojonegoro", which stated that occupational safety had a significant effect on employee productivity. According to the findings of this study, occupational safety indicators, namely personal protective equipment, work load, work safety regulations, communication and support, work safety training, have a significant effect on employee productivity in the production division at PT. UDM. The facts at PT.UDM show that work safety has gone well. This can be seen from the majority of respondents who agreed, meaning that the application of Work Safety affects employee productivity. Therefore, PT UDM must maintain or further improve the implementation of the Work Safety program in order to increase the level of employee productivity.

The Influence of Occupational Health on the Productivity of Production Division Employees at PT. UDM.

The calculated t value for the Occupational Health variable (X2) is 2.023 based on the t statistical test coefficient table, while the t table is 1.676. As a result, t count > t table, and the significant value of 0.049 < 0.05. As a result, it is possible to conclude that work safety has a substantial impact on the productivity of PT. UDM production division employees. The findings of this study are consistent with those of Muhammad Busyairi, La Ode Ahmad Safar Tosungku, and Ayu Oktaviani (2014), who examined "The Influence of occupational safety and occupational health on employee work productivity", stating that occupational health has a significant effect on employee productivity. These findings indicate that the Occupational Health indicators, namely the physical work environment, health facilities and services, recreation facilities, occupational health regulations have a significant effect on employee productivity in the Production Division at PT. UDM. Which means that the more the Work Safety Program and Implementation is improved, it will have a positive influence on the company and increase employee productivity.

The most dominant variable in employee productivity at PT. UDM is Occupational Health.

The most important variable in PT.UDM workforce productivity. Based on a comparison of the regression values of the independent variables. The independent variable with the highest regression coefficient has the most influence on the dependent variable. After the multiple linear regression test was carried out, the coefficient that had the highest value was the occupational health variable, with a value of 0.679 and a significance level of 0.001, while the coefficient for the Occupational Safety variable was 0.442 with a significance level of 0.049.

D. CONCLUSION

Based on the research and discussion, it is possible to conclude that the work safety variable (X1) has a positive and significant effect on PT.UDM employee productivity (Y). The regression equation coefficient shows a positive correlation, so it can be concluded that increasing the value of the work safety variable will increase employee productivity. The research results show that the occupational health variable (X1) has the most significant influence on employee productivity (Y), according to the following equation: $Y= 10.246 + 0.679X_1 +0.442X_2 +C$. When compared to the work safety variable, which has a coefficient value of 0.679 with a significant value of 0.001, this is demonstrated by the greatest multiple linear regression coefficient value of 10.246 with a significant value of 0.02. In other words, the occupational health program is the most important component in increasing the work productivity of PT employees. UDM.

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