The effect of occupational health and safety to employee performance in the sawmills industries in Langkat, North Sumatra, Indonesia

Muhdi*, Rifai1, R D Harahap1 and D S Hanafiah2

1Faculty of Forestry, Universitas Sumatera Utara, Medan, North Sumatra 20155, Indonesia
2Faculty of Agriculture, Universitas Sumatera Utara, Medan, North Sumatra 20155, Indonesia

*E-mail: muhdi@usu.ac.id

Abstract. Occupational health and safety is the most important aspects at work, especially for workers related to machine equipments. The purpose of this study was to analyze the effect of occupational safety and health on the performance of employees in the sawmill process at UD. Rahmat, Kuala Begumit, Langkat, North Sumatra, Indonesia. The method used is descriptive analysis. Respondents in this study were all employees who worked in the sawmill process at UD. Rahmat, Kuala Begumit, Langkat, North Sumatra, Indonesia. The sampling were 30 respondents. The multiple regression analysis method with the simultaneous test. The results show that occupational safety and health have a significant effect on employee performance. Based on the perception of workers the company has provided personal protective equipment but the workers feel uncomfortable and if they wear personal protective equipment they assume that it interferes with their work.

1. Introduction

The sawmill industry is a business that produces semi-finished goods which are then processed and processed into advanced goods to be made into certain products [1, 2]. There are 72 businesses engaged in the sawmill industry consisting of home industries and small industries [3]. The rapid development of technology affect the emergence of jobs. It is expected to maximize the production process but it is possible that the number of work accidents that will occur will continue to increase [4]. It is expected that production results will increase and it is hoped that it will make it easier for workers to do their jobs.

Occupational health and safety is the most important aspects at work, especially for workers related to machine tools. Safety is a valuable item for workers and business actors to be able to maximize their production results. Accidents due to work have an impact, either directly or indirectly, can cause losses including delays in production results, loss of customers and the cost of healing affected workers. Work accidents affect the company and affect death and suffering due to accidents [5].

In other hand, forest degradation and deforestation in the Indonesia has an impact on the forest economy including the forestry business and global climate change [6,7]. Performance is a description of the level of achievement of the implementation of a program of activities to realize a goal, both goals, vision and mission as outlined in order to achieve the desired goals. Human being has the potential to
carry out activities or activities instinctively, the potential for certain behaviors is called ability, while expression and other potentials are known as performance.

This study aimed to analyze the effect of occupational health and safety (OHS) on the performance of employees in the sawmill process at UD. Rahmat, Kuala Begumit, Langkat, North Sumatra, Indonesia.

2. Methods
The research was conducted on sawmill employees at UD Rahmat Kwala Begumit, Langkat, North Sumatra, Indonesia. In the descriptive analysis method, the respondent's characteristics obtained information through a questionnaire consisting of the respondent's characteristics, namely gender, age, education level and length of work. Respondents in this study were all employees who worked in the sawmill process at UD. Rahmat, Kuala Begumit, Langkat, North Sumatra, Indonesia. The total of respondents were 30 workers.

Using specific criteria of measurement, we determine the effect of occupational safety and health on performance. According to [6], in general, there are two main criterias are used in determining employee performance, namely that these factors must be relevant to the implementation of job relatedness and measurable.

2.1. Data collection
The sampling technique in this study used the nonprobability sampling method, while the sampling method used was saturated sampling. Nonprobability sampling is a sampling technique in which each population does not have the same opportunity to be used as research samples, for sampling in this study using a saturated sampling technique. In this case the sample to be studied is all workers in sawmill.

The respondents of this study were sawmill workers at UD Rahmat. The population in this study were 33 workers at UD Rahmat, consisting of 30 workers in the sewing division, one processing product sorter, one foreman and one manager, respectively.

2.2. Data analysis
Multiple linear regression analysis was used to analyze the effect of the independent variables on the dependent variable.

3. Results and Discussion

3.1. Respondent characteristics
We identify the respondent's characteristics to provide an overview of the conditions in the research area. The characteristics of the respondents based on gender, age, education and working priod. The analysis results obtained, the data on the characteristics of the respondents are found in Table 1.

| Characteristics | Category          | Respondents |
|-----------------|-------------------|-------------|
| Gender          | Male              | 30          |
|                 | Female            | 0           |
| Age             | 20–29 years       | 5           |
|                 | 30–39 years       | 15          |
|                 | 40–59 years       | 10          |
| Last education  | Elementary school | 9           |
|                 | Junior high school| 16          |
|                 | High school       | 5           |
| Working priod   | ≤ 1               | 12          |
|                 | > 1               | 18          |
Men carry out the workers in the sawmill section because the sawing process has a high risk of accidents, so that male workers carry out this work. The average age of workers in the sawmill section at UD. Rahmad, Kuala Begumit, Langkat, North Sumatra is at the age of 30 to 39 years old. It is caused of the performance to carry out the production process, the older the age, and lower the productivity of workers.

Characteristics of respondents based on education indicate that the average level of education of workers in the sawmill section at UD. Rahmat, Kuala Begumit, Langkat, North Sumatra is at the junior high school level. Workers in sawmill at UD. Rahmat has been working for more than one year. According to [8], the working period can affect a person's performance in doing work, the longer the employee's working period.

A test is carried out on each question in each variable to find out that the list of questionnaires is declared valid. The results can be seen in Table 2.

| No | Variables          | Item Question | Rcount | Rtable (a=5%) | Result validity |
|----|--------------------|---------------|--------|---------------|----------------|
| 1. | X1.1               | 0.667         | 0.361  | Valid         |
| 2. | X1.2               | 0.650         | 0.361  | Valid         |
| 3. | X1.3               | 0.486         | 0.361  | Valid         |
| 4. | X1.4               | 0.576         | 0.361  | Valid         |
| 5. | X1.5               | 0.779         | 0.361  | Valid         |
| 6. | Work safety (X₁)   | X1.6           | 0.717  | 0.361         | Valid         |
| 7. |                   | X1.7           | 0.622  | 0.361         | Valid         |
| 8. |                   | X1.8           | 0.543  | 0.361         | Valid         |
| 9. |                   | X1.9           | 0.489  | 0.361         | Valid         |
| 10.|                   | X1.10          | 0.603  | 0.361         | Valid         |
| 11.|                   | X1.11          | 0.674  | 0.361         | Valid         |
| 12.|                   | X2.1           | 0.572  | 0.361         | Valid         |
| 13.|                   | X2.2           | 0.559  | 0.361         | Valid         |
| 14.|                   | X2.3           | 0.583  | 0.361         | Valid         |
| 15.|                   | X2.4           | 0.559  | 0.361         | Valid         |
| 16.|                   | X2.5           | 0.765  | 0.361         | Valid         |
| 17.| Occupational health (X₂) | X2.6         | 0.771  | 0.361         | Valid         |
| 18.|                   | X2.7           | 0.559  | 0.361         | Valid         |
| 19.|                   | X2.8           | 0.621  | 0.361         | Valid         |
| 20.|                   | X2.9           | 0.375  | 0.361         | Valid         |
| 21.|                   | X2.10          | 0.583  | 0.361         | Valid         |
| 22.|                   | X2.11          | 0.661  | 0.361         | Valid         |
| 23.|                   | X2.1           | 0.755  | 0.361         | Valid         |
| 24.|                   | X2.2           | 0.764  | 0.361         | Valid         |
| 25.|                   | X2.3           | 0.695  | 0.361         | Valid         |
| 26.|                   | X2.4           | 0.755  | 0.361         | Valid         |
| 27.| Performance (Y)   | X2.5           | 0.686  | 0.361         | Valid         |
| 28.|                   | X2.6           | 0.546  | 0.361         | Valid         |
| 29.|                   | X2.7           | 0.606  | 0.361         | Valid         |
| 30.|                   | X2.8           | 0.664  | 0.361         | Valid         |
| 31.|                   | X2.9           | 0.857  | 0.361         | Valid         |
| 32.|                   | X2.10          | 0.715  | 0.361         | Valid         |

Based on the results of the validation test, it can be seen that each r-count value is greater than the r-table value, it can be concluded that each question on each variable is declared valid or the questions asked can explain the variables studied.

3.2. Distribution of respondents' answers to work safety, occupational health and performance

The distribution of respondents' answers to 12 statements regarding the work safety (X₁) can be seen in Table 3.
Based on Table 3, it can be seen that, in the first question (the company provides work protective equipment such as helmets, boots, gloves, masks (personal protective equipment) that can protect me from work accidents) it can be seen that the highest answer as many as 20 people stated somewhat agree (66.67%), 10 people disagree (33.33%). The average respondent's answer to the first question is 2.66 which is categorized as less good. It can be said that workers do not agree to use personal protective equipment as their step to avoid work accidents.

The distribution of respondents' answers to 11 statements regarding Occupational Health (X$_3$) can be seen in Table 4.

Table 3. Distribution of Respondents' Answers to the Work Safety (X$_1$).

| Item Questions | Strongly disagree | Disagree | Somewhat agree | Agree | Strongly agree | Total | Average |
|----------------|-------------------|----------|----------------|-------|----------------|-------|---------|
|                | F     | %     | F     | %     | F     | %     | F     | %     | F     | %     |       |
| 1.             | 0     | 0.00  | 10    | 33.33 | 20    | 66.67 | 0     | 0.00  | 0     | 0.00  | 30    | 100%  | 2.66  |
| 2.             | 0     | 0.00  | 13    | 43.33 | 14    | 46.67 | 3     | 10.00 | 0     | 0.00  | 30    | 100%  | 2.66  |
| 3.             | 0     | 0.00  | 6     | 20.00 | 23    | 76.67 | 1     | 3.33  | 0     | 0.00  | 30    | 100%  | 2.83  |
| 4.             | 0     | 0.00  | 16    | 53.33 | 12    | 40.00 | 2     | 6.67  | 0     | 0.00  | 30    | 100%  | 2.53  |
| 5.             | 0     | 0.00  | 16    | 53.33 | 12    | 40.00 | 2     | 6.67  | 0     | 0.00  | 30    | 100%  | 2.53  |
| 6.             | 0     | 0.00  | 19    | 63.33 | 10    | 33.33 | 1     | 3.33  | 0     | 0.00  | 30    | 100%  | 2.40  |
| 7.             | 0     | 0.00  | 17    | 56.67 | 13    | 43.33 | 0     | 0.00  | 0     | 0.00  | 30    | 100%  | 2.43  |
| 8.             | 0     | 0.00  | 0     | 0.00  | 6     | 20.00 | 14    | 46.67 | 10    | 33.33 | 30    | 100%  | 4.13  |
| 9.             | 0     | 0.00  | 0     | 0.00  | 10    | 33.33 | 7     | 23.33 | 13    | 43.33 | 30    | 100%  | 4.10  |
| 10.            | 0     | 0.00  | 10    | 33.33 | 17    | 56.67 | 3     | 10.00 | 0     | 0.00  | 30    | 100%  | 2.76  |
| 11.            | 0     | 0.00  | 15    | 50.00 | 15    | 50.00 | 0     | 0.00  | 0     | 0.00  | 30    | 100%  | 2.50  |

Based on Table 4, it can be seen that, in the first question (My work environment cleanliness level is good) it can be seen that the highest answer is 13 people agree (43.33%), 9 people disagree (30%), and 8 respondents answered very agree. The average respondent's answer to the first question is 3.96 which is categorized as good, it can be said that the workers agree to work in a good work environment.

The distribution of respondents' answers to 10 statement items regarding the variable Performance (Y) can be seen in Table 5.
Based on table 5, it can be seen that, in the first question (I do my job carefully) it can be seen that the highest answer is 24 people who agree (80%) and disagree (20%), respectively. The average respondent's answer to the first question is 2.80 which is categorized as not good. It can be stated that the workers disagree to do the work carefully.

3.3. The effect of occupational safety and health to employee performance
Based on the multiple linear regression analysis results, the effect of occupational safety and health on employee performance obtained the following regression equation: \( Y = 8.30 + 0.74X_1 - 0.08X_2 \). Simultaneous hypothesis testing (F test) shows that occupational health and safety significantly affect employee performance. [9] states that productivity or performance results from qualitative and quantitative work carried out by employees in completing tasks according to the responsibilities given. Every company hopes that all employees can work as well as possible and fulfill the work goals expected by the company and the scope of work determined by the company.

The coefficient of determination in column \( R^2 \) is 0.64, which means that 63.9% of performance factors can be explained by occupational health and safety variables. In comparison, the remaining 36.1% can be explained by other factors not examined in this study. Other factors that influence performance are personal, leadership, team, and situational factors in the work environment [10]. Meanwhile, according to [11], other factors that influence a person's performance consisted of internal and external factors. Internal factors are usually related to the characteristics of a person.

The application of occupational health and safety in the industry, especially sawmills, really needs to be considered because the work has a relatively large potential for danger. The company must be able to apply the occupational safety and health system properly. Based on the workers' perception, the company has provided personal protective equipment such as masks, gloves, and shoes. The workers feel uncomfortable wearing personal protective equipment and it interferes with their work.

4. Conclusions
Occupational safety and health together have a significant effect on employee performance. Based on multiple linear regression analysis, the regression equation is obtained as \( Y = 8.30 + 0.74X_1 - 0.08X_2 \). The coefficient of determination is 0.64, which means that 64% of the performance factors can be explained by occupational health and safety variables.

References
[1] Sandberg D, Vasiri, Trischler and Öhman M 2014 Scandinavian Journal of Forest Research 29 932005
[2] Salim R and Johansson J 2016 Procedia CIRP 57 764
[3] Sinaga M A 2018 Study of the distribution of the sawmill industry in Medan City (Faculty of Forestry Universitas Sumatera Utara: Medan)
[4] Putri K 2017 Application of Occupational Safety and Health (K3) in Wood Work Practices for Class XII Students of the Building Drawing Engineering Skills Program at SMK Negeri 2 Depok (Yogyakarta State University: Yogyakarta)

[5] Hasyim H 2015 Journal Health Services Management 8 61

[6] Purwoko A, Muhdi and Hanafiah A S 2018 International Journal of Mechanical Engineering and Technology 9 313

[7] Muhdi, Sahar A, Hanafiah D S, Zaitunah A and Nababan F W B 2019 IOP Conf. Ser.: Earth Environ 374 012054

[8] Elphiana E, Yuliansyah D and Kosasih Z 2017 Scientific Journal of Business and Applied Management 1 14

[9] Tarwaka, Solichul B A and Lilik S 2010 Ergonomics for occupational health and safety and productivity (UNIBA Press: Surakarta)

[10] Mangkunegara A A 2011 Company Human Resource Management (PT. Rosdakarya Youth: Bandung)

[11] Wibowo E and Utomo H 2016 Among Makati 9 38