Research Inventy: International Journal of Engineering And Science
Vol.13, Issue 12 (December 2023), PP 38-41
Issn (e): 2278-4721, Issn (p):2319-6483, www.researchinventy.com

The Application of HIRADC Method for Risk Analysis on Service Process of Vespa Garage (Case Study: Scootfellas Garage, Mataram City, NTB)

Fikrihadi Kurnia[1], Yusril Ilhamdani[2], Rohendi Zulpian[3]
[1] *Department of Industrial Engineering, Faculty of Engineering, Universitas Mataram, Indonesia*
[2,3] *Department of Mechanical Engineering, Faculty of Engineering, Universitas Mataram, Indonesia*
Corresponding Author: fikrihadi@unram.ac.id

Abstract: *The risk of work accidents is a condition that must be a concern for all parties to create a safe and comfortable work environment. To increase the productivity of a company, one important aspect that plays a role is Occupational Health and Safety (OHS). By implementing OHS, companies can minimize the rate of work accidents, so that the company can increase productivity. This study aims to analyze the level of work risk in Vespa workshop workers in Mataram City, West Nusa Tenggara. The research will be conducted during March 2023. The analysis process uses the HIRADC (Hazard Identification, Risk Assessment and Determining Control) Method. The results showed that there was 1 activity that had a high level of risk, namely the process of taking service equipment, which had the potential to scratch the workpiece. Based on this, an improvement proposal was given as a control, namely personal protective equipment in the form of work gloves and work clothes that have long sleeves.*

Keywords: *Assessment, Hazard, Occupation, Risk, Safety.*

Date of Submission: 03-12-2023 Date of acceptance: 16-12-2023

I. INTRODUCTION

Data from the Ministry of Manpower of the Republic of Indonesia, (2022), shows that, between 2019-2021 work accident cases occurred 64.4% from inside the workplace, 27% from traffic, 8.2% from outside the workplace, and the rest from other factors. This work accident continues to increase from year to year, between 2019 to 2020 it increased by 3.4%, and increased again by 0.06% in 2021. The victims who experience work accidents are dominated by the productive age of work, namely between the ages of 25-35 years. These results show that work accident cases in Indonesia fall into the category that is quite serious and requires comprehensive improvement. This is with the aim of reducing the rate of work accidents so as to ensure the safety of workers during work activities.

Previous research explained that, more than 60% of workers in small and medium enterprises have bad attitudes and behaviors during work (Tarigan et al., 2020). Attitudes and behaviors contribute to creating a healthy and safe work environment (Pratiwi et al., 2022; Veloso Neto et al., 2021). Risk perception is correlated with work behavior and the level of work accidents, so that individual workers contribute to safety in work activities (Sutalaksana et al., 2019). Work culture creates appropriate safety procedures to implement, and mitigates workplace hazards (Jule, 2020). To maintain safety in the workplace, comprehensive cooperation is needed with all stakeholders to be able to make it happen (Rikhotso et al., 2021).

This research was conducted with the aim of identifying hazards, assessing and handling hazards in the workplace. Analysis using HIRADC Hazard Identification Risk Assessment and Determining Control) is a method used to control and repair workplace accidents by identifying and measuring work risks (Sjarifudin et al., 2023). In its application, this method is flexible to be applied to manufacturing and service industries (Khusufi et al., 2023; Syahlan, 2021). This research was conducted on Schootfellas Garage workers in Mataram City, West Nusa Tenggara. Schootfellas Garage is a business entity engaged in automotive services, namely vespa motor service, vespa accessories, vespa motor repaint, etc. Based on this, it is expected to contribute in the form of effective improvement proposals in overcoming work accidents and increasing productivity.

II. EXPERIMENTAL PROCEDURE

This study aims to analyze the level of work risk in Schootfellas Garage workers in Mataram City, West Nusa Tenggara. Schootfellas Garage is a business entity engaged in automotive services, namely Vespa motor service, Vespa accessories, Vespa motor repaint, etc. The research will be conducted during March 2023. The analysis process uses the HIRADC (Hazard Identification Risk Assessment and Determining Control) Method, which is a method of assessing work risks through identification and assessment of work risks , as well

as determining proposed improvements so that work risks can be well controlled. There are 3 main activities in the HIRADC method, namely:

1. Risk Identification: identify the process of work activities that take place from beginning to end. Next is to provide details of potential hazards that may arise that result in work accidents, this potential can be in the form of minor, moderate, torn, broken injuries, until death. Based on these details, it is considered by respondents to provide assessments in accordance with field conditions so far.
2. Risk Assessment: An assessment consisting of the level of probability or intensity (Likelihood) of the number of accidents occurring and the severity (Severity) experienced if the accident occurred at the job site. Likelihood indicates the likelihood of an event that will occur, while Saverity indicates the severity impact that will occur from an accident. Then to determine the risk rating will use the values of likehoot and Saverity. Risk rating is a value that will indicate the level of risk, namely at the low, medium, high, and / or extreme levels. Basically the assessment process and scale refer to AS/NZS Standard 4360 (Madill, 1999).

Table 1. Risk scale of Likelihood

Level	Description	Information
5	Almost Certain	There are ≥ 1 incident in each shift
4	Likely	There are ≥ 1 incident in every day
3	Posible	There are ≥ 1 incident in each week
2	Unlikely	There are ≥ 1 incident in each month
1	Rare	There are ≥ 1 incident in a year or more

Table 2. Risk scale of Severity

Level	Description	Information
1	Insignificant	No injuries, little financial loss
2	Minor	Minor injuries, little financial loss
3	Moderate	Moderate injury, need for medical attention, major financial loss
4	Major	Heavy injuries ≥ 1 person, heavy losses, production interruptions
5	Catastrophic	Fatal ≥1 person, very large losses and very wide impact, the cessation of all activities

Table 3 Risk Rating Scale

Likelihood	Severity				
	1	2	3	4	5
5	H	H	E	E	E
4	M	H	E	E	E
3	L	M	H	E	E
2	L	L	M	H	E
1	L	L	M	H	H

Note:

L: Low
M: Medium
H: Hight
E: Extream

3. Determination of Risk Control: The proposal for improvement is based on the severity obtained at the risk assessment. The goal is to control the risks that are formed. Control can be done by considering the urgency of the level of risk. In this case, control can be in the form of investigating field conditions, providing new tools or technology to support worker work safety, or stopping a work activity and replace with other alternatives if the level of risk is extreme.

III. RESULTS AND DISCUSSIONS

This study aims to analyze the level of work risk in Vespa workshop workers when servicing. The use of the HIRADC method is used as an analytical tool which will be given the level of risk from the activities carried out. The risk level of the analysis results is divided into low, medium, and high risk (Table 1).

Table 1. Recapitulation of analysis results using HIRADC

Activity	Hazard Identification	Risk	Risk Assessment			Risk level
			S	L	RR	
Setting Up the Tool						
Taking the tools	Hands scratched by tools	Scratches on the hands	2	3	6	High
	Tools fall on the foot	Tools fall on the foot	2	2	4	Low
Bring the tool to the service place	Slipping due to a messy workplace	Slipping due to a messy workplace	3	2	6	Medium
Opening the CVT body						
Unscrewing the CVT bolt with the tool	Hands hit the floor when opening primary and secondary	Deep wounds on the hand or fingers	2	2	4	Low
Opening CVT components						
Opening primary and secondary pulley	Hands hit the floor	Deep wounds on the hand	2	3	6	Medium
	Hands pinched	Wounds on pinched hands	2	3	6	Medium
Opening V Belt	Snapped v-belt	Deep wounds on the hand or fingers	2	3	6	Medium
Opening a roller house	Stuck home roller	Exfoliated skin wounds	2	2	4	Low

Note:
L : Likelihood rate of occurrence
S : Severity of work accidents
RR : The multiplication between L and S

Based on Table 1, it shows that there are 6 activities that have a potential risk for work accidents. Each activity has 1-2 potential hazards. Based on this potential hazard, further identification of risks that arise in the event of a work accident. In obtaining the final value for the level of risk that will be used as a reference in making the final risk decision, the probability value of the event and the severity of work accidents must be filled in first. The level of risk formed is then given improvement proposals as consideration for risk control, including:

1. High risk level there is 1 activity with 1 potential hazard, that is, taking service equipment with potential danger is scratched on the hand area. This risk is required to immediately investigate the activity or work site. Risk control needed is to provide personal protective equipment in the form of gloves and long-sleeved uniforms.
2. The medium risk level has 4 potential hazards in each of its activities. This risk has no urgency to be corrected, but as a preventive measure to overcome potential dangers in the future.
3. The low risk level has 3 potentials in each of its activities. This risk does not require improvement at all because there is no urgency, however, as a documentation of the report that can be discussed by the management that there area danger that may appear in the future.

IV. CONCLUSION

The risk of work accidents is a condition that must be a concern for all parties to create a safe and comfortable work environment. It is necessary to carry out documentation and data collection on accidents that have occurred so that they can be used as material for evaluation of repair and control. The results of the study aim to conduct an analysis of work accidents and provide suggestions for improvement. This makes work accidents well controlled and increases work productivity. The research method uses HIRADC (Hazard Identification Risk Assessment and Determining Control), on the service process of vespa workshops located in Mataram, West Nusa Tenggara. The results showed that there was 1 activity that had a high level of risk, namely the process of taking service equipment, which had the potential to scratch the workpiece. Based on this, an improvement proposal was given as a control, namely personal protective equipment in the form of work gloves and work clothes that have long sleeves.

Conflict of interest

There is no conflict to disclose.

ACKNOWLEDGEMENT

The present study was approved and supported by Department of Industrial Engineering Universitas Mataram, Indonesia. We also express our gratitude to all participants in who participated in this study.

REFERENCES

[1]. Kementerian Ketenagakerjaan RI. *Profil Keselamatan Dan Kesehatan Kerja Nasional Indonesia Tahun 2022*.; 2022.
[2]. Tarigan SP, Ramdhan DH, Nuridzin DZ, Nugraha F, Susetyo H. Ability to Identify Occupational Health and Safety (OHS) Hazards in Small Sized Enterprises Workers in Cimanggis District, Depok City, West Java. *Natl J Occup Heal Saf*. 2020;1(01). doi:10.59230/njohs.v1i01.4570
[3]. Pratiwi IM, Paskarini I, Dwiyanti E, Arini SY, Suswojo H. The Relationship of Knowledge and Attitudes with Behavior of Implementing Health Protocols in Garment Workers. *Indones J Occup Saf Heal*. 2022;11(2):168-177. doi:10.20473/ijosh.v11i2.2022.168-177
[4]. Veloso Neto H, Arezes P, Barkokébas Junior B. Safety values, attitudes and behaviours in workers of a waste collection and sanitation company. *Saf Sci*. 2021;144:105471. doi:10.1016/j.ssci.2021.105471
[5]. Sutalaksana IZ, Zakiyah SZZ, Widyanti A. Linking Basic Human Values, Risk Perception, Risk Behavior and Accident Rates: The Road to Occupational Safety. *Int J Technol*. 2019;10(5):918. doi:10.14716/ijtech.v10i5.2165
[6]. Jule JG. Workplace Safety: A Strategy for Enterprise Risk Management. *Workplace Health Saf*. 2020;68(8):360-365. doi:10.1177/2165079920916654
[7]. Rikhotso O, Morodi TJ, Masekameni DM. Occupational Health Hazards: Employer, Employee, and Labour Union Concerns. *Int J Environ Res Public Health*. 2021;18(10):5423. doi:10.3390/ijerph18105423
[8]. Sjarifudin D, Kurnia H, Nuryono A, Barita E, Tambunan M. Hazard Identification Risk Assessment and Determining Control (HIRADC) Method for Shoe Cutting Dies Production. *J Sist Tek Ind*. 2023;25(2):322-333. doi:10.32734/jsti.v25i2.12186
[9]. Khusufi UN, Fasya AHZ, Handayani D, Wijaya S. Literature Review: Using HIRADC Method Analyzing the Risk of Work Accidents in The Manufacturing Sector in Indonesia. *KESANS Int J Heal Sci*. 2023;2(5):272-279. doi:10.54543/kesans.v2i5.134
[10]. Syahlan N. HAZARD IDENTIFICATION USING THE HAZARD IDENTIFICATION AND RISK ASSESSMENT AND DETERMINING CONTROL (HIRADC) TECHNIQUE (CASE STUDY AT LABORATORIES AT UNIVERSITAS ISLAM NEGERI SUMATERA UTARA). *J Penelit Kesmasy*. 2021;4(1):15-22. doi:10.36656/jpksy.v4i1.753
[11]. Madill K. AS/NZS 4360-1999: Risk Management. *Stand Assoc Aust*. 1999;4(7):426. doi:10.1080/00050326.1933.10436323

Fikrihadi Kurnia, et. al. "The Application of HIRADC Method for Risk Analysis on Service Process of Vespa Garage (Case Study: Scootfellas Garage, Mataram City, NTB)." *International Journal of Engineering and Science*, vol. 13, no. 12, 2023, pp. 01-11.