

## **Identify Potential Dangers of Unsafe Action and Unsafe Conditions with Work Accidents**

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### **Abstract**

Based on an initial survey of 30 workers, 10 of them stated that they had experienced work accidents. Among them were exposed to heating rolls, exposed to splinters of sawdust, stuck in the machine, and exposed to splashes of chemical liquids. The purpose of this study was to determine the relationship between unsafe action and unsafe condition with the incidence of work accidents among workers at MnM Center Tanjung Morawa Printing. Methods uses a quantitative method with a cross sectional study approach. The research population was all workers at the MnM Center Tanjung Morawa Printing, totaling 30 people and all of them were used as samples. The analysis of this study used univariate analysis, bivariate analysis with the chi-square test. Results showed that the p-value for unsafe action ( $p=0.000$ ) and unsafe condition ( $p=0.328$ ). Conclusion of this study is that there is a relationship between unsafe action and work accidents, there is no relationship between unsafe conditions and work accidents at the MnM Center Tanjung Morawa. It is expected that respondents pay more attention to their actions while working, as well as increased awareness and knowledge of safe work behavior.

**Keywords:** Unsafe Action, Unsafe Condition, Accidents

### **Introduction**

Occupational Health and Safety (K3) is a form of effort to create a workplace that is safe, healthy, free from environmental pollution, so that it can protect and be free from work accidents which in turn can increase work efficiency and productivity. Occupational accidents not only cause fatalities but also material losses for workers and employers, but can disrupt the production process as a whole, damage the environment which will ultimately have an impact on the outside community (Jung et al., 2020; Budiyo & Fernanda, 2020).

Work accidents are events that do not happen by chance but have a cause. Because there is a cause, the cause of the accident must be investigated and found, so that in the future with corrective actions aimed at that cause as well as with further preventive measures the accident can be prevented and similar accidents do not recur. There are two groups of causes of work accidents. The first group is mechanical and environmental factors, which include everything other than human factors. The second group is the human factor itself which is the cause of accidents (Kelly & Efthymiou, 2019).

According to the International Labor Organization (ILO) in 2018, 2.78 million workers die every year due to work accidents and work-related diseases. Approximately 2.4 million (86.3%) of these deaths were due to occupational diseases, while more than 380,000 (13.7%)

were due to work accidents. Every year, there are almost a thousand times more non-fatal work accidents than fatal work accidents. Non-fatal accidents are estimated to affect 374 million workers annually, and many of these accidents have serious consequences for the earning capacity of workers (Yeoh et al., 2013).

Work accident theory/ Heinrich's Domino Theory is widely used as one of the principles of accident prevention and loss control. Heinrich adopted domino to explain the occurrence of work accidents, including the first, namely heredity is a characteristic or condition possessed by someone who is at risk of injury. Second, unsafe behavior is a habit that risks accidents. Third, unsafe conditions are conditions that pose a risk of causing accidents. Fourth, an accident is an unwanted event that can cause harm to humans, property and the production process. Fifth, losses are the result of an accident. In summary, the domino theory explains that work accidents can be prevented by improving one of the causal factors. According to Heinrich's theory, it was explained that 88% of accidents were caused by unsafe actions, 10% were caused by unsafe conditions, and 2% were things that could not be avoided (anavoidable). Thus, unsafe behavior or actions are actions that can endanger the worker himself or other people which can cause work accidents (Moore et al., 2012).

MnM Printing Center Tanjung Morawa is located on Jalan Kelapa Sawit no. 59. Printing in this research is a place of production. In the production process, workers use various kinds of machine tools which are used according to their respective functions. From the results of the initial survey conducted in July 2021, it was recorded that out of the entire population of 30 people, 10 of them stated that they had experienced work accidents. The work accidents experienced were in the laminating section, 1 worker who was hit by a heating roll on his hand, causing burns to the skin of his hand, in the pond knife section, namely 1 worker whose eyes were hit by wood dust when cutting wood patterns, in the printing section 3 workers' hands had been caught in the printing machine when inserting paper and ink, causing bruises on their fingers, in the pond machine section, namely 3 workers had their fingers caught when operating the machine, causing bruises and swelling on their fingers, and in cliché part: 2 workers were exposed to chemical liquid splashes on their hands, causing itching/irritation on the skin.

Several factors/problems that cause work accidents are unsafe actions, including working too hastily, chatting/joking with colleagues while working/operating machines, smoking in the work area. Then, the relationship between unsafe conditions includes piles of goods placed haphazardly, placing machines too close to each other, narrow work areas because there are lots of piles of paper waste. There have been many impacts from work accidents experienced, both in terms of material losses, working time, and for individuals. Information obtained from the initial survey was that work accidents that occurred at the MnM Center Tanjung Morawa printing press were caused by unsafe actions carried out by workers while working and unsafe conditions in the work environment. Several variables that will be examined in this research are unsafe actions, unsafe conditions and work accidents.

Therefore, researchers are interested in conducting research on "Identifying Potential Dangers of unsafe actions and unsafe conditions with the incidence of work accidents among workers at the MnM Center Tanjung Morawa printing press in 2021".

The aim of this research is to identify the potential dangers of unsafe actions and unsafe conditions with the incidence of work accidents among workers at the MnM Center Tanjung Morawa Medan printing press.

## **Methods**

The research uses quantitative methods with a cross sectional study approach, which is a research design where the independent variable and dependent variable are measured and

collected at the same time (12). The study population consisted of 30 workers with a total sample of 30 workers using the total population. The tool for data collection is a questionnaire. The data that has been collected was processed by univariate and bivariate analysis with the chi-square statistical test.

## Results and Discussion

Table 1 shows respondents based on age, of the 30 workers aged 17-25 years there were 14 people (46.7%), respondents aged 26-45 years were 13 people (43.3%), respondents aged >45 years as many as 3 people (10.0%). It is also known that respondents based on female gender were 3 people (10.0%), and male gender were 27 people (90.0%). It is also known that based on education, 4 people graduated from junior high school (13.3%), 23 people from high school/vocational school (76.7%), and 3 people who graduated from bachelor's degree (10.0%). It is also known that respondents based on a work period of 1-5 years were 17 people (56.7%), at 6-10 years there were 9 people (30.0%), and at 11-15 years there were 4 people (13.3%).

Table 1. Frequency Distribution Based on Respondent Characteristics

Characteristic	Frequency (f)	Percentage (%)
<b>Age</b>		
17-25 Years	14	46,7
26-45 Years	13	43,3
> 45 Years	3	10,0
<b>Gender</b>		
Woman	3	10,0
Man	27	90,0
<b>Education</b>		
Junior School	4	13,3
High School / Vocational School	23	76,7
Bachelor	3	10,0
<b>Period of Service</b>		
1-5 Years	17	56,7
6-10 Years	9	30,0
11-15 Years	4	13,3
<b>Sum</b>	<b>30</b>	<b>100,0</b>

In table 2. it is known that workers who carried out *low unsafe action* as many as 13 people (43.3%), workers who carried out *high unsafe action* as many as 17 people (56.7%)

No	Unsafe Action	f	%
1	Low	13	43,3
2	Tall	17	56,7
	<b>Sum</b>	<b>30</b>	<b>100,0</b>

Table 3. It is known that *the low unsafe condition* is 12 people (40.0%), and the high unsafe condition is 18 people (60.0%).

No	Unsafe Condition	f	%
1	Low	12	40,0
2	Tall	18	60,0
	<b>Sum</b>	<b>30</b>	<b>100,0</b>

Table 4. It is known that workers who have never had a work accident as many as 13 people

(43.3%), and workers who have had work accidents as many as 17 people (56.7%).

No	Work Accidents	f	%
1	Never	13	43,3
2	Ever	17	56,7
	<b>Sum</b>	<b>30</b>	<b>100,0</b>

### **Identification of potential hazards *Unsafe Action* with Work Accidents in Workers at the Tanjung Morawa MnM Center Printing in 2021**

Based on the results of the Chi-square test, it shows that the unsafe action variable has a p value = 0.000 (<0.05), meaning that unsafe action has a relationship between unsafe action by workers and work accidents at the MnM Printing Center Tanjung Morawa.

Unsafe Action is a failure (Human Failure) in following the correct work requirements and procedures resulting in work accidents, such as: Actions without qualification and authority, lack or not using personal protective equipment, failure to save equipment, working at dangerous speeds, failure to comply with warnings, avoiding or moving safety equipment, using inappropriate equipment, using certain equipment for other deviant purposes, working in hazardous places without proper protection and warning, repairing equipment incorrectly, working rudely, wearing unsafe clothing when working, and taking unsafe work positions (Golestani et al., 2020)

The factors that influence the formation of unsafe actions are very complex, which involve a wide range of factors, namely: management, social, psychological and human-machine-environment system. Even though it is complex, the essence is to illustrate that unsafe actions cannot be separated from factors originating from the people themselves and their organizational environment (Golestani et al., 2020).

According to the researchers' assumptions, in this study the majority of respondents who had work accidents, namely workers who carried out high unsafe actions were more compared to respondents who had experienced accidents in the low unsafe action category. The results of the chi-square test showed  $p = 0.000 < 0.05$ , which means that there is a relationship between unsafe actions and work accidents. Awareness from workers regarding the importance of always being careful when working, always maintaining cleanliness and tidiness, not smoking, always checking the condition or condition of work tools in good condition when they want to use them in order to help minimize the chance of work accident incidents. Conversely, when a worker is sick at work, does not check work equipment, is in a hurry while working, littering, smokes while working, and does not use PPE such as masks and gloves then this will reduce concentration at work and can cause work accidents.

### **Identification of Potential Unsafe *Condition* Hazards with Work Accidents in Workers at MnM Center Tanjung Morawa Printing.**

Based on the results of the Chi-square test, it shows that the unsafe condition variable has a value of  $p = 0.328 (> 0.05)$ , meaning that unsafe conditions are not related to work accidents at the Tanjung Morawa MnM Printing Center.

The results of this research are in line with research conducted by Irkas, Fitri, Purbasari, and Pristya regarding the relationship between unsafe action and unsafe conditions with work accidents in furniture industry workers in 2020. The results of the chi-square test for the unsafe condition variable obtained  $p\text{-value}=0.074 (>0.05)$  which means there is no relationship between unsafe conditions and work accidents. Even though workplace conditions are included in the highly unsafe condition category, this does not completely affect whether workers can implement self-protection measures when working (Sun et al., 2017).

Unsafe conditions include: equipment that is no longer suitable for use or is damaged, inadequate protection or barriers, inadequate personal protective equipment, fire in dangerous areas, inadequate building security, exposure to noise, exposure to radiation, lighting or insufficient or excessive ventilation, dangerous temperature conditions, excessive security, excessive warning systems, the nature of work that contains potential dangers (Zhang et al., 2016).

The conditions of the workplace environment where workers carry out their daily activities contain many direct and indirect dangers to the safety and health of workers. Unsafe conditions are conditions in the work environment, including tools, materials or the environment that are unsafe and dangerous. For example, slippery floors, damaged or broken stairs, poor lighting or noise that exceeds permissible safe limits (Ichwan et al., 2021). According to the researchers' assumptions, in this study the majority of respondents who experienced work accidents were in the high unsafe condition category compared to respondents who experienced work accidents in the low unsafe condition category. The results of the chi-square test show that the  $p$  value =  $0.328 > 0.05$ , meaning there is no relationship between unsafe conditions and work accidents at the Tanjung Morawa MnM Printing Center in 2021.

Unsafe conditions in this research were caused by several things, such as the work area being used being narrow because there were lots of piles of waste resulting from production, the floor was not easy to clean and was slippery, there was some paper waste on the floor. A work environment that does not meet the requirements will have the possibility of work accidents occurring. However, even though workplace conditions are included in the high unsafe conditions category, this does not fully affect whether workers can implement self-protection measures when working. As per the answers from the results of the questionnaire conducted by respondents, it is true that their work area has the potential for work accidents to occur, but they are used to the conditions of the work environment so it is not a big problem for them. So, with the unsafe working environment there, no relationship was found with the work accidents they experienced.

Like the theory put forward by Heinrich that unsafe conditions have an effect of 10% on accidents, while unsafe actions are far greater, namely 88%. For example, when a company does not provide PPE to workers, this will not have much effect if workers always use the PPE they have because of the high awareness of implementing safety measures. Or even though the workplace floor is not easy to clean, if workers always maintain the cleanliness and safety of the environment then this will also have quite an effect on efforts to prevent work accidents.

## **Conclusion**

The conclusion of this study shows that there is a relationship between unsafe action and work accidents among workers at the Tanjung Morawa MnM Printing Center with a  $p$  value =  $0.000 (<0.05)$ . There is no relationship between unsafe conditions and work accidents among workers at the Tanjung Morawa MnM Center Printing with  $p = 0.328 (> 0.05)$ . It is hoped that the company can provide information about work accidents to workers that can occur because they are caused by unsafe action relationships, such as smoking while working, piling goods beyond the maximum limit, carrying excessive loads, working in drowsy conditions or work in a rush. Furthermore, the company is able to carry out prevention efforts by supervising, monitoring, and coaching workers at the Tanjung Morawa MnM Printing Center. Also, business owners can equip or provide personal protective equipment for workers according to their needs. Such as rubber gloves and masks used during the cliché making process.

## **Thank-You Note**

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## References

- Budiyanto, M. A., & Fernanda, H. (2020). Risk assessment of work accident in container terminals using the fault tree analysis method. *Journal of Marine Science and Engineering*, 8(6), 466.
- Golestani, N., Abbassi, R., Garaniya, V., Asadnia, M., & Khan, F. (2020). Human reliability assessment for complex physical operations in harsh operating conditions. *Process Safety and Environmental Protection*, 140, 1-13.
- Ichwan, N. E., Sutoni, A., & Khoerunnisa, S. T. (2021, February). Analysis of Occupational Safety and Health Systems in Bridge Construction Development Logistics Systems: Case Study at Cibeureum Bridge, Sukabumi. In *Journal of Physics: Conference Series* (Vol. 1764, No. 1, p. 012173). IOP Publishing.
- Jung, S., Woo, J., & Kang, C. (2020). Analysis of severe industrial accidents caused by hazardous chemicals in South Korea from January 2008 to June 2018. *Safety science*, 124, 104580.
- Kelly, D., & Efthymiou, M. (2019). An analysis of human factors in fifty controlled flight into terrain aviation accidents from 2007 to 2017. *Journal of safety research*, 69, 155-165.
- Moore, C., Detert, J. R., Klebe Treviño, L., Baker, V. L., & Mayer, D. M. (2012). Why employees do bad things: Moral disengagement and unethical organizational behavior. *Personnel psychology*, 65(1), 1-48.
- Sun, C., Kahn, M. E., & Zheng, S. (2017). Self-protection investment exacerbates air pollution exposure inequality in urban China. *Ecological economics*, 131, 468-474.
- Yeoh, H. T., Lockhart, T. E., & Wu, X. (2013). Non-fatal occupational falls on the same level. *Ergonomics*, 56(2), 153-165.
- Zhang, Y., Shao, W., Zhang, M., Li, H., Yin, S., & Xu, Y. (2016). Analysis 320 coal mine accidents using structural equation modeling with unsafe conditions of the rules and regulations as exogenous variables. *Accident Analysis & Prevention*, 92, 189-201.