# Results of Occupational Safety and Health Implementation Analysis using the HIRADC Method (Hazard Identification, Risk Assessment and Determining Control) in the Plant and project Area : Literature Review

[1]Alit Trijaya Subekti, [2]Merliana, [3]Riky Pratama

[1,2,3]Occupational Safety and Health, Faculty of Health Sciences, Teuku Umar University, Indonesia
**Corresponding author:**: Alit trijaya subekti, Email : alit23062006@gmail.com

## Abstract

In Indonesia, workplace accidents remain a serious problem, especially in industrial sectors and projects with high potential hazards. To reduce risks, companies must implement Occupational Safety and Health (OSH) programs. One way to do this is by using the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method. This systematic method is used to identify potential hazards, assess risk levels, and determine appropriate control measures in accordance with the risk control hierarchy. The purpose of this study is to evaluate the application of the HIRADC method through a literature review focused on its implementation in facilities and projects. In this study, a literature review method was used to examine national journals published in 2021–2022, with specific keywords related to the application of HIRADC. From the search results, three journals were found that met the research criteria. Every aspect of hazard classification, risk assessment, and risk control approaches mentioned in each study was evaluated. The results showed that physical and chemical hazards were the most common, followed by ergonomic hazards and biological hazards, which were less common. All three journals emphasized the importance of using personal protective equipment (PPE), administrative controls, and engineering controls in risk control. In addition, two of the three studies noted the use of substitution and elimination, although not always used. In general, most risks fall into the moderate to substantial category; however, by using appropriate control techniques, these risks can be reduced to a lower level. HIRADC has proven useful for improving work safety, reducing accident rates, and supporting the implementation of a K3 culture in industrial and project environments. However, this success can only be achieved through continuous monitoring, regular safety audits, and ongoing worker training programs. Therefore, implementing HIRADC is not just an administrative task but also an important part of efforts to create a safe, healthy, and productive work environment.
**Keywords:** Occupational Safety and Health, HIRADC, Hazard Identification, Risk Control

## Introduction

The HIRADC method is an important component in creating a safe and comfortable working environment. As part of SMK3, risk assessment and control consist of hazard identification (hazard identification) and risk control activities. (Ameiliawati, 2022). Occupational safety and health (OSH) is a method used by industries to protect their employees from work-related hazards and illnesses. Employee productivity can be disrupted if OSH is not properly implemented.(Radityazty Dahayu Nurhayati & Yayok Suryo Purnomo, 2023).



The Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method is one way to identify homes and reduce the risk of accidents so that work may be done effectively and in accordance with the plan. Every individual or group in the business environment may experience work-related stress, which can lead to serious or ringan operations that are more than complete. As a result, a system to monitor and manage work-related stress is required; this system is commonly referred to as the safety and healt work sistem (Marfuah et al., 2024). The hazard identification, risk assessment, and control (HIRADC) method is used to reduce the risk of workplace accidents. The goal is for companies to create a safe and comfortable workplace for their employees. HIRADC is a systematic approach created by Dr. Wayne

H. Weston to identify potential hazards in the workplace, assess the associated risks, and taking appropriate control measures. This method is often used as a guide for organizations to prioritize employee safety and security in order to reduce the number of injuries and accidents that occur in the workplace (Muhammad Agung et al., 2024).

The World Health Organization (WHO) states that occupational safety and health is a systematic effort aimed at improving and maintaining the highest level of physical, mental, and social well-being of workers in all sectors of work. OSH is not only important for preventing accidents, but also for creating a productive, healthy, and sustainable workplace. HIRADC adalah alat bantu yang efektif dalam mengenali sumber bahaya, menilai kemungkinan dan dampaknya, serta menyusun tindakan pengendalian yang tepat. Sementara itu, JSA dianggap sebagai pendekatan sistematis yang memecah proses kerja menjadi langkah-langkah kecil untuk menilai bahaya setiap tahapan (Damai illam tumbur et al., 2025).

One of the important components of SMK3 (Occupational Health and Safety Management System) is

HIRADC (Hazard Identification, Risk Assessment, and Determining Control). This is because it is directly related to hazard prevention and control efforts used to determine occupational health and safety objectives and plans. One of the components of the OHSAS 18001 2007 standard, HIRADC includes clause 4.3.1, which states that companies must establish, create, implement, and maintain procedures, including hazard identification, risk assessment, and determination of necessary hazard and risk controls (Mentari Ramadhania, Nazarwin Saputra, Dadang Herdiansyah, 2021).

## Methods

This research is a literature review, where the data sources in this study come from published national journals obtained from the Google Scholar search engine. The research data concerns the Implementation of Occupational Safety and Health using the HIRADC Method in Indonesia from 2021 to 2022 with the keywords “Results of Occupational Safety and Health Implementation Analysis using the HIRADC Method (Hazard Identification, Risk Assessment and Determining Control) in the Plant and project Area.” A total of three studies were found, which were then filtered based on the suitability of the title, abstract, and content relevant to this study, resulting in three journals. The purpose of this study is to analyze the implementation of occupational safety and health using the HIRADC
method in relation to hazard identification, risk assessment, and risk control to protect workers from occupational accidents.

## Result

The selected list of journals/articles was analyzed in terms of Hazard Classification aspects related work Plant and project Area . The findings are summarized in (Table 1)

**Table 1.** Hazard Classification

| Paper Identity | Hazard Classification | | | |
|---|---|---|---|---|
| | chemical | Physical | Bio | Ergo |
| (Rika Ameiliawati, 2022) | ✓ | ✓ | - | ✓ |
| (Thania G.B Lensun et,all 2022) | ✓ | ✓ | - | - |

| | | | | |
|---|---|---|---|---|
| (Mentari Ramadhania 2021) | ✓ | ✓ | ✓ | ✓ |

The selected list of journals/articles was analyzed in terms of Risk Management aspects related work Plant and project Area . The findings are summarized in **(**Table 2)

**Table 2.** Risk Management

| ***Paper Identity*** | **Risk Management** | | | | |
|---|---|---|---|---|---|
| | ***Elim*** | ***Sub*** | ***Eng*** | ***Adm*** | ***Ppe*** |
| (Rika Ameiliawati, 2022) | - | - | ✓ | ✓ | ✓ |
| (Thania G.B Lensun et,all 2022) | - | - | ✓ | ✓ | ✓ |
| (Mentari Ramadhania 2021) | ✓ | ✓ | ✓ | ✓ | ✓ |

**Discussion**

From the journals obtained and reviewed, it was found that the most common hazards in industry and projects were physical and chemical hazards (3 journals identified physical and chemical hazards), followed by ergonomic hazards (two of the three journals identified ergonomic hazards), and biological hazards (one of the three journals identified biological hazards).

According to (Mawardani & Kharin Herbawani 2022), hazard identification is the process of identifying all actions that have the potential to cause accidents or occupational diseases in a company. However, according to (Ilmi, 2019), hazard identification is a systematic process to identify whether there are hazards in company operations. Identifying hazards is the first step in creating a risk management system for safety and identifying risks that may arise from each work process, in (Lensun et al., 2020). According to Australian Standard/New Zealand Standard 4360:2004, hazard identification is part of the risk management process that aims to determine the source or possibility of failure and how failure scenarios occur.

As part of the hazard identification process at the UD Ridho Abadi workplace, interviews were conducted with the business owner, foreman, and employees of UD Ridho Abadi regarding the different work processes, ranging from the preparation of raw wood materials, cutting, planing, gluing, and assembly to the final stage, finishing (Mentari Ramadhania, Nazarwin Saputra, Dadang Herdiansyah, 2021). The method for identifying hazards and minimizing the risk of accidents is the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) method. This method ensures that work can be completed properly and according to plan. Based on the findings, there are several risks that may occur in the cake mold manufacturing process, including: MSME workers not using personal protective equipment (PPE)

(Marfuah et al., 2024).

The hazard identification process is based on the activities or processes carried out. Examples of these activities include collecting raw materials, unloading cargo from trucks or containers, storing physical stocks of palm oil and diesel fuel, forklift operations, and heavy equipment operations. The process of maintaining primary raw materials during storage in the warehouse includes storing raw materials in the warehouse, maintaining and sampling bulk raw materials, cleaning, fumigation, and collecting stock and maintaining silos.

The process of removing primary raw materials includes retrieving raw materials from plots, retrieving bulk production and mutase raw materials, and feeding raw materials into the retrieval machine. In addition, operations related to the maintenance and removal of animal feed from the warehouse include stacking or piling up finished feed, cleaning the warehouse and machines, and loading finished feed. Hazard identification is carried out to identify hazards that may occur in each work process (Alexander, Nengsih and Guspari, 2019) in (Ameiliawati, 2022).

**Risk control**

From the journals obtained and reviewed, it was found that the most common risk controls in industry and projects were engineering controls, administration, and PPE (three of the three journals obtained used engineering controls, administration, and PPE for risk control). and industries or projects that implement risk control through elimination and substitution (recorded from 3 journals, 2 journals implement risk control through elimination and substitution).

The HIRADC method has an impact on labor productivity (risk identification, risk assessment, and because it is part of the construction project implementation process, Determining Controls), namely by carrying out risky activities but not identifying hazards, assessing risks, and clearly stating that this construction work is risk control.(Lensun et al., 2020). The number of workplace accidents that have occurred shows that efforts to prevent and control potential hazards have not been effective. Therefore, if potential hazards are not controlled, it can result in losses for the company because workers are an important asset to the company (Fadhilah et al., 2023). Risk control, also known as risk management, covers all hazards identified during the hazard identification process. It also considers risk ratings to determine priority levels and control methods (Lensun et al., 2020).

The risk control hierarchy is used to determine risk controls, including elimination, which means removing hazardous conditions; substitution, which means replacing hazardous actions or conditions; engineering controls, which means using closely monitored and supervised technology and work methods to minimize risk; and administrative controls, which means using targeted procedures or methods and PPE to protect workers from hazards and risks. Based on Australian Standard/New Zealand Standard 4360:2004, risk assessment is a process that results from identifying hazards in the workplace by combining the likelihood of a hazard occurring, the frequency of risk exposure, and the impact or consequences of the hazard to determine the level of risk (Radityazty Dahayu Nurhayati & Yayok Suryo Purnomo, 2023).

**Conclusion**

The conclusion of this literature review related to the Application of Occupational Safety and Health using the HIRADC (Hazard Identification, Risk Assessment and Determining Control) Method in the Plant–Warehouse Area is that hazards in the workplace can include physical or mechanical, chemical, biological, and ergonomic hazards, according to the three studies that have been analyzed. None of them indicate a very high risk, but the medium and high

categories indicate the highest risks. This shows that an appropriate OSH management system can control conditions despite the potential hazards. It has been proven that control measures, which include the use of personal protective equipment, administrative controls, and engineering controls, have successfully reduced the risk level to a low category. The results of the study show that risk assessment methods such as HIRADC and AS/NZS Risk Matrix are very effective in improving worker safety and reducing the likelihood of workplace accidents. In addition, this study emphasizes the importance of continuous monitoring to ensure that the controls that have been implemented remain effective in the long term.

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