CHAPTER I

INTRODUCTION

1.1. Research Background

Occupational safety and health are very important in terms of social security and the welfare of workers. In addition, it can have a positive and beneficial impact on the company [1] 's productivity. Implementing an Occupational Safety and Health program is one way to protect the workforce. This program aims to achieve the best level of productivity by protecting the workforce from hazards in the surrounding work environment[2]. Based on the Occupational Safety Law No. 1 of 1970 and the Labor Law No. 13 of 2003 which states that employers are obliged to protect their workforce and the potential dangers they face in the workplace[3].

Several research results show that the human factor plays an important role in the occurrence of work accidents. Based on data from *the International Labour Organization* (ILO) claims that every year there are more than 250 million workplace accidents, more than 160 million workers become sick due to workplace hazards, and 1.2 million workers die due to workplace illnesses and accidents. The figures show that the cost of social and human production is too high[4].

According to *the National Safety Council Alliance*, the implementation of *near miss reports* encourages the workforce to work according to OSH principles. They also explained that most OSH activities in companies are

[1] Nabila Rahmawati and M Hanifuddin Hakim, "Analysis of Hazards and Efforts to Prevent Nearmiss of Hoist Transport Aircraft in the Warehouse Area at PT XYZ" 1, no. 2 (2022): 10–19.
[2] FIRMITA DWISELI, "The Influence of Unsafe Act and Unsafe Condition on Workplace Accident Among Cleaning Service of Stella Maris Hospital, Makassar," 2020.
[3] Alkaf Mu'nis Bahsin and Abdul Rohim Tualeka, "EVALUATION OF UNSAFE ACTION, UNSAFE CONDITION, NEAR MISS, SAFE ACTION, SAFE CONDITION IN WORKERS IN THE OPERATIONAL DEPARTMENT AT PT SYNGENTA SEED INDONESIA (USING GENSUITE OBSERVATION)" 6, no. 2655–4712 (2024): 4063–76.
[4] Score, *Occupational Safety and Health Safety and Health Means for Productivity*, 2024.

reactive, not proactive. With *near miss reports*, companies can switch to a proactive approach by preventing work accidents before they occur. Bernard (2001) explained in his research that in 1982 there were 8 accidents in a company. After implementing *the near miss report* in 1986, accidents were reduced to zero in 1990. He also emphasized that the more *near miss* reports, the fewer accidents occur[5].

The implementation of *near miss* reporting is in line with Government Regulation No. 50 of 2012 which states that hazard reporting procedures must be owned by companies and known to their employees. The workforce plays an important role in the implementation process of the hazard and *near miss* reporting system in the company. Near *miss reporting* is divided into two, namely reporting unsafe conditions and *unsafe actions*[6]. Heinrich stated in his theory that *unsafe actions* of 88%, *unsafe conditions* of 10%, and "*acts of God*" of 2% or unavoidable events are the causes of work accidents[7].

According to Bird and Germain, *unsafe action*, *unsafe condition*, and *near miss* are things that should be learned and prevented so that work accidents do not occur that can cause a number of losses. Fast, precise, and effective handling is necessary in every activity or work. The process of reporting and submitting *findings of unsafe actions* and also *unsafe conditions* requires fast, precise and effective behavior[8]. Near *miss* is the basis of the accident pyramid. Every work accident, no matter how small, must be reported so that it can be investigated and analyzed to find the causative factors so that repairs can be made immediately, with the aim of preventing the recurrence of the same incident or even a larger incident[9].

---

[5] Ridwan Abdulloh, "The Relationship between the Near Miss Report Implementation Program and the Implementation of Risk Control at PT. ALP Petro Industry," *Repository Unair*, 2017, 1–11.
[6] Almira Aurellia, "Overview of the Implementation of Unsafe Action, Unsafe Condition, and Near Miss Reporting at Pt Semen Indonesia (Persero) Tbk. Gresik Factory," 2022.
[7] Yuliani Setyaningsih Julia Rakhmawati, Suroto, "Is it *Unsafe Action* And *Unsafe Condition* Affects Fisherman's Accidents?," *Journal of Nursing* 14 (2022): 301–12.
[8] Aurellia, "Overview of the Implementation of Unsafe Action, Unsafe Condition, and Near Miss Reporting at Pt Semen Indonesia (Persero) Tbk. Gresik Factory."
[9] Yemima Irawanti, Cornelis Novianus, and Arif Setyawan, "FACTORS RELATED TO THE BEHAVIOR OF REPORTING WORK ACCIDENTS IN PT X PRODUCTION WORKERS IN 2020" 02, no. 01 (2021).

According to information data collected by *the National Fire Incident Reporting System* (NFIRS), the U.S. fire administration and a summary of information from the NFPA's annual fire experience survey, that over the five-year period from 2017 to 2021, local fire departments responded to an annual average of 3,396 structural fires involving equipment related to hot work (hot wok). The fire resulted in about 19 civilian deaths, 120 injuries, and $292 million in property damage[10].

In almost every industrial sector, there are *hot work* activities that are at risk of causing fires or explosions. These risks can be prevented by following NFPA standards. Hot work, is any work that produces sparks that can start a fire. *Hot Work* also includes any work using equipment that can generate heat, whether in the form of fire, sparks, or hot surfaces. Welding and cutting with torches are common examples of *hot work* activities. Other jobs that are included in the hot *work* category are the use of grinding machines and *the brazing* or *electroplating* process. Areas that have a *hot work* permit always have materials that are at risk of flammability, as well as the possibility of sparks falling that can directly hit flammable materials or AFR (*alternative fuels and raw*) materials[11].

Although this *hot work* activity has appropriate standard operating procedures (SOPs), there is still the potential for work accidents due to unsafe conditions and unsafe actions. Heinrich stated in his theory that the five sequences of accidents according to the domino theory that say that: Work accidents are the result of innate factors/*genetic factors*, lack of knowledge and expertise in doing work, and an inappropriate social environment and work environment. More than 60%, work accidents are caused by human error and other reasons are limited knowledge of workers, carelessness in work, not carrying out the work procedures given and not being disciplined in

[10] Tucker McGree, "Structure Fires Caused by Hot Work NFPA", 2023.
[11] Monica Myline and Ferida Yuamita, "Risk Management Improvement Proposals for OSH Program Implementation," no. September (2023): 115–22.

implementing work safety regulations, including the use of personal protective equipment[12].

PT Trans-Pacific Petrochemical Indotama Tuban is engaged in the processing of petroleum and petrochemical products. The company operates a prefractionation unit that uses a furnace to heat crude oil, which is essential for separating fractions based on boiling point. This process is essential to maximize the efficiency of petrochemical production[13]. PT Trans-Pacific Petrochemical Indotama Tuban manages the offshore pipeline and conducts risk assessments to ensure structural integrity and safety, using methods such as Risk-Based Inspection to evaluate potential failures[14]. PT Trans-Pacific Petrochemical Indotama (TPPI) is a private industry located in Jenu, Tuban, East Java, Indonesia. PT Trans-Pacific Petrochemical Indotama Tuban produces *petroleum* and *petrochemicals* made from condensate both domestically and abroad. The petroleum *produced is* Pertamax, Pertalite, Light Naphta, Kerosin, Gas Oil, *and* LPG. The petrochemicals *produced are* Benzene, Toluene, Xylene *(*Paraxylene *and* Orthoxylene[15]).

Hot work *activities* at PT Trans-Pacific Petrochemical Indotama Tuban are a job that can cause heat and sparks, which requires strict work safety measures to prevent *near misses* and work accidents. The integration of advanced monitoring systems and proper hydration practices is essential to ensure worker safety and operational efficiency in high-risk environments such as in refinery areas. The *hot work activity* is in the form of welding and repairing machines that have the potential to cause fires and explosions, Based

[12] Agung Nugraha Widjaja and Syahfirin Abdullah, "The Influence of Non-Physical Work Environment on Unsafe Actions and Unsafe Conditions Their Impact on Work Accidents," *Journal of Applied Management Research* 1, no. 1 (2021): 55–65, https://doi.org/10.36441/jamr.v1i1.231.
[13] Siti Nurkhopipah and Farlina Hapsari, "Analysis of Furnace Performance Efficiency 201-H-001 Prefractionation Unit PT Trans-Pacific Petrochemical Indotama Tuban-East Java" 15, no. 2 (2024): 719–25.
[14] Achmad Rudiyanto, "Risk Analysis on the Offshore Pipeline owned by PT. Trans Pacific Petrochemical Indotama (PT. TPPI) Tuban due to free span using the Risk Based Inspection (RBI) method," 2014, 91, http://repository.its.ac.id/51196/.
[15] Dea Noviana and Devi Octasari, "TEST OF THE EFFECT OF PHOSPHATE CONTENT ON THE PH OF BOILER FEED WATER AND COMPARATIVE TEST OF MERCURY CONTENT MEASUREMENT IN NAPTHA (202-S-001) AND CONDENSATE SAMPLES USING NIC SP3D AND NIC PE-1000 AT PT TPPI," no. 2031910016 (2022): 1–87.

on the description above, it can be concluded that there are several factors that can affect the occurrence of *near miss* and work accidents in *hot work* activities. Due to the potential dangers of *hot work* activities that can cause *near miss* and work accidents at PT Trans-Pacific Petrochemical Indotama Tuban, the researcher wants to explore the factors that cause *near miss* in *hot work activities*.

1.2. Problem Formulation

Based on the background that has been described, the formulation of the problem can be taken, namely " What factors contribute to the occurrence of Near misses in hot work activities at PT Trans-Pacific Petrochemical Indotama Tuban?".

1.3. Research Objectives

1. General Purpose

   The general purpose of this study is to explore the factors that affect the occurrence of near miss in hot work activities at PT Trans-Pacific Petrochemical Indotama Tuban.

2. Special Purpose

   1. Exploring the workforce's understanding of near miss incidents in hot work activities at PT Trans-Pacific Petrochemical Indotama Tuban.

   a. Exploring the factors related to unsafe actions in hot work activities at PT Trans-Pacific Petrochemical Indotama, Tuban.

   b. Exploring the factors contributing to unsafe conditions in hot work activities at PT Trans-Pacific Petrochemical Indotama, Tuban.

1.4. Research Benefits

1. For Researchers
   a. Gain experience and knowledge on how to identify, analyze, and describe the factors that cause *near miss* in *hot work* activities in a company.
   b. Develop self-ability in the field of writing related to the factors that cause the occurrence of *unsafe actions* and *conditions* in *hot work* activities to prevent *near miss* and work accidents.
2. For Companies

   As a material for evaluation and consideration, especially in terms of *near miss* in *hot work* activities at PT Trans-Pacific Petrochemical Indotama Tuban so that it can prevent and reduce *the number of near miss* and work accidents.
3. For Institutions

   Adding references and literature related to the factors that cause *near miss* in *hot work* activities through scientific paper research and as an effort to improve student knowledge and knowledge, especially for students of the Faculty of Health Sciences.

1.5. Originality of Research

Several previous studies have been conducted related to *Near Miss*, *unsafe action,* and *unsafe condition* with different intentions and objectives. The following is a previous study with the same theme as this study:

Table 1 Originality of the Research

No.	Research Title	Type of Research	Variable	Result	Research Differences
1.	Optimization of the Near Miss Reporting System to Achieve Zero Accident at Pt. Mitrabahtera Segara Sejati Jakarta[16]. (Aska and Ningrum, 2020)	Qualitative Descriptive.	*Near Miss* and *zero Accident*	The study conducted in 2018 at PT. Mitrabahtera Segara Sejati Tbk in Jakarta found that the *near miss reporting system* did not achieve the goal of zero accidents. Some of the causes of these failures include low employee awareness of the importance of reporting *near misses*, and the lack of training the company provides on the procedures of *the near miss* reporting system.	The variables of this study used *near miss* and *zero accident* and my research used *the variables near miss, unsafe action,* and *unsafe condition*. The analysis tools used are *fishbone analysis* and FTA, while my research uses thematic analysis in qualitative research.

[16] Aska Ambar and Rokmana Ningrum, "Optimization of the Near Miss Reporting System to Achieve Zero Accident at PT. Mitrabahtera Segara Sejati Jakarta," 2020.

No.	Research Title	Type of Research	Variable	Result	Research Differences
2.	The Application of *Near Miss Card* as an Effort to Reduce the Number of Work Accidents [17], (Risma and Herry, 2017)	Qualitative Descriptive.	*Near Miss* and work accidents.	While the near miss reporting procedure clearly shows the process, there is no near miss reporting flow chart in the work area. The company has not organized OSH analysis training, there are no policies or procedures related to the management of risk factors in each department, and there is no document of temporary action procedures to reduce the risks faced by employees.	The variables of this study used *near miss* and work accidents, my research used *the variables near miss, unsafe action,* and *unsafe condition*. This study did not explore the factors that cause *near miss.*

[17] Jefy Risma and Herry Koesyanto, "APPLICATION OF NEAR MISS CARD AS AN EFFORT TO REDUCE THE NUMBER OF WORK ACCIDENTS" 1, no. 2 (2017): 119–30.

No.	Research Title	Type of Research	Variable	Result	Research Differences
3.	Evaluation of *Unsafe Action*, *Unsafe Condition*, *Near Miss*, *Safe Action*, *Safe Condition* in Workers in the Operational Department at PT Syngenta Seed Indonesia (Using *Gensuite Observation*), [18] (Bahsin and Tualeka, 2024)	Descriptive Qualitative with Observation Approach	*Unsafe Action*, *Unsafe Condition*, *Near Miss*, *Safe Action*, and *Safe Condition.*	PT SSI has a major HSE rule observation and evaluation program. Utilizing *gensuite observation* to report the incidence of *unsafe action*, *unsafe condition*, *near miss*, *safe action*, safe *condition* and recap important events that will be evaluated regularly for further improvement.	The method of collecting data for this research uses an observation approach, while in my research I use interview guidelines.

[18] Bahsin and Tualeka, "EVALUATION OF UNSAFE ACTION, UNSAFE CONDITION, NEAR MISS, SAFE ACTION, SAFE CONDITION IN WORKERS IN THE OPERATIONAL DEPARTMENT AT PT SYNGENTA SEED INDONESIA (USING GENSUITE OBSERVATION)." (Surabaya, 2024)

No.	Research Title	Type of Research	Variable	Result	Research Differences
4.	Overview of the near miss, unsafe act *and* unsafe condition *report system* in the Jakarta *Mass Rapid Transit* (MRTJ) Tokyu-Wika joint operation project[19], (Nuraini Fitri, 2016).	Qualitative Descriptive	*Near miss, unsafe condition,* and *unsafe action*	The input stage component, the company's materials, already has an appropriate OSH policy in the TWJO reporting system. For company standards, it is not yet fully compliant because there are still differences in understanding of different *definitions of near miss*. The types of *near miss* and *unsafe condition* reporting are appropriate because companies have created their own types and formats of reporting, while the types of *unsafe action reporting* do not yet exist.	This research focuses on reporting *near misses,* while my research focuses on exploring the workforce's understanding of *near misses*

[19] Nurani Fitri, OVERVIEW OF NEAR MISS, UNSAFE ACT AND UNSAFE CONDITION REPORTING SYSTEMS IN THE TOKYU-WIKA JOINT OPERATION JAKARTA MASS RAPID TRANSIT (MRTJ) PROJECT IN 2016 (Jakarta, 2016).

No.	Research Title	Type of Research	Variable	Result	Research Differences
5.	Factors related to worker awareness reported near *miss events*[20], (Denny, Bagas, Fu'ad, Ikmal, Rabbani, 2023).	Quantitative Cross Sectional	Employee knowledge and reporting are almost a disaster	The results of the study on factors related to employee awareness about reporting near-miss incidents at PT. Charoen Pokphand Makassar concluded that: Education, knowledge, attitudes, regulations, training, supervisor support, and co-worker support have no relationship with employee awareness of reporting near-accident incidents.	This study uses a quantitative method with *a cross sectional* approach, while in my research I use a descriptive qualitative method with interview guidelines.

[20] Denny Oktavina Radianto, Bagas Tri Pramudi Putra, Ikmal Muntadhor Hamid, Mohammad Syamzidan Rabani, Fu'ad Alfafa, "Factors Affecting Workers' Awareness of Work Accident Reporting in the Construction Sector," *Journal of Student Research (JSR)* 1, no. 4 (2023): 207–14, https://doi.org/10.55606/jsr.v1i4.