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Job Safety Analysis (JSA) of Work Accidents on Wood Work Machines in the Construction Workshop

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ABSTRACT

This research was motivated by the occurrence of work accidents that occurred in wood construction workshops and also the magnitude of potential hazards that might cause work accidents. The purpose of this study is first; To reveal how many types of static machines there are in the wood construction workshop. Second; Reveal the forms of accidents that have the potential to occur in woodworking machines. Third; Conduct JSA on the form of potential hazards of work accidents that may occur in the use of wood work machines. This type of research is quantitative descriptive with a survey method using the Guttman scale which produces percentages. This research was conducted on lecturers of wood work practice courses along with technicians of the Wood Construction Workshop of the Department of Civil Engineering FT UNP. The findings of this study are that first; The number of types of static wood work machines used routinely by students / lecturers in wood construction workshops is 6 (six), namely armed-arm circular saws, flattening crabs, thickening crabs, tabled circular saws, chisels, and combination crabs. Second;Forms of work accidents that may occur include the use of machines exceeding normal limits, machine layout, machine maintenance processes, experience of machine use processes, maintenance on machines, the occurrence of short circuit sources on machines, cleanliness of the work environment, and implementation of machine usage procedures. Third; JSA in this study is to control aspects of machine operation including by requiring all students to use complete personal protective equipment, giving obligations to lecturers of courses and practices along with technicians or instructors to strictly supervise the use of machines that have the potential to cause accidents.

Keywords: *Means; K3; Accident; Danger; JSA.*

INTRODUCTION

The Wood Construction Workshop of the Department of Civil Engineering FT UNP is a training in wood work skills for civil engineering students, especially for Building Engineering Education students. In this construction workshop, Building Engineering Education students are trained for the work needed for prospective teachers who are professionals in vocational schools and job training centers throughout Indonesia. With the development of science and technology, human resources are still found *in construction workshops who do not fully understand the knowledge and understanding of the importance of Occupational Health and Safety Management in construction workshops*. This will certainly affect students who have not obtained sufficient views on Occupational Health and Safety Management because unconsciously students will do Occupational Health and Safety (K3) while in construction *workshops*. The Occupational Health, Safety Management System (SMK3) is the most

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important part to be applied to work in laboratories and *workshops,* because both places are very vulnerable to hazards in work.

The Department of Civil Engineering of Padang State University has three *construction workshops , namely* wood, concrete stone and plumbing construction workshops. Of the three *construction workshops in the civil engineering department of FT UNP*, the danger of work accidents in wood construction workshops has a high risk of accidents, this is due to the volume of activity levels most carried out in wood construction *workshops*. In addition, *wood construction workshops have the most equipment, so they become dangerous threats and are very vulnerable to accidents while working.*

Meanwhile, in terms of the researcher's own knowledge and experience agreed by other fellow students, there are still many students who do not understand and know the use of tools, coupled with practical wood work learning carried out *online*, which at the time of learning only observed videos from *YouTube* Only those who are usually lazy to access by fellow students for the reason of being bored without understanding and seeing in real terms what is presented by the video, so that in using tools students have no experience with tools.

In the initial observations that the researchers made, researchers conducted a little interview with wood workshop technicians on Tuesday, October 25, 2022 regarding the potential risk of accidents in wood construction *workshops,* in his statement the highest threat of danger is posed to equipment that uses machines because of the fast rotation of wood machines and uses very sharp tools (blades) that have a sharpness angle of 15 degrees so that can cause the potential impact of permanent work accidents. So in this case, it is actually very necessary to have proper knowledge about hazards and how to have good and correct work safety standards.

This is reinforced by the results of research by Priadi (2018) where the implementation of K3 *in wood construction workshops* has been carried out well but has not been carried out optimally, so it needs to be improved in order to minimize the occurrence of work accidents [1]. Although the implementation of K3 has reached 76.9%, cases of work accidents in wood construction *workshops* often occur to students because they do not care about the importance of using K3 in the use of machines during practical activities.

The lack of concern for K3 can also be seen in the results of researcher interviews with students who have finished carrying out wood work practices who have experience in the use of wood machine tools, namely the students of the class of 2018. "... when in the practice room the K3 that needs to be applied is work behavior, eye protection, masks, ear protection, gloves, head protection, foot protection and wearing practice clothes, but some of the colleagues during the practice do not use complete personal protective equipment so there are several cases of work accidents due to ignoring K3 ". To convince researchers of the negligence in implementing K3, researchers also conducted interviews with K3 lecturers, workshop lecturers, and wood construction *workshop* technicians on machines at *the wood construction workshop on Wednesday, November 2, 2022, it was concluded that in the wood construction workshop, K3 regulations in the operation of wood machines have been categorized well and have been made Standard Operating Procedure* (SOP) *workshop, but the implementation of Standard Operating Procedure* (SOP) in controlling the risk of hazards using work tools, especially machines, was not carried out properly. Therefore, it is necessary to identify hazards and determine the level of risk using the JSA method on woodworking machines. In addition, in the wood construction *workshop* there are no steps to prevent work accidents on wood work machines, for example posters of the dangers of using wood machines and no pocket books of

SOP guidelines are given to students.

Although the implementation of the form of hazard control of *machines in the wood construction workshop is only an initiative directed by lecturers, also assisted by construction* workshop technicians to explain it and supervise the implementation of practice, there are still errors that occur in practical students who are not present when lecturers explain wood machines that are still in practice. This is due to the lack of seriousness of students in carrying out practice, resulting in the non-achievement of risk control in each work machine in the *wood construction* workshop.

Several cases of work accidents that occurred in *the Wood Construction Workshop* of the Department of Civil Engineering FT-UNP.

Table 1. Work accident cases in the Wood Construction Workshop

Year	Accident Cases
2015	Occurred in students of the class of 2014 during the operation of the flattening crab machine, resulting in serious injuries to three fingers and surgery had to be carried out. This is due to not using tools when carrying out gardening work and students are not careful (negligent) and careless.
2017-2019	Occurred in students scratched by saws, hands hit by hammers and wounds due to being hit by blocks, as a result of which the students suffered injuries, bruises and pain. This accident case is caused by the work behavior of students who tend to joke and do not think about the dangers that occur when holding and dealing with objects that pose a danger to them.
2020	An accident in a class of 2019 student while operating a flattening crab machine resulted in the hijab being rolled up by the machine, this incident occurred because the victim's hijab was not tied back. Fortunately, the victim's friend quickly pulled the victim when the victim's hijab was eaten by the crab machine and saved the victim from the incident that almost claimed the victim's life. This accident case was caused by a lack of understanding of K3 in victims and behavior when victims did not practice seriously and laughed.
2021	It was found that some students during practice had minor accidents due to negligence in using PPE, namely gloves, as a result of which their hands were wrinkled and cracked. In addition, that year there was also a work accident on the thickening crab machine where the crab eye of this machine was broken caused by nails stuck in wooden blocks during garden work.

From the results of interviews related to work accident cases in the *wood construction workshop* above, it can be seen that many forms of fatal work accidents occur in wood work machines, which are caused by the lack of K3 for personal safety and K3 for tools. But this kind of thing has not been anticipated directly from the technicians of the *wood construction* workshop.

From the description of the problem above, it is unconsciously necessary to identify the risk of work accidents and control them to prevent accidents on wood work machines in construction workshops. Based on information obtained from lecturers of *workshop* courses, this research has never been conducted and needs to be investigated more deeply to find out the forms of work accidents and steps to prevent accident cases that may occur. Therefore, researchers want to conduct a study entitled "*Job Safety Analysis* (JSA) of Work Accidents on Woodworking Machines in the Construction *Workshop* of the Department of Civil Engineering FT-UNP".

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METHOD

Types of Research

The type of research used is quantitative descriptive research with survey methods. According to Sugiyono, the definition of quantitative descriptive is a research method based on data collected during systematic research on the facts and properties of the object under study [2].

Research Location

This research was conducted at *the Wood Construction Workshop* of the Department of Civil Engineering, Faculty of Engineering, Padang State University.

Population and Sample

The population is static machines in the wood construction *workshop* and lecturers of wood work practice courses along with technicians *of the* Wood Construction Workshop of the Department of Civil Engineering FT UNP from 2017 to 2022. The total population is taken from 7 (seven) wood construction workshop lecturers and 2 (two) wood construction workshop technicians , considering that the source of research data to be taken by researchers is small, then the research sample that researchers take is the number of population subjects in the study, which is 9 (nine) people. The population of the subject is not too much, so population research can be done [3].

Data Sources

The data used in this study consisted of secondary data pimer data. Data obtained directly from observations and interviews of lecturers of courses and practices, along with construction workshop technicians and also equipped with industrial people engaged in the *furniture* industry who use static wood work machines such as those in *the* Wood Construction Workshop of the Department of Civil Engineering FT-UNP become primary data. While secondary data is obtained from documents collected from other parties, in the form of documentation from observations and interviews.

Data Collection Techniques

Research data collection is outlined in a questionnaire instrument that presents written statements for respondents to answer. Then the validity test of the instrument in terms of language and material is carried out. According to Sugiyono, instrument validity is a way to find out whether the instrument used is very capable of measuring the object you want to measure [4] with the validity formula. The results of the validity test use the Aiken formula as follows.

$$V = \frac{\sum(r_i - l_o)}{n\,(c-1)} \qquad [5]$$

Information:
V = rater deal index
r = number given by the appraiser
l_o = lowest validity rating number
c= highest validity assessment number
n = number of appraisers

Data Analysis Techniques

In analyzing the data, work accident data statements are obtained from a literature study on a review of the factors causing work accidents compiled in the following list of statements: (See

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Table 2)

Table 2. Work Accident Data Statement Instrument

No.	Statement
1.	The use of the machine is carried out at speeds exceeding normal limits
2.	The occurrence of gaps in machine positioning
3.	Repairing machines / tools when the machine is running
4.	Lack of experience in the use of woodworking machines
5.	Routine maintenance activities for machine tools are not carried out
6.	The occurrence of a short circuit source on the wood working machine when carrying out work
7.	Lack of cleanliness of the machine working environment during wood work practice activities in each area of the machine
8.	Lack of self-awareness of each student towards the rules in carrying out the use of wood work machines

(**Source:** *Primary Data, Work Accident Data Statement Instrument, 2023*)

There are 3 (three) stages to disclose JSA (*Job Safety Analysis*) on accidents on wood work machines as follows:

1. Reveal the percentage of machine adequacy against the number of practices
$$Persentase = \frac{Besaran\ di\ lapangan}{Besaran\ standar} \times 100\% \quad [6]$$
2. Disclose the percentage of work accidents that have the potential to occur when operating woodworking machines
$$Persentase\ skor = \frac{Skor\ yang\ dicapai}{Skor\ ideal\ yang\ seharusnya\ dicapai} \times 100\% \quad [7]$$
3. Reveals the percentage of Job Safety Analysis *(JSA) accident risk classification* for the form of work accidents
$$Persentase\ skor = \frac{Skor\ yang\ dicapai}{Skor\ ideal\ yang\ seharusnya\ dicapai} \times 100\% \quad [8]$$

RESULTS AND DISCUSSION

A. Research Results

1. Data on Static Wood Work Machines used routinely by Students / Lecturers in *the* Wood Construction Workshop of the Department of Civil Engineering FT UNP
Data on static machine equipment used routinely by students / lecturers *in* wood construction workshops in wood work practice learning are adjusted to the Labsheet and Syllabus used in the 2013 curriculum of the Building Engineering Education Study Program. This static machine tool data is described in Table 3 below.

Table 3. Data of Static Wood Working Machine in *wood construction* workshop

No.	Tool Name	*Workshop*		Sum	Condition		
		1 (bottom)	2 (Top)		Good	Broken	Not Suitable for Use
1.	Arm-arm circular sawing machine (cutting saw)	1	1	2	2	-	-
2.	Flattening crab machine	2	-	2	2	-	-

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3.	Thickening crab machine	2	1	3	3	-	-
4.	Tabled circular sawing machine (splitting saw)	3	1	4	3	1	-
5.	Chisel machine	1	1	2	2	-	-
6.	Combination crab machine	1	1	2	1	1	-

(**Source:** *Primary Data, Results of Researcher Questionnaire Data, 2023*)

2. Data on the Form of Work Accidents that Have the Potential to Occur When Operating Wood Work Machines in the *Wood Construction Workshop* of the Department of Civil Engineering FT UNP
   The forms of work accidents that have the potential to occur when operating wood work machines in the Wood Construction *Workshop* of the Department of Civil Engineering FT UNP are described in Figure 1.

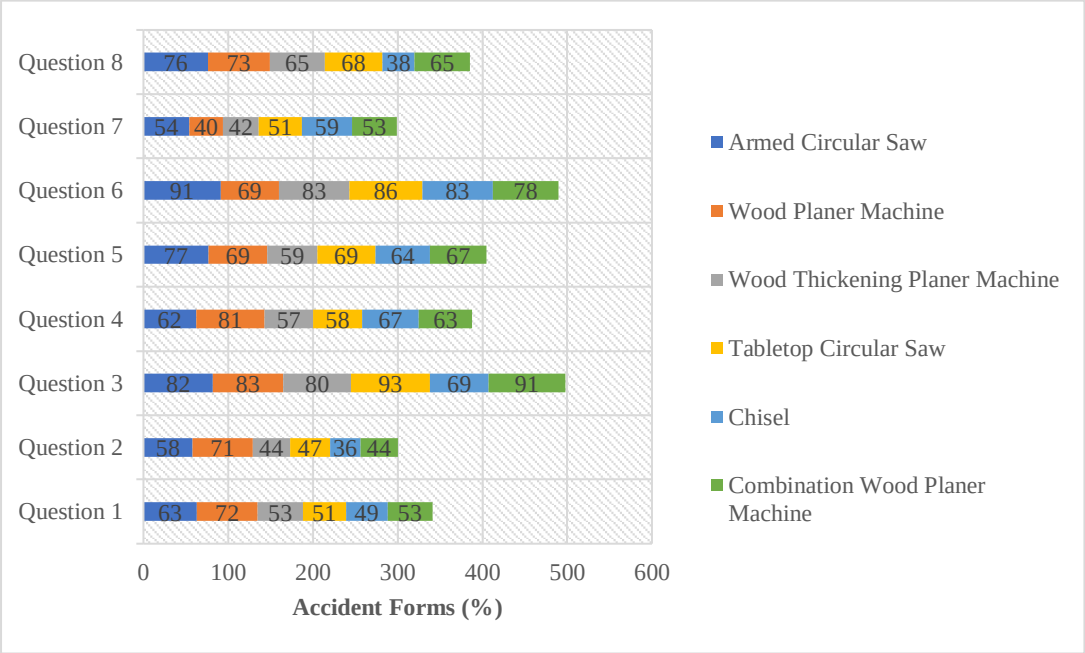

Figure1: *Bar Chart* of Forms of Work Accidents
(**Source:** *Primary Data, Bar Chart of Forms of Work Accidents, 2023*)

3. Work Accident Risk Data in the *Wood Construction Workshop* of the Department of Civil Engineering FT UNP
   The risk of work accidents that have the potential to occur when operating wood work machines *in the Wood Construction Workshop* of the Department of Civil Engineering FT UNP is described in Figure 2.

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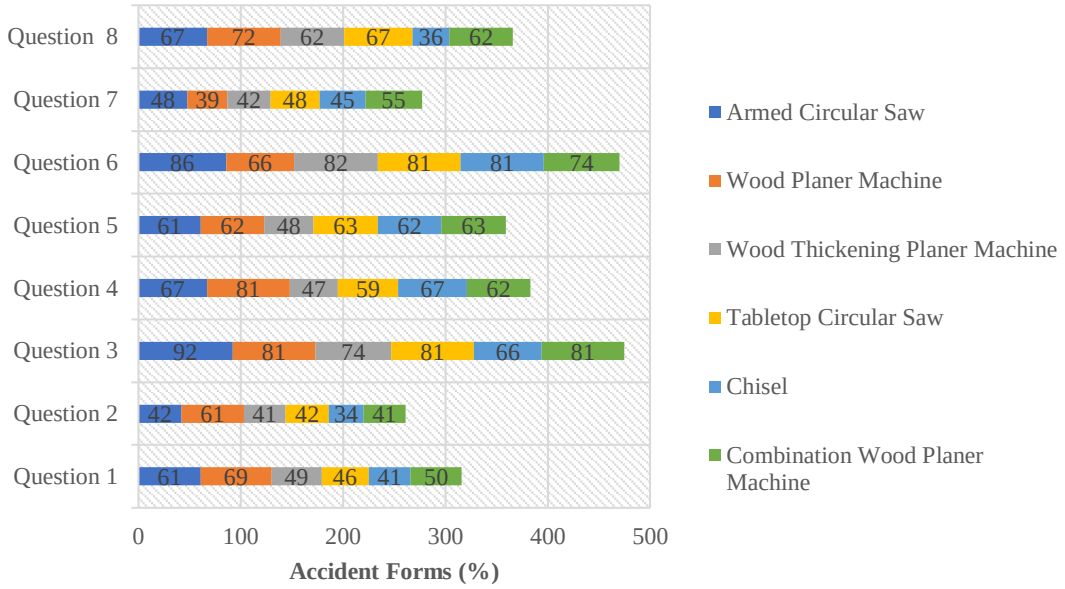

Figure 2: *Work Accident Risk* Bar Chart
(**Source:** *Primary Data, Work Accident Risk Bar Chart, 2023*)

B. Discussion

1. Analysis of Static Wood Work Machines used routinely by Students / Lecturers in *the* Wood Construction Workshop of the Department of Civil Engineering FT UNP

The tool calculation standard refers to the Regulation of the Minister of National Education Number 40 of 2008 concerning the standard of facilities and infrastructure for Vocational High Schools (SMK) and Madrasah Aliyah Vocational (SMK). This reference was set because in *the Wood Construction Workshop* of the Department of Civil Engineering FT-UNP the capacity of students who practice wood work amounted to 16 people with the same work (the same equipment operating hours) and the number of work teams was divided into 4 groups. The calculation of the needs of the researcher tool is set forth in Figure 3.

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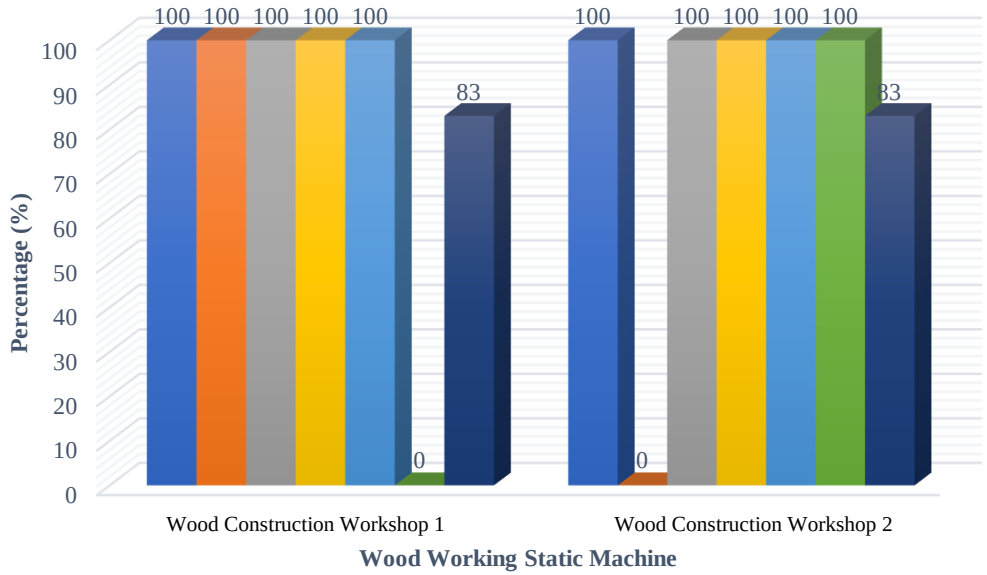

Figure 3: Diagram of Availability and Adequacy of Static Wood Working Tools/Machines (**Source:** *Primary Data, Woodworking Machine Availability and Adequacy Diagram, 2023*)

Based on Figure 3, it can be seen that the static wooden work machine equipment that is often used by students and lecturers in *the old wood construction workshop (*workshop 1) has met the standards. The percentage of availability and adequacy of machines according to standards with those in the field is 83%.

The results of the analysis of the percentage of conformity of the number of equipment there is 1 (one) piece of equipment whose number does not meet the standard, namely in the combination crab machine, but this machine has an amount that is in accordance with the standard. This is because the combination crab machine in the *old wood construction workshop (*workshop *1) is in a damaged condition, as a result the implementation of learning practices is disrupted, learning time becomes ineffective and takes longer practical work, but this problem can be overcome manually without using a combination crab machine, namely by using the help of a cutting saw machine and a splitting saw.*

2. **Analysis of Forms of Work Accidents that Potentially Occur When Operating Wood Work Machines in the *Wood Construction Workshop* of the Department of Civil Engineering FT UNP**
   Analysis of the form of work accidents that have the potential to occur when operating wood work machines in accordance with the calculation results of the percentage analysis of forms of work accidents that have the potential to occur when operating wood work machines (see Figure 4).

3. **Risk Analysis of Work Accidents in *the* Wood Construction Workshop of the Department of Civil Engineering FT UNP**
   The analysis of work accident risk in accordance with PUPR Minister Regulation Number 5 of 2021 concerning Guidelines for Evaluating the Effectiveness Level of Risk Management Implementation at the Ministry of PUPR is determined by classification of severity based on the accident risk level coefficient below:

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a. Die	: 5 points	d. Severe injuries	: 2 points
b. Limb defects	: 4 points	e. Minor injuries	: 1 point
c. Partial limb defects	: 3 points		

The classification of work accidents is obtained based on the classification of work accidents from several countries, namely Indonesia, Poland, Germany, India, and the United States [9]. The results of the classification of work accidents from these 5 (five) countries are summarized by unifying the classification of work accidents through modification of the classification of work accidents as follows:

1) Die	:	The victim died within 24 hours and doctors declared his death related to a work accident he had experienced.
2) Limb defects	:	The victim loses part of the body function (limb defect) so that he cannot work again and requires medical treatment.
3) Partial limb defects	:	The victim lost part of the body, but was still able to return to work and required medical treatment.
4) Severe injuries	:	The victim was out of work, hospitalized for ≥3 weeks and required medical treatment.
5) Minor injuries	:	The victim did not work ≤3 weeks and only required light treatment measures.

The calculation method of this analysis is by multiplying the coefficient of the level of the accident risk category by the number of correct answers and the number of wrong answers, then the results of the values obtained in each multiplication using the coefficient of the level of the accident risk category are calculated the percentage of accident risk. The results of the calculation of the percentage analysis of the risk of work accidents that have the potential to occur when operating wood work machines can be seen in Figure 4.

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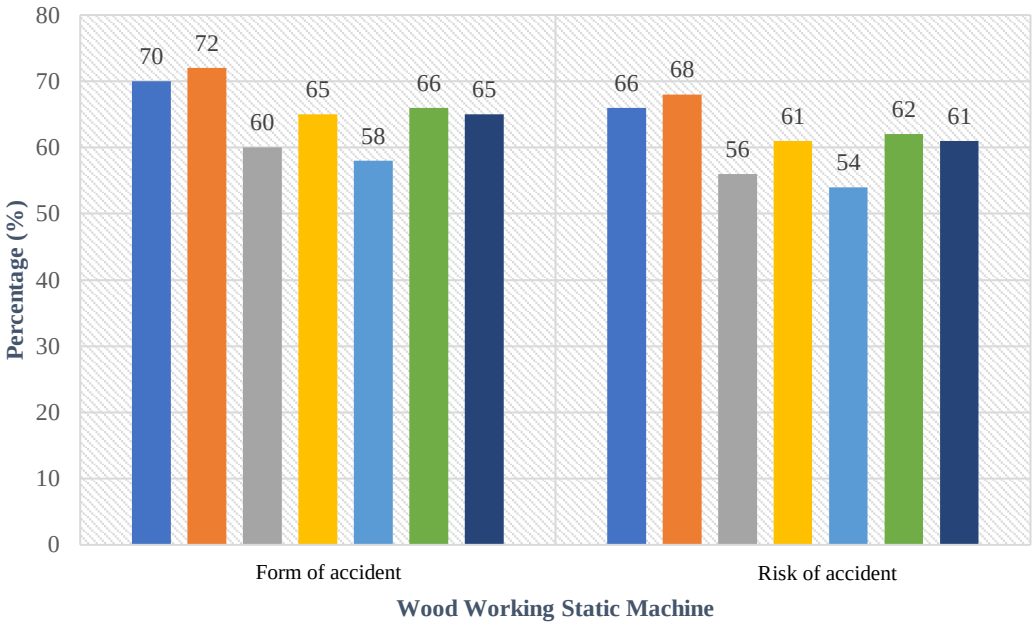

Figure 4: Work Accident Analysis Recapitulation Diagram
(**Source:** *Primary Data, Work Accident Recapitulation Diagram, 2023*)

Recapitulation of the percentage of work accident analysis that may occur in the implementation of the use of wood work machines is obtained by an average percentage with the High category. Because the equipment used in wood work machines uses very sharp objects and poses potential accident hazards, so monitoring and work experience are needed. The highest sequence of potentially accidents occurred in grading crab machines, arm-arm circular sawing machines, combination crab machines, tabled circular sawing machines, thickening crab machines, and chisel machines. The percentage value of the forms of work accidents shows a difference or higher than the percentage of work accident risk, but the percentage value is already in the same category range. This is because at the time of accident risk analysis, the number of respondents and the number of determination of the severity of accident risk greatly affect the use of wood work machines.

Based on the results of the analysis of the percentage of work accident forms that have the potential to occur when operating wood work machines (Figure 1), the percentage of work accident risk results that have the potential to occur when operating wood work machines (Figure 2) and the calculation of the percentage analysis of work accident risks that may potentially occur when operating wood work machines (Figure 4) are obtained:

1. In armless circular sawing machines (cutting saws) the potential form of work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 63% (High) and an accident risk of 61% (High); The occurrence of gaps in engine positioning has an accident percentage of 58% (Medium) and an accident risk of 42% (Medium); Repairing machines/tools in a running machine state has an accident percentage of 82% (Very High) and a risk of accidents of 92% (Very High); Lack of experience in the use of wood working machinery has an accident percentage of 62% (High) and an accident risk of 67%

(High); Non-maintenance activities on machine tools routinely have an accident percentage of 77% (High) and an accident risk of 61% (High); The occurrence of a short circuit source in wood work machines when carrying out work has an accident percentage of 91% (Very High) and an accident risk of 86% (Very High); The absence of cleanliness of the machine work environment during wood work practice activities in each machine area has an accident percentage of 54% (Medium) and an accident risk of 48% (Medium) and; The absence of self-awareness of each student towards the rules in carrying out the use of wood work machines has a percentage of accidents of 76% (High) and a risk of accidents of 67% (High).

2. In crab machines, the potential for work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 72% (High) and an accident risk of 69% (High); The occurrence of gaps in engine positioning has an accident percentage of 71% (High) and an accident risk of 61% (High); Repairing machines/tools in a running machine state has an accident percentage of 83% (Very High) and an accident risk of 81% (Very High); Lack of experience in the use of wood working machinery has an accident percentage of 81% (Very High) and an accident risk of 81% (Very High); Non-maintenance activities on machine tools routinely have a percentage of accidents 69% (High) and a risk of accidents 62% (High); The occurrence of a short circuit source on a wood work machine when carrying out work has an accident percentage of 69% (High) and an accident risk of 66% (High); The absence of cleanliness of the machine working environment during wood work practice activities in each machine area has an accident percentage of 40% (Low) and an accident risk of 39% (Low) and; The absence of self-awareness of every student towards the rules in carrying out the use of wood work machines has a percentage of accidents of 73% (High) and the risk of accidents 72% (High).
3. In thickening crab machines, potential forms of work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 53% (Medium) and an accident risk of 49% (Medium); The occurrence of gaps in machine positioning has an accident percentage of 44% (Medium) and an accident risk of 41% (Medium); Repairing machines / tools in a running machine state has an accident percentage of 80% (High) and an accident risk of 74% (High); Lack of experience in the use of wood work machinery has an accident percentage of 57% (Medium) and an accident risk of 47% (Medium); Routine maintenance of machine tools has a percentage of accidents of 59% (Medium) and a risk of accidents of 48% (Medium); The occurrence of a short circuit source in wood work machines when carrying out work has an accident percentage of 83% (Very High) and an accident risk of 82% (Very High); The absence of cleanliness of the machine work environment when wood work practice activities in each machine area has an accident percentage of 42% (Medium) and an accident risk of 42% (Medium) and; The absence of self-awareness of each student towards the rules in carrying out the use of wood work machines has an accident percentage of 65% (High) and an accident risk of 62% (High).
4. In tabled circular sawing machines (splitting saws) the potential form of work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 51% (Medium) and an accident risk of 46% (Medium); The occurrence of gaps in machine positioning has an accident percentage of 47% (Medium) and an accident risk of 42% (Medium); Repairing

machines/tools in a running machine state has an accident percentage of 93% (Very High) and an accident risk of 81% (Very High); Lack of experience in the use of wood work machinery has an accident percentage of 58% (Medium) and an accident risk of 59% (Medium); Non-maintenance activities on machine tools routinely have an accident percentage of 69% (High) and an accident risk of 63% (High); The occurrence of a short circuit source on a woodworking machine during work has an accident percentage of 86% (Very High) and an accident risk of 81% (Very High); The absence of cleanliness of the machine working environment during wood work practice activities in each area of the machine has an accident percentage of 51% (Medium) and an accident risk of 48% (Medium) and; The absence of self-awareness of each student towards the rules in carrying out the use of wood work machines has a percentage of accidents of 68% (High) and the risk of accidents of 67% (High).

5. In the chisel machine the potential form of work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 49% (Medium) and an accident risk of 41% (Medium); The occurrence of gaps in machine positioning has an accident percentage of 36% (Low) and an accident risk of 34% (Low); Repairing machines / tools in a running machine state has an accident percentage of 69% (High) and an accident risk of 66% (High); Lack of experience in the use of wood working machines has an accident percentage of 67% (High) and an accident risk of 67% (High); Non-maintenance activities on machine tools routinely have an accident percentage of 64% (High) and an accident risk of 62% (High); The occurrence of a short circuit source in a woodworking machine during work has an accident percentage of 83% (Very High) and an accident risk of 81% (Very High); The absence of cleanliness of the machine working environment during wood work practice activities in each area of the machine has an accident percentage of 59% (Medium) and an accident risk of 45% (Medium) and; The absence of self-awareness of each student towards the rules in carrying out the use of wood work machines has an accident percentage of 38% (Low) and an accident risk of 36% (Low).
6. In crab machines, a combination of potential forms of work accidents for: The use of machines carried out at speeds exceeding normal limits has an accident percentage of 53% (Medium) and an accident risk of 50% (Medium); The occurrence of gaps in machine positioning has an accident percentage of 44% (Medium) and an accident risk of 41% (Medium); Repairing machines / tools in a running machine state has an accident percentage of 91% (Very High) and an accident risk of 81% (Very High); Lack of experience in the use of wood working machines has an accident percentage of 63% (High) and a risk of accidents of 62% (High); Non-maintenance activities on machine tools routinely have an accident percentage of 67% (High) and an accident risk of 63% (High); The occurrence of a short circuit source in a wood working machine when carrying out work has an accident percentage of 78% (High) and an accident risk of 74% (High); The absence of cleanliness of the machine work environment when wood work practice activities in each area of the machine has an accident percentage of 53% (Medium) and an accident risk of 55% (Medium) and; The absence of self-awareness of each student towards the rules in carrying out the use of wood work machines has an accident percentage of 65% (High) and an accident risk of 62% (High).

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CONCLUSION

Based on the results of the research and discussion of the research that has been presented, it can be concluded that:

1. The types of static wood work machines used routinely by Students / Lecturers in the Wood Construction *Workshop of the* Department of Civil Engineering FT-UNP have 15 (Fifteen) Static Machines with 6 (six) types of machines, namely armed-arm circular saws, flattening crabs, thickening crabs, tabled circular saws, chisels, and combination crabs where in the *old wood construction workshop (*workshop 1) consists of one arm-sleeved circular sawing machine, two flattening crab machines, two thickening crab machines, three tabled circular sawing machines, one chisel machine, and one combination crab machine, while in the *new wood construction workshop (*workshop 2) consists of one arm-sleeved circular sawing machine, one thickening crab machine, one tabled circular sawing machine, one chisel machine, and one combination crab machine. The availability of static woodworking *machines in wood construction workshop* 1 and wood construction *workshop* 2 shows that the category has met the standard with the percentage of availability and adequacy of machines according to standards with those in the field is 83%.
2. The forms of work accidents that may occur when operating wood work machines in the Wood Construction *Workshop* of the Department of Civil Engineering FT-UNP consist of three parts, namely from the machine itself, from the user and from the workpiece. The three parts are described in 8 (eight) forms of accidents, namely the use of machines carried out at speeds exceeding normal limits, the occurrence of gaps in the placement of machine positions, repairing machines / tools in the state of machine running, lack of experience in the use of wood work machines, not carrying out routine maintenance activities on machine tools, the occurrence of short circuit sources on wood work machines when carrying out work, The lack of cleanliness of the machine work environment during wood work practice activities in each machine area, and the lack of self-awareness of each student towards the rules in carrying out the use of wood work machines which are categorized as high shows a recapitulation of the percentage of work accident analysis as a whole finds the number of possible accidents at 65% and the risk of possible accidents at 61%.
3. *Job Safety Analysis* (JSA) of the form of work accidents that may occur in wood work machines in the Construction *Workshop* of the Department of Civil Engineering FT-UNP can be seen in Figure 1, Figure 2 and Figure 4 with control of the risk of danger to accidents using wood work machines including; Three machines with administrative hazard control and Personal Protective Equipment (PPE) are arm-arm circular sawing machine, thickening crab machine and chisel machine; Two machines with engineering, administrative control and Personal Protective Equipment (PPE) namely flattening crab machine, tabled circular saw machine and; One machine with control by elimination, substitution, engineering, administrative and Personal Protective Equipment (PPE) is a combination crab machine.

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