

# CHAPTER I

## INTRODUCTION

This chapter contains the background, problem formulation, research objective, research scopes, and outline of the report.

### 1.1 Background

Every job has the probability of risk due to occupational accidents (Hidayat and Hardono, 2021). An occupational accident is an unwanted and often unexpected or unplanned occurrence that causes one or more workers to incur the loss of time, property, and/or physical (injury, illness, even death) in the work process or related thereto (ILO, 2019 and Fairyo and Wahyuningsih, 2018). Therefore, the International Labour Organization (ILO) sets the principle that workers are must be protected from occupational accidents. However, the reality is very different for workers. This is reinforced by data from the ILO (2018), which reports that more than 380,000 workers die every year due to occupational accidents.

According to ILO (2018), more than 1.8 million occupational deaths occur annually in the Asia and Pacific region. Two-thirds of occupational deaths in the world occur in Asia. One of the countries in Asia is Indonesia. Based on Badan Penyelenggara Jaminan Sosial (BPJS) Ketenagakerjaan, it is known that the number of occupational accidents in Indonesia in 2017-2022 has increased every year (Sinaga et al., 2022; Mukhlis, 2022; and Nugroho, 2023). The following is the chart of the number of occupational accidents in Indonesia from 2017 to 2022.



**Figure 1.1** The Number of Occupational Accidents in Indonesia in 2017-2022 (Source: BPJS Ketenagakerjaan, 2022 in Sinaga et al., 2022, Mukhlis, 2022, and Nugroho, 2023)

Based on **Figure 1.1**, it can be calculated that the number of occupational accidents in Indonesia in the 2017-2022 period is 1,200,734 cases. The average number of occupational accidents annually in Indonesia in the 2017-2022 period is 200,122 cases. The average number of occupational accidents in 2017 is the lowest average in the 2017-2022 period, which is around 10,254 cases every month. Meanwhile, the average number of occupational accidents in November, 2022 is the highest average in the 2017-2022 period, which is around 22,112 cases every month.

Occupational accidents can occur in various sectors, such as electricity, gas, and drinking water; finance, real estate, leasing, and services; industry; mining and excavation; community, social, and individual services; transportation, warehousing, and communications; trade, restaurants, and accommodation services; construction; and agriculture and hunting. In addition to these sectors, occupational accidents also occur in the education sector, such as in university areas. The following are examples of occupational accidents that occur in universities in Indonesia.

**Table 1.1** Occupational Accidents Cases in Universities in Indonesia

No	University	Date	Description
1.	Universitas Baiturrahmah	February 17, 2022	Fire at Dental and Oral Hospital Laboratory, Faculty of Medicine.
2.	Universitas Negeri Padang	September 12, 2021	Fire at Special Needs Campus Garage.
3.	Universitas Islam Negeri Imam Bonjol	August 30, 2021	The car overturned due to hitting the pavement near the corner in front of the Campus Mosque.
4.	Universitas Khairun	February 15, 2021	A large tree in the courtyard of the Faculty of Cultural Sciences fell, so that 10 students were trapped in the gazebo collapse due to being hit by the tree.
5.	Universitas Muhammadiyah Sumatera Barat	April 30, 2020	Fire at postgraduate lectures building and laboratories.
6.	Politeknik Negeri Kupang	August 6, 2019	The prospective student fell from the third floor of the Mechanical Engineering building because he opened the emergency door (which had a large enough drain hole) which was mistaken for a bathroom door.
7.	Universitas Negeri Makassar	August 30, 2018	The old ceiling of the Faculty of Engineering building collapsed and almost hit students who were passing around the area.
8.	Universitas Negeri Jakarta	June 5, 2018	A 19-year-old man fainted from being electrocuted while placing a banner on the ceiling.

(Source: Azwar, 2022, Antara, 2021, Fajriadi, 2021, Universitas Khairun, 2021, Akbar, 2020, Bere, 2019, Atika, 2018, and Ramdhani, 2018).

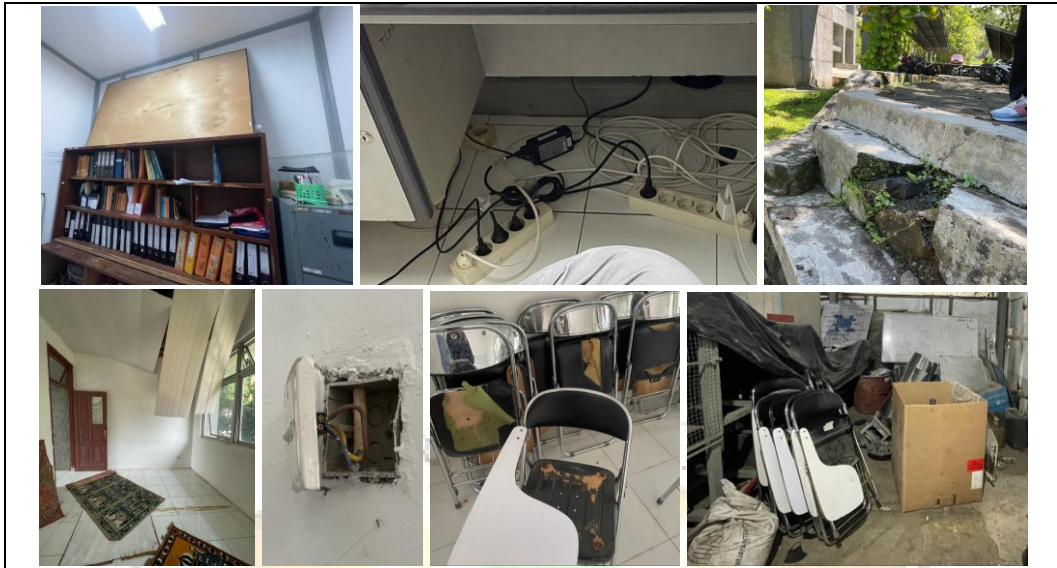
Cases of occupational accidents are not only found in the universities listed in **Table 1.1**, but are also found in other university, such as Universitas Andalas. Universitas Andalas is one of the tertiary universities in Indonesia and located in Sumatra Barat Province. The main campus is located in Limau Manis, Pauh, Padang; the first campus is located in Jati, Padang Timur, Padang; the second campus is located in Payakumbuh; and the third campus is located in Dharmasraya.

Based on Certificate Number 327/SK/BAN-PT/Akred/PT/XII/2018, Universitas Andalas is a university that received “A” accreditation. The accreditation is valid for five years from December 4, 2018 to December 4, 2023 (Universitas Andalas, 2022b). However, Universitas Andalas cannot be separated from the problem of occupational accidents. This statement is supported by observations made by Nazer (2020) at Universitas Andalas, from 171 questionnaire respondents who are Universitas Andalas students, it is known that there are several types of occupational accidents that have occurred at Universitas Andalas, whether the respondents have only been seen or experienced directly. The occupational accidents include driving accidents, fires, fallen trees, attacks by wild animals, natural disasters, security disturbances, falling heavy objects, robberies, loss of vehicles, and rape.

Universitas Andalas consists of 16 faculties and 127 research programs. The Faculty of Engineering is one of the 16 faculties at Universitas Andalas. The Faculty of Engineering, Universitas Andalas consists of five departments, namely Industrial Engineering, Civil Engineering, Mechanical Engineering, Environmental Engineering, and Electrical Engineering. Three departments from the Faculty of Engineering, Universitas Andalas have an Accreditation Board for Engineering and Technology (ABET), namely Departments of Industrial Engineering, Mechanical Engineering, and Environmental Engineering (Universitas Andalas, 2022a). Nevertheless, some of the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas have potential hazards that can cause occupational accidents.

Facilities are anything that can be used as a tool in achieving goals or objectives; tools; or media. For example, furniture, educational equipment, educational media, books and other learning resources, and other equipment needed to support an orderly and continuous learning process. Meanwhile, infrastructure is everything that is the main support for the implementation of a process. For example, land, rooms (classrooms, education unit leadership rooms, educator rooms, administrative rooms, library rooms, laboratory rooms, workshop rooms, production unit rooms, and canteens), power and service installations, places to exercise, places of worship, places to play, places to be creative, and other spaces/places needed to support an orderly and continuous learning process (Sopian, 2019).

Based on initial observations from March 4, 2022 to March 14, 2022, there were potential hazards that cause occupational accidents at the facilities and infrastructure used by students of the Faculty of Engineering, such as in the department building, department laboratory, Dean's Building, basic laboratory, C Building, G Building, H Building, and I Building. For Example, improper placement of objects, such as placing items that fall easily or are heavy (whiteboard) in high position that fall easily (on top of the cupboard); scattered electrical cables and improper use of electricity, such as excessive use of electricity and plugging electrical plugs into another plug; damaged, inadequate/inappropriate, and/or uncomfortable facilities and infrastructure, such as stairs are damaged and mossy, the ceiling detached from the frame, damaged light switches, broken and uncomfortable chairs, and untidy, poorly lit, and uncomfortable practicum rooms; etc. The following is some documentation of the potential hazards of the observations made.



**Figure 1.2** Potential Hazards at Facilities and Infrastructure Used by Students of the Faculty of Engineering, Universitas Andalas

The potential hazards in **Figure 1.2** can cause occupational accidents at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas. These occupational accidents are generally caused directly by unsafe actions and unsafe conditions. Unsafe actions are actions or human behavior that are harmful or human failures to follow the requirements and correct work procedures so as to allow accidents to occur on themselves, others, or the surrounding environment, while unsafe conditions are conditions in the environment that can be dangerous. surrounding conditions so that occupational accidents are possible (Priono and Supriadi, 2021 and Priyohadi and Achmadiansyah, 2021). Examples of unsafe actions that can cause occupational accidents at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas are improper placement of goods; overloading of electric power; use of damaged facilities and infrastructure; and failure to work safely, while examples of unsafe conditions that can cause occupational accidents at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas are the facilities and infrastructure used are damaged and inappropriate and the room is not clean, untidy, and lacks lighting.

There are two factors (basic causes) that cause unsafe actions and unsafe conditions, namely personal factors and job factors. Personal factors are the basic cause of occupational accidents that come from humans themselves, such as lack of knowledge and awareness about the dangers of Occupational Health and Safety (OHS) and its risks. Meanwhile, job factors are the basic causes of occupational accidents originating from work, such as lack of supervision, inadequate engineering control; inadequate maintenance and care of facilities and infrastructure; insufficient seats suitable for use; and damage or cracks in facilities and infrastructure due to prolonged use.

Personal factors and job factors can occur due to lack of control, whether an inadequate program, inadequate program standards, or inadequate compliance to standards. According to Bird and German (1985), these sequential causal factors can cause occupational accidents and cause losses (Karuniawati et al., 2018). Therefore, OHS planning is needed for the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas to prevent hazards, control hazard risks, avoid/overcome occupational accidents that have not/already occurred, and minimize losses incurred.

The OHS planning at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas is supported by the vision of the Faculty of Engineering, "Becoming a Dignified and Internationally Reputable Engineering Faculty" (Fakultas Teknik Universitas Andalas, 2022). Faculties with international reputations must have OHS so that they can overcome and reduce occupational accidents that occur at the Faculty of Engineering, Universitas Andalas. In addition, the OHS planning is also supported by Rector Regulation Number 10/XIII/A/UNAND-2015 regarding Laboratory/Workshop/Studio Quality Policy, specifically Article 4 about the Objectives of Universitas Andalas. One of the objectives of Universitas Andalas is "Improve the quality of services through the provision of facilities, infrastructure, and technology by national and international standards and creating a conducive and beneficial academic atmosphere for the public".

The OHS planning at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas is also supported by several legislations in Indonesia, such as Chapter X Article 27 Paragraph 2 of the 1945 Constitution and the Law of the Republic of Indonesia Number 1 of 1970. Chapter X Article 27 Paragraph 2 The 1945 Constitution states that "Every citizen has the right to work and a decent living for humanity". Meanwhile, the Law of the Republic of Indonesia Number 1 of 1970 contains that every worker has the right to protection for his safety in doing work for the welfare of life and increasing national production and productivity; everyone else in the workplace needs to be guaranteed their safety; every source of production needs to be used and used safely and efficiently; in connection with that it is necessary to make all efforts to foster work protection norms; and fostering these norms needs to be realized in a law that contains general provisions on occupational safety following the development of society, industrialization, engineering, and technology.

Government Regulation Number 50 of 2012 also supports the OHS planning at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas. This regulation stipulates that every company is obliged to implement OHS Management System (OHSMS) in its company. The company in question is a company that employs more than 100 people and carries out routine and sustainable activities. Therefore, Universitas Andalas can be said to be the same as a company. Universitas Andalas consists of several faculties so each faculty including the Faculty of Engineering needs OHS and applies it properly to create a good OHSMS Universitas Andalas following existing conditions and problems. In addition, several standards regulate OHSMS, such as the Australian/New Zealand Standard (AS/NZS) 4801:2001, American National Standards Institute (ANSI) Z10-2005, Occupational Health and Safety Assessment Series (OHSAS) 18001:2007, and International Organization for Standardization (ISO) 45001:2018 (newest standard) (Masjuli et al., 2019).



## **1.2 Problem Formulation**

The problem formulations in this research is how to plan OHS at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas.

## **1.3 Research Objective**

The research objectives in this research is to determine OHS planning at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas.

## **1.4 Research Scopes**

The research scopes in this research are as follows:

1. The research was only conducted at the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas that have the potential hazard based on the Regulation of the Minister of Manpower of the Republic of Indonesia Number 5 of 2018.
2. This research was only conducted until verification based on sub-subclause 6.1.2. to 6.1.4 ISO 45001:2018.
3. The risk assessment carried out by OHS experts in this research only assessed the likelihood level and the severity level of the occupational safety risk perceived by a person (property, cost, or reputation risks were not assessed).
4. Risk control in this research focuses on the high-risk category.

## 1.5 Outline of Report

The outline of the research is as follows:

### CHAPTER I INTRODUCTION

This chapter contains the background, problem formulation, research objective, research scopes, and outline of the report.

### CHAPTER II LITERATURE REVIEW

This chapter contains the literature for solving research consisting of hazard, risk, ISO 45001:2018, and previous research.

### CHAPTER III RESEARCH METHODOLOGY

This chapter contains the stages of research consisting of preliminary research, literature research, problem identification, problem formulation, method selection, data collecting, data processing, discussions, and conclusions.

### CHAPTER IV RESULTS AND DISCUSSIONS

This chapter contains the results of data collection and discussion regarding the OHS analysis based on ISO 45001:2018 sub-subclause 6.1.2 to sub-subclause 6.1.4 using the HIRARC method.

### CHAPTER V CONCLUSIONS

This chapter contains conclusions from the discussion regarding OHS analysis of the facilities and infrastructure used by students of the Faculty of Engineering, Universitas Andalas. In addition, this chapter also contains suggestions for future research.