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The effect of occupational health and safety on the performance of employee of Tire Industry Indonesia

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ABSTRACT

Tire Industry Indonesia Bekasi Plant is a manufacturing company that produces vehicle tires, tubes, and flaps. The production process in the Indonesian Tire Industry uses a lot of dangerous equipment and machines production process so that it can affect the safety and health of employees. During 2020, work accidents increased which caused employee performance to decline and resulted in decreased productivity. This study aims to analyze employee performance which is influenced by Occupational Safety and Occupational Health in the Indonesian Tire Industry. The results of the questionnaire from the respondents as many as 200 people in the production section were analyzed by linear regression. This research uses the help of Ms. Excel and SPSS v.17 software. Based on the results of the study, it is known that partially occupational safety and health have no significant effect on employee performance. In addition, it is also known that simultaneously there is a significant influence between the variables of Occupational Safety and Health on Employee Performance.

1. Introduction

The development of the manufacturing industry in Indonesia has progressed and increased [1]. Indirectly, this progress and improvement have helped boost the economy in Indonesia. The manufacturing industry is also a mainstay sector for Indonesia to increase national income. To support the creation of a good national income, competent, reliable, professional and excellent resources are needed. Tire Industry Indonesia Bekasi Plant is an industry engaged in manufacturing that produces vehicle tires (cars, motorcycles, buses, trucks, forklifts, and tractors), tubes, and flaps. The production process in the Indonesian Tire Industry uses a lot of dangerous equipment and machines production process so that it can affect the safety and health of employees. The use of dangerous machines must ensure the safety and health of employees when operating.

Based on observations in the Indonesian Tire Industry, cases of work accidents have increased during 2020. This has an impact on decreasing employee performance and even productivity. Occupational safety and health are part of the maintenance of human resources [2]. Work safety needs to be considered to increase production results even to productivity [3]. However, employee health issues are no less important because this greatly affects the health condition of employees in carrying out their duties [4]. Both of these parameters need to be improved so that companies can improve employee performance in producing a product or service that is expected by the company and even by customers. In developing companies such as the Indonesian tire industry, occupational safety and health have an important role [5].

Where the application of these two things is the competitiveness that can improve the company's reputation. High productivity is one of the targets for the manufacturing industry to meet market needs [6]. Therefore, a good occupational safety and health technique is needed to support smooth production [7]. Performance is indeed a parameter for employees in carrying out their duties. Performance has the same meaning as work results or work performance. However, in other contexts, performance is not just work performance and work results, performance can be interpreted as the ability to process work [8]. Therefore, the company must pay more attention to the condition of employees in carrying out their duties, especially those related to occupational health and safety, to improve employee performance [9].

Research by [10] showed that improving occupational health and safety programs can significantly increase company productivity. Reference [11] explained that improving work safety is done by improving the safety management system and providing standardized PPE. Research by Lestari *et al.* [12] explains that occupational health is supported by a good work environment. Mrema *et al.* studied the status of safety implementation under economic rise in Tanzania [13]. Challenges in implementation of occupational and health after Covid-19 pandemic was investigated by [14]. Amponsah-Tawiah and Mensah investigated the commitment of mining companies in Ghana to implement occupational and health safety [15].

This study aims to analyze employee performance which is influenced by Occupational Safety and Occupational Health in the Indonesian Tire Industry. This research is the first research that analyze the safety practices in a tyre manufavturer company. The results can be used by the company as an evaluation and improved the implementation of occupational and safety practices. Employees can also benefit by learning the weak factors in their current practices.

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2. Material and method

The type of research used is explanatory, which is to explain the correlation between occupational safety and health variables on employee performance. The population used as the object of research is all employees in the production department. The total population of this study was 400 people. Determination of the number of samples to be selected using the Slovin method [16]. The error rate used in this study was 5%, due to the impossibility of analyzing the incomplete questionnaire 100%. The larger the error rate used, the smaller the number of samples used [17]. Calculation of the number of samples using Eq. (1)

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

where n denotes the number of samples, N denotes the total population, and e denotes the margin of error.

Analysis of the results of the questionnaire using multiple linear regression. Processing data using the help of SPSS v17 software [18]. The variables used in this study consisted of work safety (X_1), Occupational Health (X_2), and Performance (Y). Operational variables that form the relationship between variables can be interpreted in Table 1, while the regression model that builds the influence between variables can be seen in Figure 1. The following is a hypothesis to test the effect between variables.

H_1: Partially there is the effect of occupational safety on employee performance.

H_2: Partially there is the effect of occupational health on employee performance.

H_3: Simultaneously there is the effect of occupational safety and occupational health on employee performance.

3. Results and analysis

Data processing in this section is carried out with several data tests. Testing the data carried out, among others, test validity, test reliability and test significance.

3.1. Respondent characteristics

A total of 400 populations were calculated to be the number of samples. Calculation using Eq. (1), the number of samples need to be taken for this study is 200. This study analyzes the results of questionnaires from 200 respondents who work in the production department. The production department was chosen because the majority of the work is related to occupational safety and health. Characteristics of respondents from the results of the questionnaire can be intepreted in Table 2.

Table 1.
Operational variable

Variable	Variable Concept	Indicators	Reference
Occupational Safety (X_1)	Work safety can be interpreted as a condition of being safe from the dangers of work accidents that result in permanent injury and disability to workers which causes losses for workers and the company [19].	1. All equipment in good condition 2. All dangerous machines have warning signs 3. Available Personal Protective Equipment such as masks, helmets, safety shoes etc 4. There is First Aid in Accidents and drugs 5. OHS training 6. Comply with OHS regulations	[19], [20]
Occupational Health (X_2)	Occupational health can be interpreted as a condition where workers are always healthy without anything that causes illness, injury or damage to body parts due to the influence of work interactions and the work environment [21].	1. Healthy and clean work environment 2. Garbage and waste disposal system is well available 3. Temperature, lighting, ventilation meet the standard 4. There are health facilities such as clinics and sports venues 5. Provision of clean water and bathroom 6. Nutritious meal menu available for employees 7. The workload does not exceed the physical ability 8. The employee's condition is healthy when starting work	[21], [22]
Employee Performance (Y)	Employee performance is the result of work in quality and quantity achieved by an employee in carrying out his duties by the responsibilities given to him by the company [23].	1. Employee awards and achievements 2. Ability to complete targets 3. Standard output level 4. Attendance at work 5. Standardized skills	[23], [24]

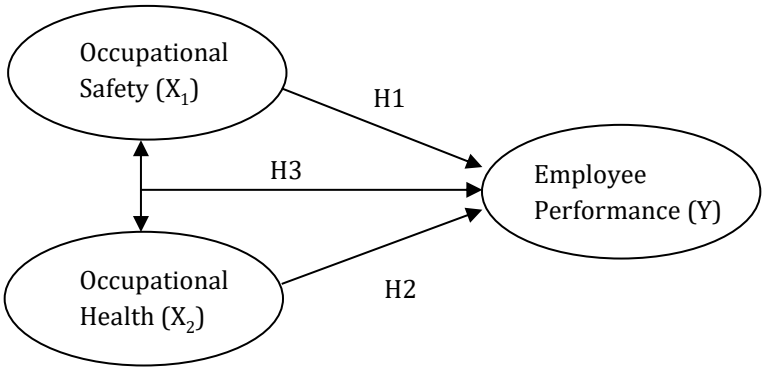

Figure 1. Regression model

Table 2.
Respondent characteristics

Characteristics		Amount	Percentage
Gender	Female	0	0.0%
	Male	100	100.0%
Age	19-28	13	6.5%
	29-38	35	17.5%
	39-48	126	63.0%
	49 >	26	13.0%
Graduate	Junior High School	12	6.0%
	Senior High School	179	89.5%
	Diploma	3	1.5%
	Bachelor	6	3.0%
Work experience	OJT	2	1.0%
	1-2	1	0.5%
	3-4	9	4.5%
	5 >	188	94.0%

Table 3.
The result of the validity test

Items	R-count	R-table	Remark
X1.1	0.681	0.138	Valid
X1.2	0.678	0.138	Valid
X1.3	0.662	0.138	Valid
X1.4	0.566	0.138	Valid
X1.5	0.638	0.138	Valid
X1.6	0.558	0.138	Valid
X2.1	0.602	0.138	Valid
X2.2	0.67	0.138	Valid
X2.3	0.679	0.138	Valid
X2.4	0.634	0.138	Valid
X2.5	0.71	0.138	Valid
X2.6	0.658	0.138	Valid
X2.7	0.535	0.138	Valid
X2.8	0.525	0.138	Valid
Y1	0.751	0.138	Valid
Y2	0.598	0.138	Valid
Y3	0.766	0.138	Valid
Y4	0.634	0.138	Valid
Y5	0.464	0.138	Valid

Table 4.
The result of the reliability test

Variable	Cronbach's Alpha	Standard value	Remark
Occupational Safety (X1)	0.686	0.60	Reliable
Occupational Health (X2)	0.776	0.60	Reliable
Employee Performance (Y)	0.648	0.60	Reliable

Based on Table 2, it can be seen that all respondents were male, as many as 200 people (100%). This shows that work at the Tire Industry Indonesia Bekasi Plant in the production area only requires male skills such as operating and maintaining machines, working at heights, lifting and transporting goods, and other fieldwork. Table 2 also shows that the majority of respondents aged 39-48 years were 127 people (63%).

This shows that many workers in the Tire Industry Indonesia Bekasi Plant are experienced in their productive age. Table 2 also explains that the results of the respondents mostly have Senior High School education as many as 179 people (89.5%). This shows that some of the employees at the Tire Industry Indonesia Bekasi Plant have a high level of education and can receive instructions from their superiors to increase their work productivity. In addition, Table 2 also shows that the working period is dominated by more than 5 years as many as 188 people with 94.0%.

3.2. Validity and reliability test

The validity test is carried out by using a product moment correlation approach for each item that measures an indicator. The validity test is declared valid if the value of the correlation coefficient (r-count) is greater than R product-moment (r-table). Then each item is searched for the value of the r table by using table r. Determination of the value in the table r can be searched using the equation with a significance of 5%. The value of r-table for this research is 200. In the r table, the value (r product-moment) is 0.138. The following results of the complete validity test can be intepreted in Table 3.

Table 5.
The result of partial test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.694	0.311		11.884	0		
	Occupational Safety (X_1)	0.141	0.084	0.145	1.677	0.095	0.657	1.522
	Occupational Health (X_2)	0.057	0.073	0.067	0.774	0.44	0.657	1.522

a. Dependent Variable: Employee Performance

Table 6.
The result of simultaneous test

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.935	2	.467	3.749	.025[a]
	Residual	24.553	197	.125		
	Total	25.487	199			

a. Predictors: (Constant), Occupational Safety, Occupational Health
b. Dependent Variable: Employee Performance

Table 8.
Multiple linear regression results

Independent variable	Regression coefficient	t count	Probability	Decision
Constanta	3.694			
Occupational Safety (X_1)	0.141	1.677	0.095	No significant
Occupational Health (X_2)	0.057	0.774	0.44	No significant

Dependent variable : Employee Performance (Y)

Based on Table 3, it can be interpreted that the results of the instrument validity test for all variables indicate that all items have a correlation coefficient greater than 0.138, which means that all items are declared valid. After the validity test is done, then the reliability test is carried out. Table 4 shows that the reliability coefficient value of Cronbach's Alpha for each variable is 0.60 which can be interpreted as being reliable. The value of the Cronbach's Alpha coefficient obtained by the measurement results can be seen in Table 4. After testing the validity and reliability of all existing question items, it can be obtained that all instruments are eligible to meet the requirements. This can be interpreted that the questionnaire instrument and data quality are good to use. Then it can be continued to test the effect of each variable.

3.3. Partial t-test

This test was conducted to determine the effect of occupational safety and health partially on employee performance. To determine the critical value, it is carried out with a level of significance of 5% with the provisions of degrees of freedom, namely $dk = n - k = 200 - 2 = 198$, so that the t table value can be determined is 1,652. To partially analyze the hypothesis, it can be seen in Table 5.

Table 5 shows that the results of data processing with SPSS obtained an Occupational Safety regression coefficient of 0.141 (positive). The coefficient significance test obtained t count of 1.677. This value is greater than the value of the t table (1.652). So, it can be interpreted that partially the work safety variable has a positive but not significant effect on employee performance. While the regression coefficient for Occupational Health is 0.057 (positive). The coefficient significance test obtained t count of 0.774. This value is greater than the value of the t table (1.652). So, it can be interpreted that partially the Occupational Health variable has a positive but not significant effect on Employee Performance.

3.4. Simultaneous f test

The F test is used to determine the effect of Occupational Safety and Health simultaneously on Employee Performance. Based on data processing, F count is 3.749 with a df of 2. The residual dk value is 197 (dk = 200 – 2 – 1 = 197), so that it can be obtained the F table value of 3.040 which is analyzed with a significance level of 5% (a = 0.05). To simultaneously analyze the hypothesis, it can be seen in Table 6.

3.5. R square test

R square test is used to determine the correlation between variables. Based on the results of calculations with SPSS which are interpreted in Table 7, the R^2 value of the processed data is 3.7%, which means that the correlation between variables is not very close. Occupational safety and health plays a 3.7% role in employee performance. Meanwhile, 96.3% was played by other factors, namely the work environment, top management support and others.

Table 6 shows that the results of data processing with SPSS obtained a calculated F value greater than F table, namely 3,749 > 3,040. So, it can be interpreted that the Occupational Safety and Health variable simultaneously has a significant effect on employee performance. Multiple linear regression analysis was used to determine the effect of the Occupational Safety (X_1) and Occupational Health (X_2) variables on Employee Performance (Y). In addition, this analysis is also used to predict the value of the independent and dependent variables. The following results of multiple linear regression analysis can be seen in Table 8. Based on the results of multiple linear regression analysis in Table 6, regression equation is obtained and formulated in Eq. (2).

$$Y = 3.694 + 0.141\,X_1 + 0.057X_2 \quad (2)$$

In Eq. (2), the constant value is obtained at 3,694 units (positive), which means that if there is an influence of X_1 and X_2 variables whose the value is equal to 0, so it can be explained that there is an increase in employee performance of 3,694 units. Work safety regression coefficient in the equation, obtained by 0.141 (positive) which means that if the score on the work safety variable increases, productivity will increase by 0.141 units and vice versa. The regression coefficient for Occupational Health in the above equation, obtained at 0.057 (positive), which means that if the score on the Occupational Health variable increases, productivity will increase by 0.057 units and vice versa.

4. Discussions

4.1. Occupational safety partial test results

The results of the partial test found that work safety had a positive but not significant effect on employee performance. This means that increasing work safety does not significantly improve employee performance and vice versa. These results do not support previous research by June and Siagian, because the work safety factors studied only prioritize work equipment, provision of Personal Protective Equipment (PPE) and training for employees [25]. All of that does not significantly affect employee performance or work safety has an indirect and indirect effect.

The results of this study can be interpreted that the partial test is more suitable based on actual conditions in the field, both observations and interviews with some employees in the Indonesian Tire Industry. Employees will continue to work even without PPE which is one of the safety factors. Employees will have a great potential for work accidents such as falling hard objects, being pinched, eyes being exposed to dust, falling from a height and so on. If this is related to performance, it will have a direct effect, namely the loss of working time. This will have a major effect on employee performance.

4.2. Occupational health partial test results

The results of the partial test found that occupational health had a positive but not significant effect on employee performance. This means that increasing Occupational Health

does not significantly improve employee performance and vice versa. These results do not support previous research by Wangi, because the occupational health factor studied only prioritizes adequate work environment facilities and infrastructures such as bathrooms, clean water supply, air circulation, waste disposal and industrial waste and the provision of nutritious food [26]. All of these have no significant effects on employee performance or occupational health, which has no real and indirect effect.

Employees will continue to work even though the air circulation is not good, employees will continue to work even though the food menu is less nutritious and employees will also continue to work with high productivity even though there is no employment insurance, or employees who often inhale dust/ chemicals caused by the mixing process until the building will not feel the direct effect but it is possible to feel it when you are not productive.

4.3. Occupational health and safety simultaneous test results

Simultaneous test results found that Occupational Safety and Health have a significant effect on employee performance. This means that variations in the performance variable can be interpreted by both Occupational Safety and Health variables simultaneously [27]. These results support previous research by Fonseca and Carvalho, because occupational safety and health is the company's image [28]. Companies can maintain the safety and health of employees and companies can comply with government regulations, so customers will trust and give good value [29], [30]. After gaining trust and getting good grades, Job Orders and Repeat Jobs from the employer will run smoothly so that the production process will continue.

4.4. Safety aspect strategy

When conducting inspections or field visits, it is hoped that the inspection team will increase their awareness of unsafe acts and unsafe conditions. There are still many workers' behavior and unsafe working conditions and sometimes these things are still not paid attention to. Inspection should be carried out by the HSE department together with the person in charge of the area, worker representatives, and management representatives. Inspection results are recorded and documented and corrective action is monitored. An award & punishment system is applied to all workers, especially in the production division. It aims to increase workers' awareness to behave safely at work and increase work motivation.

4.5 Health aspect strategy

The health aspect has not become a priority for the company, as can be seen from the absence of a health program included in the HSE division's annual work program. In the curing area, it is better to provide workers with body ion replacement drinks to prevent dehydration/heat stroke in workers. It is advisable to carry out hygiene checks on the canteen and canteen personnel regularly and pay more attention to the nutritional aspects of the food provided.

5. Conclusion

Based on data processing and analysis in the previous stage, this study concluded that work safety partially has an insignificant effect on employee performance. This can be interpreted that Employees will continue to work even without Personal Protective Equipment which is one of the factors of work safety. Occupational Health partially has no significant effect on employee performance. This can be interpreted that employees will continue to work even though the air circulation is not good, employees will continue to work even though the food menu is less nutritious. This is not a statement that OHS does not mean that it is not important to employee performance but that OHS is important for companies to meet the standards set by the government to achieve zero accidents. Occupational Health and Safety simultaneously have a significant influence on Employee Performance. This is because occupational safety and health is the company's image market. Customers will trust and provide good value to the company if the company can provide protection and welfare for employees and the company can comply with government regulations. This research produces an equation model Y = 3.694 + 0.141 X1 + 0.057 X2. This means that each variable of occupational safety and health is equal to 0, so it can be explained that there is an increase in employee performance of 3,694 units.

For future research, research can be done by examining the relationship between performance variables and other factors such as leadership, wages, or work motivation. In addition, it can be done by taking time series financial data with independent variables as costs that support workplace safety and costs that support occupational health and the dependent variable as the company's net profit.

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