



ANALYZING THE ACCIDENT RISK FACTORS IN THE MANUFACTURING INDUSTRY

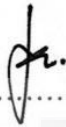


UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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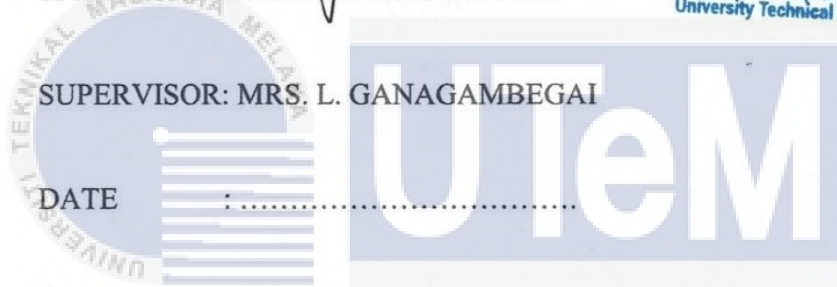
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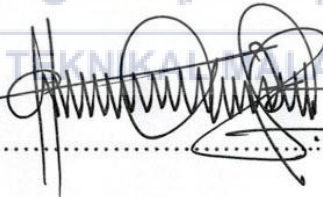
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ANALYZING THE ACCIDENT RISK FACTORS IN THE MANUFACTURING INDUSTRY
IN MALAYSIA

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This thesis is submitted in partial fulfillment of the requirements for the award of Bachelor of
Technology Management (Technology Innovation) with Honors (BTMI)



17 JANUARY 2023

DECLARATION OF ORIGINAL WORK

“I hereby declare that this report is entirely my own work with project title “The Effectiveness of Augmented Reality towards E-commerce platforms” and with the exception of a few clarifications and passages where every source is clearly cited.



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DEDICATION

I would like to dedication my gratitude to my dear parents, who have supported me have both spiritually and monetarily

Hazani bin Sahak @Ishak
Sofiaariyati binti Abdul Manaf

A big thanks to my supervisor and panel for guiding me throught my research study.

Ts Dr. L. Ganagambegai (Supervisor)

Dr. Hasan bin Saleh (Panel)

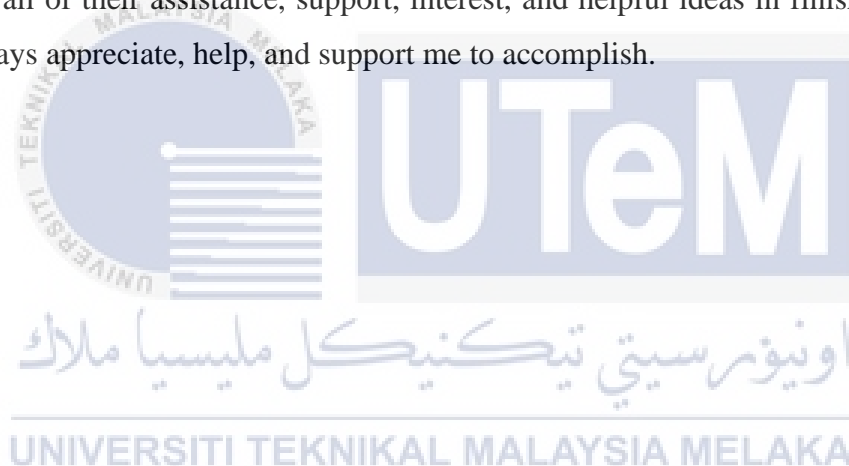
Thank you so much for always being understanding, as well as to my friends who supported and assisted me, without their support and blessing, this study would be difficult to accomplish in the time allotted. Thank you very much!

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ABSTRACT

This study examined the risk factors of accidents at work in the manufacturing industry sector. Occupational Safety and Health Act 1994 (Act 514) is an act responsible for establishing the Department of Occupational Safety and Health (DOSH). With the benefits of installing this department to protect the safety, health and employees at work, accidents at work cannot be avoided entirely. This government body aims to control the rate of accidents that occur. This study's main goal was to increase awareness about occupational safety and health among workers. The research instrument used is to distribute a survey questionnaire involving workers from manufacturing factories. This study was conducted in one of the industries in Malaysia that use chemical materials to manufacture electrical goods, namely Jinko Solar Sdn. Bhd. The findings of this study and the methodology might be useful for research at other construction sites in other regions and countries. This work provides useful information for project managers and safety practitioners who desire to improve safety and health performance on manufacturing factories.

Keywords: *occupational safety and health (OSH) management; education/training; occupational safety health practices, work permission; hazard assessment; personal protective equipment*



ABSTRAK

Kajian ini mengkaji faktor risiko kemalangan di tempat kerja dalam sektor industri pembuatan. Akta Keselamatan dan Kesihatan Pekerjaan 1994 (Akta 514) adalah akta yang bertanggungjawab untuk menubuhkan Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP). Dengan faedah memasang jabatan ini untuk melindungi keselamatan, kesihatan dan pekerja di tempat kerja, kemalangan di tempat kerja tidak dapat dielakkan sama sekali. Badan kerajaan ini bertujuan mengawal kadar kemalangan yang berlaku. Matlamat utama kajian ini adalah untuk meningkatkan kesedaran tentang keselamatan dan kesihatan pekerjaan di kalangan pekerja. Instrumen kajian yang digunakan adalah mengedarkan borang soal selidik yang melibatkan pekerja dari kilang pembuatan. Kajian ini dijalankan di salah satu industri di Malaysia yang menggunakan bahan kimia untuk menghasilkan barangan elektrik iaitu Jinko Solar Sdn. Bhd. Dapatan kajian dan metodologi ini mungkin berguna untuk penyelidikan di tapak pembinaan lain di rantau dan negara lain. Kerja ini menyediakan maklumat berguna untuk pengurus projek dan pengamal keselamatan yang ingin meningkatkan prestasi keselamatan dan kesihatan di kilang pembuatan.

Kata kunci: *pengurusan keselamatan dan kesihatan pekerjaan (OSH); pendidikan/latihan; amalan kesihatan keselamatan pekerjaan, kebenaran bekerja; penilaian bahaya; alat pelindung diri*

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CHAPTER 1

INTRODUCTION

1.1 Background

In a manufacturing plant, workers or staff must wear personal protective equipment while in a place that carries the risk of accidents, for example, a place that uses chemicals that can cause health problems. However, not everyone complies with this directive which is a factor in accidents at work.

There are two causes of accidents: individual factor and nature of job, all of which will be discussed in more detail. These accidents resulted in the loss of valuable workers and high health care costs. Those who experience occupational hazards may experience occupational diseases or loss of life (Ya-huei Wang, 2021).

An uncomfortable and uncondusive workplace environment is also one of the factors to the occurrence of accidents at work (Azam & Zilan, 2021). Employees who are less care about personal safety and do not comply with what has been set by the company, will be more vulnerable to dangers that can cause injury or, worse, death at work. The compliance of all workers in the manufacturing company on this safety issue needs to be taken seriously to reduce fatalities and accidents in the workplace. Awareness of personal safety in the workplace is the main criterion for preventing accidents. If there is no safety-prioritizing attitude among workers can increase accidents and injuries in the workplace

In the past, the manufacturing industry did not look at occupational safety and health as they were only pursuing profit which was their main goal. Still, if they continue not to comply with these occupational safety and health issues, they will also incur losses from expenses to pay. reparation. BLS also reports workplace accident statistics among industrial workers as 25% of injuries are caused by slipping, tripping, and falling (EHS Daily Advisor, 18 October 2019, Emma Voss)

1.2 Problem Statement

According to data from the Department of Occupational Safety and Health of the Ministry of Human Resources Malaysia, occupational accidents involved 6933 cases, of which 6446 cases were permanent disability, 274 cases involving permanent disability, and 213 cases involved death in 2020 alone. This explains that the case of worker safety and health in Malaysia is quite severe. Subsequently, manufacturing sector sales grew 4.5 per cent in December 202, which is the highest growth since March 2020 (Najib Aroff, 2020).

In Malaysia, the total labour force in February 2021 was over 16.05 million people (Department of Statistics Malaysia, 2021). This amount is a significant amount that deserves attention, especially regarding their safety and health. In hiring, the industry chooses Malaysians because, in the manufacturing industry, it is easiest to get a job with only a minimum achievement of Sijil Pelajaran Malaysia (SPM) to work in this sector. According to Bank Negara Malaysia (BNM), In terms of sector performance, all sectors of the economy recorded improvements. Powered by strong E&E product output and ongoing recovery in the consumer, resource, and construction-related clusters, the manufacturing sector grew at a faster rate of 6.6%.

In Malaysia, the Ministry of Human Resources introduced Act 514 to all companies under the occupational safety and health act 1994. an act responsible for establishing the Department of Occupational Safety and Health (DOSH) (Azam & Zilan, 2021). If all workers know about these laws and acts, why is there still dumping of accident cases involving this manufacturing industry? Do employees in the manufacturing industry know about this law? If the company does not follow this law, they have the right to report to a higher authority that can make a report to the Malaysian Labor Office (Siti Faridah, Laila Affiyani, 2019)

This employee safety and health issue are critical, especially in the manufacturing industry, where it involves hazardous materials and equipment according to the type of goods produced by the company. Workplaces that use these dangerous materials need to use proper clothing or equipment to reduce the accident factor in the workplace. Either directly or indirectly, every employee involved must prioritise safety to prevent accidents. The employer must ensure that all employees follow the correct steps to run a good job.

The question that is a question mark during the preparation of this report is, do employees know about the occupational safety and health act 1994? Do they work to earn a fixed monthly salary, be able to survive in the age of modelling or be someone who has the purchasing power to meet their wants and needs without thinking about the consequences behind the accident that will happen if they continue to think so? According to the case accident reports, a clear act on their safety and health while working does not indicate they know about personal safety.

Despite the many reports of accidents in the workplace. From reading on the internet, there are various ways to curb this problem, for example by wearing equipment in the right way, ensuring a comfortable workplace area, giving bonuses and rewards as appropriate to inspire them to work well and many other ways that submitted (Azhar, Rizwan, and Kamalesh, 2015)

Turning to employees' views, why are there other employees who do not want to follow the rules set by employees? What is the reason they do so? In a workplace with chemicals that can be harmful to health, the superiors will inevitably provide adequate equipment such as PVE clothing, supply face masks, gloves and others. Is it this equipment that makes them uncomfortable for them to continue working or the employees themselves who underestimate the ethics of wearing it?

1.3 Research Question

The question for this study is to meet the goal of the study, which is to improve the level of awareness of occupational safety and health among workers, especially in the manufacturing industry, where the question of the study is how to ensure the rate of accidents at work in the manufacturing industry can be reduced. The question of this study is to answer the following questions:

- i. How to measure individual factors with workplace accidents among employees there factors influencing workers' accidents in the manufacturing industry?
- ii. How to measure nature of job with workplace accidents among employees there factors influencing workers' accidents in the manufacturing industry?

1.4 Research Objective

There are research objectives to be achieved from this study.

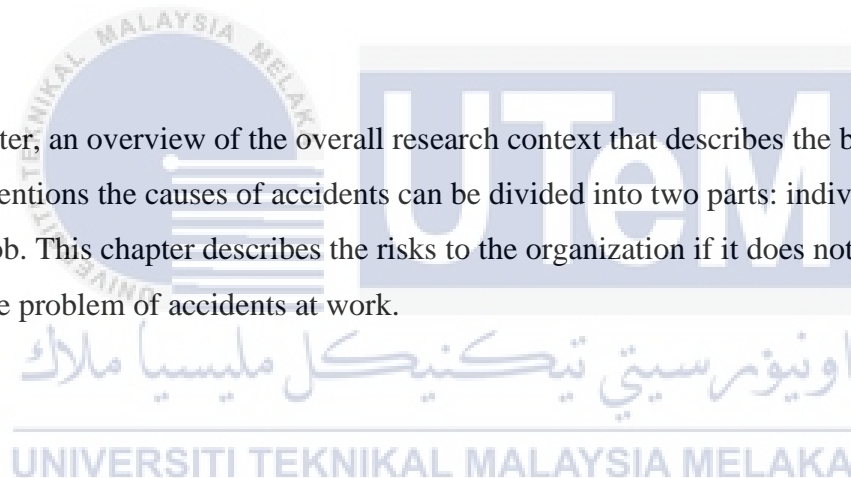
- i. To measure individual factors with workplace accidents among employees.
- ii. To measure nature of job with workplace accidents among employees.

1.5 Scope of the Research

The scope of this study is implemented in the area of the manufacturing industry. This involves chemicals that can endanger human health, one of the Chinese companies in Malaysia, namely Jinko Solar Company in Perai, Penang. This study focuses only employees.

1.6 Summary

In this chapter, an overview of the overall research context that describes the background of research that mentions the causes of accidents can be divided into two parts: individual factors and nature of job. This chapter describes the risks to the organization if it does not take early steps to curb the problem of accidents at work.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The term research describes the meaning of the title of the study presented by the researcher and the researcher's understanding of the matter to be studied. This chapter will explain the literature review in the study in depth which will explain the issues related to the study's title. This study involves the Occupational Safety and Health Act (OSHA), which is the main emphasis of this study. The end of the chapter will show the theoretical framework of the research.

2.2. Overview Occupational Safety and Health in Malaysia

According to the National Health Morbidity Survey Report in 2015, a total of 4.2 million Malaysians aged 16 years and above suffer from various health problems, especially mental health, and most are workers. The statistical frequency of mental health problems among civil servants is 24.6 per cent, lower than that of private employees, which is 29.3 per cent. In 2016, a total of 24 688 employees received SOCSO health programs to ensure employees receive free guidance and treatment to prevent risky diseases, especially diabetes, high blood pressure, heart attack, cervical cancer and breast cancer. Especially for women (SOCSO, 2017). Apart from the work environment, employers should take note of the stress experienced by employees and the level of employee health in their organization. Therefore, employee welfare, which includes employee safety and health, should be paid attention to by employers and organizations involved.

Accordingly, an ergonomic work environment can enhance work quality and productivity (Selamat, 2016; Selamat & Mukhiffun, 2018). Aspects of work that cause muscle fatigue, limb injuries or skeletal muscle disease (MSD) and carpal tunnel syndrome (wrist) are considered ergonomic risk factors. However, an ergonomic work environment does not lie in the furniture or

tools used alone. Employees can create an ergonomic work environment if desired. According to a Berita Harian newspaper clipping, among the adverse effects of the work environment are not ergonomic: company productivity, job dissatisfaction and high accident risk. Stress experienced due to the work environment can affect the well-being of employees and the way they cope with workloads in the workplace (Edwards, 1998; Safe, 2013).

An ergonomic workstation environment is one way of alleviating stress problems in the workplace (Murphy, 2002; Zafir et al., 2013). Stress or stress in the workplace can change human psychology and physiology. Workplace stress can damage the body's immune system and cause risky illnesses including high blood pressure and heart disease. If stress is not relieved, death can occur in the individual due to coronary failure or heart disease (Zafir & Fazilah, 2006). Therefore, employers should provide an ergonomic workspace so as not to cause employees stress and, at the same time, affect their health (Selamat, 2016).

As is well known, the manufacturing sector is no exception to manual handling that requires the activities of pushing, pulling, lifting, lowering, carrying, and bearing weight without any mechanical assistance. Improper manual handling can cause a person to get musculoskeletal disease disorders (Ministry of Health Malaysia). This task manual requires specific techniques so that employees are spared from any occupational safety and health problems such as accidents, injuries, overload and the like. All these elements are classified as aspects of ergonomic work systems (Selamat & Mukhiffun, 2018). The need to look at this aspect in the organization is highly encouraged so that the continuity of employee work can be implemented better and more perfectly.

2.3. Occupational Safety and Health (OSH) Training

OSHA 1994 places a strong emphasis on training and another OSH programmed. A type of training called occupational safety and health (OSH) training attempts to provide participants the abilities they need to operate safely and prevent workplace accidents. Capacity may be developed through occupational health education, protective skills, and increased risk awareness. When someone learns the skills necessary to execute a task safely while on the job, this is when informal OSH training first started in highly industrialised countries like the United States. (Surienty et al., 2019). The OSHA was established in the 1970s, and health and safety training became

standardized. Law and policy now guarantee that employers give health and safety training to their employees. Meanwhile, OSH training and practices spread around the world throughout this 'industrial' era and continues to this day. Nowadays, OSH training is a crucial component of the sector. A safety and health officer and an occupational health specialist are necessary to maintain effective workplace supervision in processes in industrial sectors that use hazardous materials. These activities necessitate qualified persons to perform carbon emissions and medical inspection. To the greatest degree practicable, employers will protect their employees' welfare, health, and safety. Additionally, OSH training is one of the components in the safety environment, according to another study. The firm's systems and procedures should incorporate OSH training programmes, and corporate goals and safety awareness should be aligned in the organization's strategic plan. The results suggest that initiatives should be incorporated into the organization's methods and practises, and OSH training should be integrated into the overall business approach and goals. Training programmes should be tailored to the business's specific training needs (as determined by health and safety evaluation methods).

examined whether employees benefit from OHS training and whether more intensive training had a greater impact than less intensive training. OHS training for employees has been shown to be helpful in changing attitudes, but there is little proof that it improves health (i.e., symptoms, accidents, diseases) (Ilynsa S Robson, 2011). Employers should aim to give workers with OHS training, according to the study team, because preparedness improves job performance. However, significant health benefits from training are unlikely (Damon L. Swift, 2014). New hires frequently receive "informal" training from more experienced workers in small and medium-sized organisations, and they are occasionally required to carry out their tasks. Another study looked at the relative effectiveness of several workplace OSH training programmes aiming at increasing safety awareness and efficiency while reducing negative outcomes (accidents, diseases, and injuries).

2.4. Worker's Perception Towards OSH Training

The best means for employees to promote adherence to OSH standards at work are through knowledge sharing and OSH training. Workers who receive workplace training are more likely to be directly involved in the safety programmed. Workers who have completed OSH training are

taught to recognize risks and dangerous behaviors and to assess the consequences. Workers who are qualified to spot relevant job concerns should have a better awareness of the risks. This will improve their adherence to warnings and instructions. We may conclude from this analysis that workers' attitudes regarding OSH training must be investigated. The findings of James's (2011) Greater understanding is closely correlated with better safety training, according to a sample of construction workers from throughout the United States, thus whether the training's material is relevant and intelligible to the employees enhances the learning potential. This consistent with that of Hallowell (2010), who claims that good health and safety training reduces the number of recordable injuries. Mojopelo et al. (2016) investigate employee views of occupational health and safety requirements in the steel sector in South Africa. The findings show that workers in the steel sector believe OSH standards are adequate in all seven parameters examined in this study (Mohammad Alamgir, 2015). This covered knowledge and training, health and safety awareness, employee behaviour, supervisory positions, health and safety monitoring systems, occupational inspection, and workplace circumstances. Health and safety awareness has emerged as the most important factor for employees (Mojopelo et al., 2016)

Training, work environment, mechanical, ergonomics, personal protection equipment (PPE), electrical, and noise were among the seven factors examined in the study. The largest mean rating was given to the perception on training element of perception, indicating that workers' knowledge of training is stronger than other factors. According to certain OSH research, safety training is one of the most essential aspects in enhancing safety performance (Surienty & Lilis. 2019). Another study examines the necessity of worker training in the lodging industry for the protection of their physical and mental health. They were produced as a result of a detailed questionnaire-based investigation. The data from the lodging firms revealed that workers' OSH training had positive results. This may be seen more directly in their own phrases, which state that OSH is frequently offered and kept through training, and that some form of training to lessen the dangers of working hours is frequently recognised as appropriate preventative measures. Specifically, a SME accommodation firm, someone who has observed the chaos and accidents that occur when there is no training knows the benefits of training very well, especially when it comes to the safety and health of workers.

2.5. Summary

Safety and health factors are the essential indicators that can assure workplace safety and health. Furthermore, the company is responsible for ensuring that occupational safety and health are incorporated into employee routines and habits to fulfil the organisation's vision and objective. Organisations' difficulty in dealing with this component can be short-term and long-term. Organisations with record-high workplace injury rates are likelier to lose talented personnel in the short run. The likelihood of qualified people moving to an organisation where they feel comfortable is higher. New employees will be hesitant to try their luck in a company with a high accident rate in the long run. Indirectly, such records will impact the organisation's reputation. It is the organisation's job to ensure safe and healthy working conditions by carefully executing safety and health measures and making such measures the cornerstone of moving ahead.

2.6. Workplace Accident

Heinrich's definition of an accident from the 1930s is frequently used. According to Heinrich, an accident is an unexpected and uncontrollable incident in which a person sustains personal damage or the likelihood of such injury as a result of the action or response of an item, material, person, or radiation (Karla & Rik, 2022). Successful intervention techniques that lessen the high human and societal costs of occupational accidents may result from an efficient causal analysis methodology. However, it is a Herculean undertaking and practically impossible to achieve the target of zero workplace accidents (Zakaria, 2012)

It is frequently maintained in more recent research that the terms "unplanned" and "uncontrolled" are deceptive. This can suggest that fate or chance played a role in the incident. It is uncontrollable. However, it is typically discovered that many occurrences were predicted and could have been avoided if the appropriate steps had been taken when the causes are established. This suggests that fate or chance were not factors in the incident (Karla & Rik, 2022)

According to Gyekye (2010), occupational accidents are often linked to two main causes: internal causal factors (worker dispositional qualities) and external causative factors (workplace characteristics). In the United States, there are over 1.6 million industrial accidents per year, and

mild to permanently disabled injuries, and occasionally even death. The distinction with these incidents is that they immediately impact a person's employment, and accidents that occur at work are the employer's responsibility (Dacanay, 2011)

2.7. Stress and Fatigue

Chronic fatigue and sleep issues brought on by long-term stress might diminish energy levels. For instance, a recent research of more than 7,000 working individuals discovered that weariness and work-related stress were "substantially correlated." Stress-related insomnia and disturbed sleep can also lead to low energy. (Link, 2021).

Due to a lack of energy while working will cause their focus to decrease and will cause accidents at work. Workload in the sense of HF psychology has been shown to be a major factor in determining stress and tiredness levels among workers undertaking monotonous manufacturing jobs (MacDonald, 2003).

Joshua (2022), the co-founder and CEO of the Six Seconds Emotional Intelligence Network, stated that there are four ways to deal with stress: first, by practising mindfulness, which entails taking a breath and observing behaviour and feelings without judgement or reaction; second, by using the label effect; third, by re-framing thoughts to view the current situation from a different perspective, the last method is to go from anxiety to enthusiasm, which transforms the former into the latter.

2.8. Unsafe Acts

Any employee behaviour that contravenes a recognised safety standard or practise, endangers oneself or others while carrying out work-related tasks, damages company property, and incurs reputational and monetary losses on the employer's part is deemed dangerous conduct. These human behaviours may be the consequence of employees' callous attitudes, a lack of awareness of safety precautions, or a disregard for safe working practises. (Green World Group, 2021)

Generally, workplace accidents occur either due to unsafe working conditions and unsafe acts of employees. Examples of unsafe acts that can cause accidents in the workplace are not following

proper work methods, using damaged equipment, not wearing personal protective equipment (PPE), working under the influence of drugs and alcohol, etc (Aksorn & Hadikusumo, 2007).

2.9. Machineries/tools

According to Payne (2011), accidents involving risky or malfunctioning machinery are much too frequent in the UK. Effective risk assessments in the industrial sector have recently been a focus of the Health and Safety Executive. While mechanical handling mostly eliminates the risks associated with manual handling, it also creates additional risks. Personnel injuries are less common but typically more serious. Transport or equipment used at work is the leading cause of industrial accidents, accounting for roughly 70 fatalities annually. Most of these accidents may be avoided (HSE, 2005).

Workers who are required to use that machinery, equipment, or tools to carry out their responsibilities are placed in a dangerous situation. Being caught in or crushed by tools or objects is one of the top 10 leading causes of occupational accidents, according to the U.S. Bureau of Labor Statistics. In 2019, 93 workers died as a result of being "caught in running equipment or machinery." One of the OSHA requirements that is frequently found to be violated is machine guarding. (Silverman, McDonald & Friedman, 2021)

2.10. Design of Workplace

As Beasley (2011) points out, older buildings may contain asbestos, which will affect all occupants. Damaged electrical wires or wiring can literally shock office workers. The arrangement of workplaces or machines and so on that are not suitable can also cause accidents in which workers who work in such places are likely to be hit or fall while working. The next step that employers can take is to provide a protection plan for employees in the event of an accident. With this protection plan, employees can make the choice to exit safely and quickly during an accident at work which with this plan will reduce accidents (Great Eastern, 2022).

According to Zakaria, Mansor, and Abdullah (2012), it is not difficult to prevent workplace transportation accidents with appropriate workplace design. But once a hazardous plan has been

constructed, fixing it is significantly more difficult. Therefore, it is essential that the design phase in the workplace receive greater attention. The lighting conditions are one of the particular suggestions made by Zakaria, Mansor, and Abdullah (2012) for minimising workplace transportation accidents. These conditions must be met by drivers in order for them to see clearly and identify dangers and pedestrians as fast as possible. Proper illumination is crucial. As individuals become older and lose their vision, this becomes even more crucial. To encourage a pleasant workplace, the element of noise level should be monitored. Others include the working environment, which enables easy transit operations, which require the help of traffic control signs. Signage and high-visibility lines used to mark edges (such as on ramps) are useful. In order to give the driver's eyes time to adjust, he draws attention to the usage of stop signs and suggests that they can be employed while moving between regions with varying illumination levels. Where people and cars interact, there has to be obvious markings; ideally, designate zones on the floor for stock storage spaces, traffic areas, and pedestrian paths.

2.11. Training Procedures

An employer provides workers with the training and educational opportunities designed to provide them the skills they need to do their jobs effectively. After the training is through, the employee will be competent and skilled and able to do his duties thanks to the training. Depending on the sort of employment, training might last a few days or many weeks. The trainee is free to ask questions at any time, and the trainer should provide the trainee with as much hands-on teaching as feasible (Clark, 2017).

According to Public Health Foundation (2022), Effective training continues after a one-on-one training session has ended and begins well before it does. The training process is made up of five interconnected phases or activities: assessment, motivation, design, delivery, and evaluation. This online resource offers recommendations for enhancing training efforts in each of these five areas, steps for putting those recommendations into practise, and references to related studies. Each chapter of the book builds on the one before it, demonstrating how trainers progress through the stages of creating, delivering, and assessing training.

2.12. Theoretical Framework

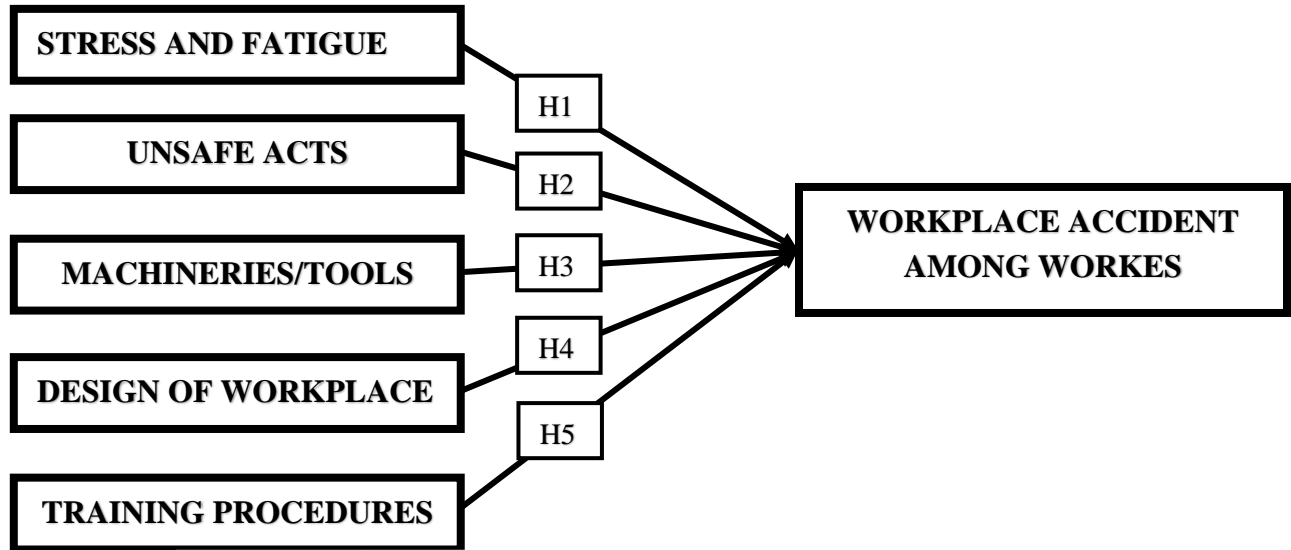


Figure 2.1: Theoretical Framework

2.13. Hypothesis of Study

Based on the theoretical in figure 2.12 the hypotheses are formed to define the concept formulated is valid or invalid. The researcher had been present the following hypotheses.

Hypothesis 1 (H1)

H1: There is significant relationship between stress and fatigue and workplace accident among workers.

H0: There is no significant relationship between stress and fatigue and workplace accident among workers.

Hypothesis 2 (H2)

H2: There is significant relationship between unsafe acts and workplace accident among workers.

H0: There is no significant relationship between unsafe acts and workplace accident among workers.

Hypothesis 3 (H3)