

# HSR Risk Analysis Using the HIRADC Method Production Area at PT ADIKU

Rian Ngesti Saputro, Ery Ansyah, Teddy Irawan, Shafly Aryanto, Taufik Rizal Wijaya, Yudi Prastyo

Industrial Engineering, Pelita Bangsa University

DOI: <https://dx.doi.org/10.47772/IJRISS.2025.9010164>

Received: 01 January 2025; Accepted: 10 January 2025; Published: 09 January 2025

## ABSTRACT

This study aims to analyze Health and Safety Risks (HSR) in the production area of PT Anugerah Daya Industri Komponen Utama (ADIKU) using the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method. HIRADC is an effective approach for identifying hazards, assessing risks, and determining necessary controls to mitigate those risks. The research was conducted through data collection, including direct observations, interviews with workers, and internal company documents. The results indicate several potential hazards, such as machine accidents and poor ergonomics, which require control measures to reduce the likelihood of incidents. Risk analysis identified various activities in the production area with high, medium, and low-risk levels. Although risk control measures are implemented, not all workers adhere to the established safety regulations. The conclusion of this study is that the application of the HIRADC method can enhance the HSR management system at PT ADIKU by providing structured control recommendations to minimize risks. The study also suggests the need for regular socialization regarding safety culture within the company, strict actions against safety violations, and training for all involved employees. Thus, this research improves workplace safety and reduces accident risks in the industrial environment.

**Keywords:** Health and Safety Risks, HIRADC, Risk Analysis, Production Safety.

## INTRODUCTION

In recent years, the importance of Health and Safety Risks (HSR) in the workplace has gained significant attention due to the increasing awareness of occupational hazards and their impact on employee well-being and productivity. The manufacturing sector, in particular, is characterized by various risks that can lead to accidents, injuries, and long-term health issues for workers. As organizations strive to create safer work environments, effective risk management strategies become essential to ensure the safety and health of employees.

PT Anugerah Daya Industri Komponen Utama (ADIKU) operates in a highly competitive industry where the safety of its workforce is paramount. The company recognizes that a robust Health and Safety Management System (HSMS) is crucial not only for compliance with legal regulations but also for fostering a culture of safety that enhances employee morale and operational efficiency. However, despite existing safety measures, incidents still occur, highlighting the need for a comprehensive assessment of potential hazards and risks within the production area.

The manufacturing environment presents unique challenges, including the operation of heavy machinery, exposure to hazardous materials, and the potential for ergonomic-related injuries. These factors necessitate a thorough understanding of the specific risks associated with various tasks and processes. To address these challenges, this study employs the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method, this systematic approach that allows organizations to identify hazards, assess associated risks, and implement appropriate control.

The objectives of this study are threefold: to identify potential hazards in the production area, to assess the risks associated with these hazards, and to recommend effective control measures to enhance the overall safety of the

workplace. The research will involve direct observations, interviews with employees, and a review of existing safety protocols to gather comprehensive data on the current state of health and safety practices at PT ADIKU.

Through this research, PT ADIKU aims to strengthen its commitment to occupational health and safety, ensuring the well-being of its employees while maintaining operational excellence. The findings will contribute to the development of targeted interventions that can mitigate risks and promote a safer workplace, ultimately leading to improved productivity and a reduction in workplace accidents. By fostering a culture of safety, PT ADIKU not only protects its workforce but also enhances its reputation as a responsible and forward-thinking organization in the manufacturing sector.

## **Theoretical Foundation**

### **Work Accidents**

An industry really does not want work accidents in its work environment, because it can destroy the company's reputation. The definition of a work accident is an unexpected and unwanted event (Suma'mur, 1996). Another definition states that a work accident is an unwanted event or occurrence, which results in injury to humans, damage to property, or loss to the production process (Frank E. Bird, 2007).

Basically, accidents are caused by two things, namely unsafe human actions and unsafe environmental conditions. From the results of the investigation, it turns out that human factors are very important in the occurrence of accidents. Research shows that 80-85% of accidents are caused by human negligence or error. To find out more about the causes of an accident, many practitioners have introduced the loss causation model theory. One of the theoretical models introduced is the domino theory by the International Loss Control Institute (ILCI). In this simple theory, it is stated that accidents do not come by themselves, but rather there are a series of events that precede an accident. In this theory, the series of events is depicted as a series of dominoes.

### **Health and Safety Risks**

Health and Safety Risks (HSR) encompass the potential dangers associated with machines, tools, materials, processes, workplace environments, and methods of work. To prevent accidents, it is essential to regulate all elements within a company, ensuring that they are integrated and managed by all parties involved. This regulation includes understanding the relationships between these elements to create conditions that minimize the potential for accidents. Such management is a critical component of an effective Health and Safety Risks (HSR) program, which must be a commitment from every organization.

To encourage companies to implement HSR programs, the government has established regulations, such as Law No. 1 of 1970 concerning Occupational Safety, particularly in Chapter III, Article 3, which outlines the requirements for occupational safety. These laws and regulations stipulate the necessary measures for ensuring workplace safety (Suma'mur, 2009). By adhering to these guidelines, organizations can better identify, assess, and mitigate health and safety risks, ultimately fostering a safer work environment for all employees.

### **Risk Management**

Risk is the possibility (probability) of an accident (injury and or damage) to humans, equipment, and or the environment exposed to a hazard. Hazard itself is a source or situation that has the potential to cause damage or injury (accident) to humans, equipment, and the environment (Suardi, 2007). Risk can occur because of the opportunity for something to happen that will affect the goal and risk is measured by the likelihood of occurrence and the consequences caused (AS/NZS 4360, 1995).

Risk management is a process or planning that includes the identification, assessment, and prioritization of risks, followed by the coordination and application of resources. To reduce, monitor, and control the probability and or impact of severity, or to maximize the realization of opportunities (ISO/IEC Guide 73:2009). *Risk* management is an effort to manage risks comprehensively, planned, and structured in a good system to prevent unwanted accidents.

According to the domino theory, accidents do not occur on their own, but rather there are a series of events that precede or become causal factors or triggers for accidents. Therefore, risk management is needed to find or identify the factors that cause the risk of accidents, so that the causal factors or triggers can be addressed immediately. Risk management is closely related to hazards and risks that exist in the workplace, where these hazards and risks can cause losses to the company. If there is no good risk management in a company, it is likely that the company will experience errors in the risk control system, which will result in company losses.

## RESEARCH METHODOLOGY

This research was conducted in the Production area of the *Stamping Machine* section at PT ADIKU. The type of research used uses a Quantitative descriptive approach. There are two data sources used, namely *Hazard Identification, Risk Assessment, and Determining Control* (HIRADC) data. HIRADC is a process that explains the possibility of potential hazards, including the level of occurrence, the level of danger to evaluate the control of any potential losses and injuries that occur. Based on OHSAS 18001: 2007, the application of the HIRARC method in the implementation of Occupational Safety and Health in the work environment can be carried out in 3 stages, namely *Hazard Identification, Risk Assessment* and *Determining Control*.

Is the first step in the OHS risk management process, it involves recognizing and recording potential hazards that can cause injury, identifying factors that can lead to the risk of injury, loss, or negatively impact employee health or business continuity so that appropriate preventive measures can be taken.

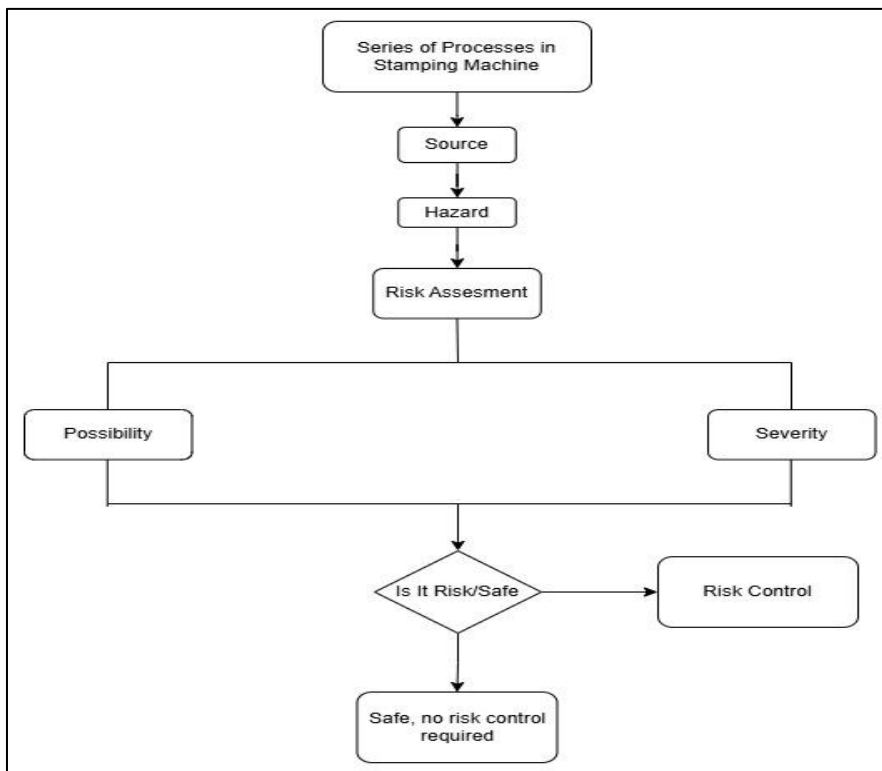


Figure 1. Flowchart of HIRADC Method Implementation

It is an evaluation process used to identify potential hazards that may occur. In risk assessment, it is necessary to examine scrutinize the factors that can cause risk or injury. The aspects of risk assessment are *Consequence* (C) or *Severity* (S) and *Likelihood* (L). The following is a *consequence table, likelihood table* and *risk rating* based on the standards set by AS/NZS 4360: 1999.

Tabel 1. Severity Scale in AS/NZS 4360 Standard

Scale	Level	Description
1	<i>Insignificant</i>	No injury occurred, little financial loss
2	<i>Minor</i>	Minor injury, little financial loss

3	<i>Moderate</i>	Moderate injury, medical attention required
4	<i>Major</i>	Serious injury $\geq 1$ person, major loss, business process disruption
5	<i>Catastrophic</i>	Fatal $\geq 1$ person, very large losses and very broad impact with the cessation of all activities

Tabel 2. Possibility scale in the AS/NZS 4360 Standard

Scale	Level	Description
5	<i>Almost Certain</i>	Almost Certain There are $\geq 1$ occurrence per shift
4	<i>Likely</i>	Likely There is $\geq 1$ occurrence per day
3	<i>Possible</i>	Possible There is $\geq 1$ occurrence per week
2	<i>Unlikely</i>	Unlikely There is $\geq 1$ occurrence per month
1	<i>Rare</i>	Rare There are $\geq 1$ occurrence per year or more

Tabel 3. Risk Rating Scale in AS/NZS 4360 Standard

Possibility	Consequence				
	1	2	3	4	5
1	H	H	E	E	E
2	H	H	H	E	E
3	L	M	H	E	E
4	L	L	M	H	E
5	L	L	M	H	H

This evaluation process involves a series of steps taken in sequence to reduce the level of risk or hazard to a safe point. The risk control hierarchy that can be applied includes:

1. Elimination, which eliminates the hazard completely by avoiding the situation or removing the risk-causing factors, such as replacing dangerous machinery with safer ones or eliminating their use.
2. Substitution, which is replacing a safer material or process, for example replacing a hazardous chemical with a safer alternative.
3. Design, which is designing equipment, work environments or processes with safety in mind, including ensuring equipment has adequate safeguards and minimizes the risk of injury.
4. Administration, i.e. setting up work procedures, training, and supervision so that employees understand SOPs and follow safe work practices.
5. Personal protective equipment (PPE), i.e. using PPE such as helmets, goggles, gloves, or safety shoes as protection against hazards that cannot be completely eliminated.

## RESULT AND DISCUSSION

Hazard identification is based on observations, interviews, and questionnaires which are then processed using the HIRADC method which consists of *hazard identification, risk assessment, and determining control*. Outlining the work steps when identifying hazards is helpful for researchers to understand each step in detail in

order to better account for potential hazards and their impacts. This identification process allowed the researcher to take appropriate precautions and ensure a safer working environment especially in the *stamping* section.



Figure 2. Stamping Process

As for the flow chat of the process can be seen in the following image:

The identification results in the stamping section at PT ADIKU can be seen in the following table

Table 4. HIRADC in Production Area at PT. ADIKU

No.	Potential Activities	Potential Risk	Risk	Possibilities	Severity	Risk Level	Risk Control
1	Operation of the Stamping Machine	machine broken	pinched hand	1	4	4	Install operator OHS training signs and install machine sensors
2	Handling dies	dies fall off	bumped body	1	4	4	Work according to SOP, Wear PPE, Use a crane / forklift forklift
3	Handling coil	broken crane	body crushed by the coil	1	4	4	Work according to SOP, Wear PPE, Use crane/forklift, Install signs, Training opt crane
4	Forklift operation	brakes fail	crashed	1	3	3	make sure the forklift is safe before use
5	Overhaul on the machine	dropped	falling from a height of several floors	1	4	4	using a body harness when working at heights
6	Welding Process	burned	exposed to sparks	2	2	4	Make sure the apd is suitable for his job, and understands the rules of his job.



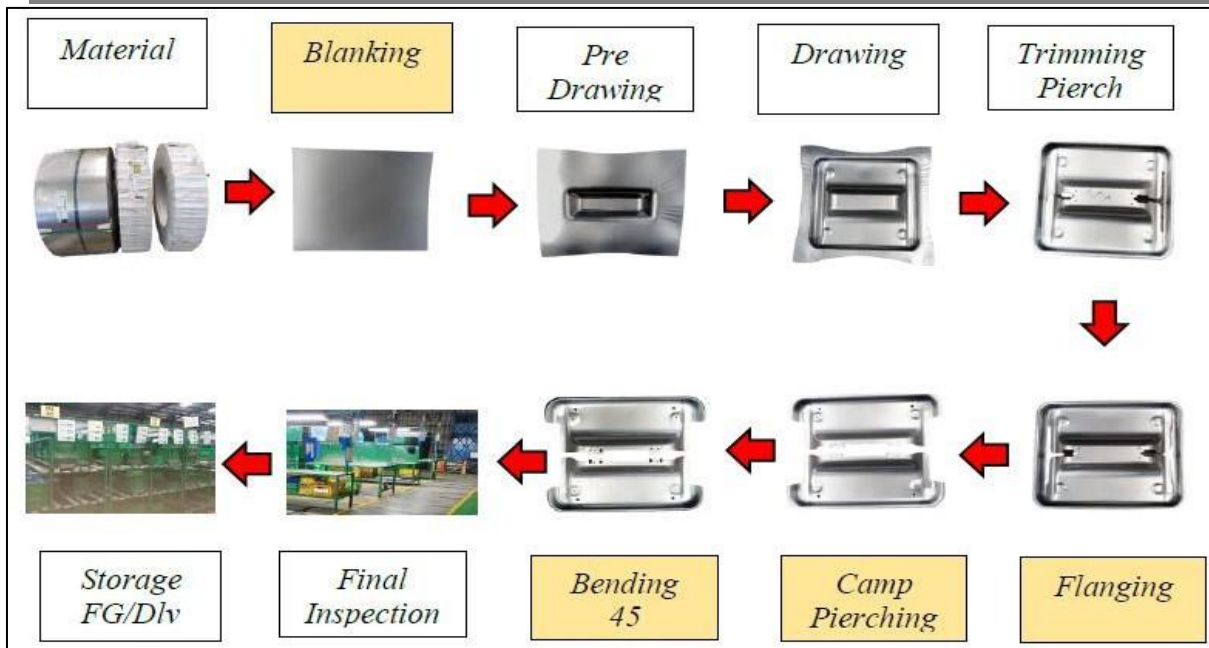


Figure 3. Flowchart Process

Based on the results of table 1 by identifying hazards, assessing risks and determining control that the production area has 9 existing activities and there are 9 potential hazards that can occur in the production area, from the potential hazards, the current control is to maximize PPE and installation of signs to minimize. The highest level of risk is *high risk* in the activity of pressing the two *push* buttons to run the machine with the potential danger of blocking one of the push buttons. The impact on the hand is pinched *dies*, so this activity is of particular concern to avoid work accidents. In addition, hazard control is determined by making SOPs, ensuring that all operators are properly trained and understand the work process.

## CONCLUSIONS

This study provides a comprehensive analysis of Health and Safety Risks (HSR) in the production area of PT Anugerah Daya Industri Komponen Utama (ADIKU), highlighting critical findings and actionable recommendations aimed at enhancing workplace safety. The research identified a range of potential hazards within the production environment, categorized into high, medium, and low-risk levels. High-risk hazards included the operation of heavy machinery, exposure to hazardous materials, and potential ergonomic issues. Medium-risk hazards were associated with manual handling tasks and inadequate safety measures, while low-risk hazards included minor slips and trips. This categorization is essential for prioritizing risk management efforts, allowing the company to focus resources on mitigating the most significant threats to worker safety.

The study employed the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method to evaluate the identified risks. It was found that while several risk control measures were implemented, such as safety training programs and the provision of personal protective equipment (PPE), compliance among workers varied. Many employees did not consistently adhere to safety protocols, which undermined the effectiveness of the existing safety measures. This inconsistency indicates a need for a more robust approach to safety culture within the organization. To enhance the effectiveness of the HSR program at PT ADIKU, several recommendations are proposed. First, conducting ongoing training sessions to reinforce the importance of safety protocols and ensure that all employees are aware of the hazards associated with their tasks is crucial. Second, implementing strict disciplinary measures for violations of safety rules can encourage adherence to safety practices. Additionally, establishing clear and visible safety signage in hazardous areas will increase awareness among employees, while regular safety meetings can facilitate discussions on safety concerns and best practices. Engaging employees in safety discussions through regular surveys and feedback sessions can foster a sense of ownership and responsibility towards workplace safety. Finally, implementing a system for continuous monitoring of safety practices and regular audits of the safety management system will help identify new hazards and assess the effectiveness of existing control measures.

By adopting these recommendations, PT ADIKU can significantly improve its safety management system, reduce the likelihood of workplace accidents, and foster a culture of safety. A proactive approach to health and safety not only protects employees but also enhances overall productivity and morale within the organization. In conclusion, this study underscores the critical importance of a structured and comprehensive approach to managing health and safety risks in the workplace. By prioritizing safety and implementing the recommended strategies, PT ADIKU can create a safer working environment that benefits both employees and the organization as a whole. The commitment to continuous improvement in health and safety practices will ultimately contribute to the long-term success and sustainability of the company.

## REFERENCES

1. Karis, R., & Wardhani, D. (2021). "Analysis of Occupational Health and Safety with the HIRADC Method in the Manufacturing Industry." *Journal of Occupational Safety and Health*, 16(3), 34-45.
2. Sunardi, M., & Setiawan, B. (2019). "Use of HIRADC for Risk Assessment in a Manufacturing Company." *Journal of Industrial Engineering*, 22(2), 78- 89.
3. Adi, P. S., & Rachmawati, D. (2022). "HIRADC Method in Analyzing OHS Risk in Industrial Sector." *Indonesian Journal of Occupational Safety*, 10(4), 102-114.
4. Safitri, R., & Hasan, M. (2020). "Evaluation of HSR Risk Control in the Production Process Using HIRADC." *Journal of OHS and Environment*, 15(1), 45- 58.
5. Sudirman, A., & Utami, P. (2023). "Case Study of HIRADC Application to Improve Work Safety." *Journal of OHS Management*, 12(2), 61- 72.
6. Rahayu, S., & Nugraha, A. (2021). "Application of HIRADC for Hazard Identification and Risk Assessment in the Manufacturing Industry Sector." *Journal of Engineering and OHS*, 8(3), 123-136.
7. Wulandari, T., & Mulyani, A. (2022). "OHS Risk Control in Production Industry Using HIRADC Method." *Journal of Occupational Safety Engineering*, 18(4), 89-98.
8. Rahmawati, N., & Suryanto, F. (2020). "Implementation of HIRADC Method to Manage OHS Hazards in a Manufacturing Company." *\*Journal of Health*
9. Alvi Octavianto, Andriyas Sugiarto, & Syafrian Eko Nugroho. (2023). "Aplication of the HIRADC Method at the XYZ Factory to Analyze Occupational Health" *International Journal of Innovative Science and Research tech*