# EFFECTIVENESS OF OCCUPATIONAL SAFETY AND HEALTH (OSH) TRAINING IN REDUCING FALL-FROM-HEIGHT INCIDENTS: ON-SITE IMPLEMENTATION BARRIERS IN SELECTED CONSTRUCTION SITE

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**A project report submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology (Honours) Construction Management**

**Faculty of Engineering and Green Technology**
**Universiti Tunku Abdul Rahman**

**May 2026**

# DECLARATION

I hereby declare that this project report is based on my original work except for citations and quotations which have been duly acknowledged. I also declare that it has not been previously and concurrently submitted for any other degree or award at UTAR or other institutions.

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## APPROVAL FOR SUBMISSION

I certify that this project report entitled **"EFFECTIVENESS OF OCCUPATIONAL SAFETY AND HEALTH (OSH) TRAINING IN REDUCING FALL-FROM-HEIGHT INCIDENTS: ON-SITE IMPLEMENTATION BARRIERS IN SELECTED CONSTRUCTION SITE"** was prepared by **WONG SHUN KAI** has met the required standard for submission in partial fulfilment of the requirements for the award of Bachelor of Technology (Hons) Construction Management at Universiti Tunku Abdul Rahman.

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Specially dedicated to
my beloved mother

## ACKNOWLEDGEMENTS

I would like to thank everyone who had contributed to the successful completion of this project. I would like to express my gratitude to my research supervisor, Ts. Dr. Tan Zi Yi and co-supervisor, Ts. Tey Kim Hai for their exceptional guidance, encouragement, and support throughout the completion of both FYP I and FYP II. Dr. Tan has consistently inspired and motivated me. She offers valuable feedback and thoughtful recommendations that have enhanced the quality of my work.

Moreover, I appreciate the sources and information provided by Universiti Tunku Abdul Rahman (UTAR). It enables me to explore various sources of evidence for this study. I would also like to acknowledge past researchers and authors whose published studies have contributed valuable insights into my research. Additionally, I am grateful and value the unwavering support, understanding, and motivation from my family and friends during the ups and downs of this academic journey.

Lastly, I would like to thank everyone who has contributed directly or indirectly to the success of this project. Every participant who took the time to complete the physical interview and on-site observation. This thesis has been completed with your efforts and contributions.

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## ABSTRACT

This study examines the effectiveness of safety training in reducing fall-from-height incidents in scaffolding work within the construction industry. It aims to identify the essential training content and delivery methods based on CIDB standards, assess the level of on-site implementation and compliance among scaffolding workers, and propose improvements to enhance training effectiveness. A qualitative approach was adopted, involving semi-structured interviews with scaffolding workers, safety officers, and site managers, along with on-site observations at a construction site in Puchong. The collected data were analysed using thematic analysis to explore patterns related to training practices, worker behaviour, and implementation challenges. The findings reveal that while basic safety training helps to build awareness, but there are still gaps in practical application, supervision, and compliance on site. Several barriers were identified, including time constraints, language differences, worker attitudes, and limited enforcement. This study suggests that reinforcing the training delivery method, strengthening supervision and the enforcement system, applying smart PPE, and implementing AI CCTV can help improve safety performance and reduce fall-related risks in construction projects.

Keywords: Safety training; Scaffolding; Fall-from-height; Construction safety; Training effectiveness; On-site compliance; Implementation barriers

Subject Area: HD9715-9717.5 Construction Industry

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| OSH | Occupational Safety and Health |
| OSHA 1994 | Occupational Safety and Health Act 1994 |
| FMA 1967 | Factories and Machineries Act 1967 |
| CIS 15:2019 | Construction Industry Standard 15:2019 |
| PPE | Personal Protective Equipment |
| DOSH | Department of Occupational Safety and Health |

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# CHAPTER 1

# INTRODUCTION

## 1.1 Research Background

The construction industry in Malaysia is the most hazardous industry, with fall-from-height accidents consistently listed among the top causes of fatalities and serious injuries (Abdul Halim et al., 2020). Scaffold, ladder, and electrical power tools are the most frequent accidents that happen in construction sites (Błazik-Borowa and Szer, 2015). According to the statistics by industry from 2013 to 2017, in comparison with other industries, the largest number of reported fatalities is from the construction industry. The construction industry accounted for of 36.13% of all occupational fatal injuries in 2013, and it increased to 41.47% in 2017 (DOSH, 2017). This demonstrates clearly that the construction industry is one of the primary causes of the rise in the number of fatalities from occupational fatal accidents in Malaysia. On construction sites, various types of accidents cause fatality. However, the use of scaffolding to work at height is one of the causes of accidents in the construction site (Błazik-Borowa and Szer, 2015).

Department of Occupational Safety and Health (DOSH) enforces mandatory safety training programs under the Occupational Safety and Health (Amendment) Act 2022 to address these concerns (OSHAA 2022). This safety training program plays a crucial role in creating strong workplace safety cultures (Aziz & Osman, 2019). These training programs are designed to equip workers with essential

knowledge and skills to recognize hazards, use fall protection tools properly, and follow safety procedures.

However, fall-from-height incidents still occur frequently. According to Curado et al. (2015), mandatory training may not be as effective as voluntary training. This finding raise concerns because the effectiveness of compulsory safety training has not been thoroughly examined using samples of actual training participants.

Therefore, it is important to investigate how mandatory safety training influences its overall effectiveness. This issue is especially relevant in determining whether such training should remain a regulatory requirement due to its perceived value, or if alternative approaches should be explored in cases where mandatory training fails to deliver meaningful outcomes.

This study focuses on evaluating how OSH safety training program is implemented in reducing fall from height incidents involving scaffolding work in Malaysia and also identifying barriers that hinder proper on-site implementation.

## 1.2 Problem Statements

The construction industry in Malaysia continues to be listed as one of the highest rates of workplace injuries and fatalities, with falls from height being identified as a leading cause. Despite the DOSH having made significant efforts to improve workplace safety through amendments such as the Occupational Safety and Health (Amendment) Act 2022 (OSHAA 2022), falls from height incidents continue to occur. These incidents are a leading cause of fatalities in the industry, endanger the lives of workers, and also lead to project delays, financial losses, and reputational damage to a company (Halim et al., 2020).

DOSH has made it compulsory for all site workers, especially those who work at height, to undergo safety training, aiming to improve safety awareness and

mitigate accidents. However, recent news and case studies show that the number of falls-related incidents has not declined much despite the implementation of the necessary safety training. This raises questions about the practical efficacy of the OSH training programs that are already in place.

Furthermore, the complexity of construction environments, the diversity of workers, time constraints, and lack of resources could all have an impact on the effective implementation of OSH training outcomes. However, in some training programs, there were challenges in being conducted out just as a legal requirement, it's formal rather than being effectively implemented into daily site operations. In this situation, the safety training turns into a box-checking exercise that does not really affect the site's safety culture.

## 1.3 Aims and Objectives

The aim of this study is to examine the effectiveness of current OSH training approaches in reducing fall-from-height incidents among scaffolding workers in Malaysia, and to identify barriers affecting the on-site implementation.

Objective 1: To investigate the essential safety training content and delivery methods required for scaffolding work benchmarked with CIDB standards.

Objective 2: To assess the current on-site implementation and compliance level of safety training among scaffolding workers employed.

Objective 3: To propose improvements for enhancing the safety delivering method and mitigate the barriers of implementation on site.

## 1.4 Significance of Study

Currently in Malaysia, construction industry continues reports one of the highest rates of workplace fatalities and leading cause of the incidents is falls from height. This concerning trend highlights the importance of evaluating how effectively Occupational Safety and Health (OSH) training applies in the real world to mitigate incidents and ensure the safety of site workers.

Falls from height incidents on construction sites continue to occur even after the compulsory safety training programs have been implemented in place under OSH legislation, for example, the Occupational Safety and Health Act 1994 and its amendment through OSHAA 2022. Therefore, this raises questions about how well this safety training programme is distributed, absorbed, and implemented daily in daily site operations.

Therefore, this study is important because it highlights one of the most significant safety issues in the construction industry in Malaysia, such as falls from height accidents, especially when scaffolding workers are involved. This research focuses on the effectiveness of OSHA training, which helps to determine whether current training programs meet industry requirements and correctly train workers to handle site hazards.

The findings will provide better insights for regulatory bodies, including the CIDB and DOSH, in improving training guidelines and might help construction companies in refining their own training programs. Besides, this study identifies the practical implementation on site and provides recommendations that might help workers improve adherence and foster a stronger safety culture among the scaffolding workers.

## 1.5 Limitation of study

There are several limitations in this study. Firstly, the study focuses on construction sites in Malaysia, which will limit the extent to which findings can be applied to other countries with different legal frameworks, safety cultures, or enforcement methods.

Moreover, the wide range of perspectives that may be collected might be limited by the availability of willing volunteers and access to construction sites. Due to privacy or regulatory issues, some companies may be unwilling to allow observations or interviews, which could limit the sample size or bias the findings in support of safer sites.

Furthermore, this study relies on a qualitative method; interviews with site workers, site supervisors, and safety officers, and on-site observation are the methods used to collect data. Although this approach provides a deep and contextual insight, subjectivity, along with potential researcher bias, might be added during the collection and evaluation of data. Furthermore, social desirability bias may affect interviewees' comments, especially if they are talking about compliance with safety procedures or training practices.

Besides, the study might face difficulties in gathering comprehensive data on the actual training content and delivery methods of the safety training program. This is because training providers, training companies, and construction companies might not be willing to share the information due to privacy, regulatory, or competitive concerns. This lack of transparency might limit the depth of analysis regarding the effectiveness of training content and method.

Lastly, the depth of occupational safety findings may be narrowed since this study only focuses on fall-from-height accidents among scaffolding workers, while other types of workplace accidents or hazards are not covered in this study.

## 1.6 Scope and limitation of study

This study focuses on assessing the effectiveness of OSH training programs in reducing fall-from-height accidents within the Malaysia construction industry, with scaffolding. It emphasizes the content and delivery of safety training, compliance levels, and barriers to on-site implementation.

The study is limited to the fall-from-height hazards involving scaffolding. However, other types of construction accidents or safety issues, such as electrical or excavation-related incidents, are not covered.

Semi-structured interviews with site personnel, such as safety officers, site supervisors, and scaffolding workers, and on-site observation of actual work practices are used for data collection. Purposive sampling will be used in the participant and site selection process to ensure subject relevance.

The research findings is based on a sample of specific sites and regions within Malaysia and therefore may not be fully generalizable to the entire industry and population. Furthermore, the qualitative method relies on participants' responses, which might contain bias or insufficient information. The completeness of the data can be affected by limitations including time limits, restricted site access, and the availability of important respondents.

## 1.7 Research Outlines

In this study, Chapter 1 presents the research background and current issues in the construction industry. Besides, it discusses the problem statements, research aim, objectives, scope, limitations of the research, and its significance.

In Chapter 2, it explores existing studies and scholarly works related to OSH training, scaffolding safety, fall from height accidents in the construction sector, relevant Malaysian legislation and industry standards, and barriers to effective safety training implementation.

In Chapter 3, it outlines the research methodology, qualitative methods, target population for interview, and development of semi-structured interview questions and observation to collect data for achieving the study objectives.

In Chapter 4, it presents and discusses the findings and results analysis from the collected data.

Lastly, Chapter 5 summarises the findings from the collected data and provides recommendations to improve OSH training and safety practices in the Malaysia construction industry.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

With an increasing number of fatalities and injuries at work in Malaysia, the construction industry is considered one of the most hazardous industries in the world. Falls from height incidents continue to rank among the most prevalent causes of fatalities and severe injuries in construction sites (Tariq et al., 2023). Despite safety regulations such as the Occupational Safety and Health Act 1994 (OSHA 1994) and the OSH Amendment Act 2022, these incidents continue to occur frequently. Therefore, OSH safety training is a crucial preventive method that is required by law to lower the risk of accidents happening. However, the effectiveness of the training approach in preventing falls and barriers to work implementation on-site remains unclear.

The literature review provides the foundation for this study by investigating previous research, theories, and frameworks related to OSH training in the construction industry. This study focuses on scaffolding, which still remains one of the most hazardous activities because of the high risk of falls from height. Therefore, a review of existing studies is important to understanding the training scope and design, delivery method, as well as the efficiency of the training program to mitigate accidents.

This chapter will investigate the key aspects relevant to the study, including an overview of previous falls from height accidents, legal and regulatory requirements, scaffolding standards, and the safety training program of the construction sector in Malaysia.

## 2.2 Overview of Occupational Safety and Health (OSH) management in the construction industry

The significance of the construction industry should not be evaluated solely based on its final products, as it comprises several organizations with a large workforce, both directly and indirectly involved, and also plays an important role in a nation's economy (Chi & Wu, 1997). Consequently, the aspect of OSH should not be ignored in the pursuit of finishing projects or improving the economy. The well-being and safety of relevant authorities involved in the construction process must be considered a top priority (Jaafar et al., 2017).

Jaafar et al. (2017) highlight that the construction industry is considered a unique, complicated, and dangerous workplace. Construction accidents arise from the distinctive characteristics of industry, such as temporary workforce, the needs of requirement to work at height, fluctuating hazards, and the intensely challenging physical and mental demand of the work involved. Besides, there are an excessive number of deaths caused by the construction industry. The OSH issues in the construction industry are a global concern in the context of the global market, rather than just being exclusive to any one country. Furthermore, the construction industry is now among the most hazardous in terms of safety due to the constant accidents and fatalities (Hinze, 2008).

In order to tackle the high fatality rate, which exceeds the industry standard, construction sites need to implement an efficient OSH management system. An effective safety management program could contribute to creating a safer working environment. (Aksorn & Hadikusumo, 2008). The unique traits and dynamics of the

construction industry contribute to challenges in enforcing safety regulations, as it has an exceptionally high injury rate compared to other industries (Hallowell and Gambatese, 2009). It is incorrect to assume that safety in construction is only significant during the construction stage. However, construction safety begins with the design phase and carries on through subsequent stages. Moreover, it was noted that developing an OSH safety program relies on factors such as economic aspects, regulation, and human consideration (Jaafar et al., 2017).

Furthermore, the project level and the organization level are the factors that affect the safety performance. This indicates that safety should be prioritized not just at the construction site but also should be addressed across the entire organization, engaging every person involved in the construction project. A safe workplace, safe procedures, and management leadership are crucial for a construction management program to succeed (Jaafar et al., 2017). An effective OSH management program and training are essential for reducing or eliminating accidents, which in turn enhances productivity and lowers medical costs. To decrease the ongoing fatalities and injuries in construction sites, it is crucial for the construction company to create and enforce a robust OSH management system and training program.

According to Jaafar et al. (2017), the Malaysia Standards for Occupational Safety and Health Management System (OSH MS) are divided into five essential stages. The first level is policy, which places a strong emphasis on both active employees' engagement and the development of established occupational safety and health policy. The second level is organizing, focusing on clearly defined responsibilities, accountability, and authority, which is supported by sufficient quality training, awareness programs, proper documentation, and efficient communication. The third level is planning and implementing. Organizations are expected to carry out preliminary evaluations, establish OSH objectives, conduct hazard identification, risk assessment, and risk control (HIRARC), and develop protocols for emergency preparedness, change management, procurement, and contracting. The fourth level is evaluation, which involves regular performance monitoring, incident investigations, and management reviews to assess the efficacy of the OSH management system. Lastly, the fifth level focuses on taking action for

improvement, emphasizing the need to implement corrective and preventative measures as well as a commitment to continuous enhancement of safety and health management systems.

### 2.2.1 Occupational Accident Statistics

**Table 2.1 Occupational Accident Statistics by Sector in Malaysia (January-October 2023)**

| **Sector** | **NPD** | **PD** | **Death** | **Total** |
|---|---|---|---|---|
| Agriculture, Forestry & Fishery | 1,020 | 25 | 19 | 1,064 |
| Mining & Quarrying | 22 | 2 | 1 | 25 |
| Manufacturing | 2,187 | 86 | 25 | 2,298 |
| Electricity, Gas, Water & Sanitary Services | 52 | 2 | 1 | 55 |
| Construction | 106 | 8 | 45 | 159 |
| Wholesale & Retail Trade | 520 | 16 | 7 | 543 |
| Hotel & Restaurant | 176 | 0 | 0 | 176 |
| Transport, Storage & Communication | 593 | 27 | 9 | 629 |
| Finance, Insurance, Real Estate & Business Services | 554 | 15 | 15 | 584 |
| Public Services & Statutory Authorities | 1,345 | 47 | 19 | 1,411 |
| **Total** | **6,575** | **235** | **141** | **6,951** |

According to DOSH (2023), the table presents occupational accident statistics by sector in Malaysia from January to October 2023, based on cases reported to the Department of Occupational Safety and Health (DOSH). Across all sectors, a total of 6,951 occupational accidents were recorded. Among these, 6,575 cases involved non-permanent disability (NPD), 235 cases resulted in permanent disability (PD), and there were 141 fatalities.

Although the total number of accidents in construction (159 cases) is lower compared to sectors like manufacturing or agriculture, it is particularly concerning due to the high number of fatalities, with 45 deaths reported (DOSH, 2023). This sector also recorded 8 permanent disabilities, indicating that accidents in construction are more likely to result in severe or fatal outcomes than in other sectors. The total fatality accident ratio in construction is the highest among all sectors, emphasizing the high-risk nature of construction work and highlighting the critical need for enhanced safety measures, strict compliance with occupational health standards, and effective training for workers.

**Table 2.2 Occupational Accident Statistics by State in Malaysia (January-October 2023)**

| **State** | **NPD** | **PD** | **Death** | **Total** |
|---|---|---|---|---|
| Johor | 1171 | 54 | 18 | 1243 |
| Kedah | 362 | 1 | 6 | 369 |
| Kelantan | 113 | 4 | 6 | 123 |
| Melaka | 379 | 5 | 2 | 386 |
| Negeri Sembilan | 398 | 10 | 7 | 415 |
| Pahang | 379 | 8 | 8 | 395 |
| Perak | 697 | 31 | 12 | 740 |
| Perlis | 11 | 0 | 1 | 12 |
| Pulau Pinang | 654 | 16 | 9 | 679 |
| Sabah | 299 | 19 | 15 | 333 |
| Sarawak | 311 | 18 | 11 | 340 |
| Selangor | 1408 | 60 | 27 | 1495 |
| Terengganu | 156 | 6 | 5 | 167 |
| WPKL | 227 | 3 | 13 | 243 |
| WP Labuan | 10 | 0 | 1 | 11 |
| **Total** | **6575** | **235** | **141** | **6951** |

Furthermore, statistics showed that Selangor had the highest number of occupational accident cases in Malaysia, from January to October 2023. Out of a

national total of 6,951 cases, Selangor alone accounted for 1,495, which represents approximately 21.5% of all reported incidents. The cases in Selangor include 1,408 non-permanent disabilities (NPD), 60 permanent disabilities (PD), and 27 deaths (DOSH, 2023).

## 2.3 Occupational Safety and Health Act 1944 (OSHA 1994)

The OSHA 1994 and the Factories and Machinery Act 1967 (FMA 1967) were two laws that were used to regulate the safety and health of workers in Malaysia. The FMA 1967 was repealed on 1 June 2024, and the OSHA 1994 was amended by the Occupational Safety and Health (Amendment) Act 2022.

Part IV General Duties of Employers and Self-Employed Person (Section 15-18):

- Every employer and self-employed person has a duty and responsibilities to ensure the safety, health, and welfare of their employees. This includes providing safe equipment and work procedures, ensuring materials are handled and stored properly, providing employees with the appropriate training and supervision, and maintaining a safe workplace, such as proper entrances, exits, and welfare facilities.

Part VI General Duties of Employees (Section 24):

- Every employee has responsibilities to ensure safety at work and is required to take reasonable precautions for their own safety and the safety of others who might be affected by their action. Employees must work with their employer to comply with the safety regulations, always wear personal protective clothing or equipment, and follow all safety guidelines and instructions set by the employer.

Part VII Safety and Health Organizations (Section 28-31):

- This part focuses on workplace safety structures and monitoring. It allows the Minister to require medical surveillance in any of the industries where work processes, substances, or conditions might risk the health of workers. (Section 28)

- Besides, a certified Safety Health Officer (SHO) is required to be employed by certain industries, whose primary responsibility is to ensure compliance with regulations and encourage safe work practices. (Section 29)
- Moreover, employers are required to set up a Safety and Health Committee in workplaces with 40 or more workers, or as instructed by the Director General. This committee provides a forum for collaboration between employers and workers in advancing safety. The committee's duties include evaluating safety protocols, looking into worker-reported workplace hazards, addressing safety concerns, and, if required, seeking government inspections. (Section 30-31)

### 2.3.1 Occupational Safety and Health (Amendment) Act 2022

It highlights the new duties and obligations on employers or principals, such as:

- Section S18A, principals are now tasked with ensuring the safety and well-being of contractors and their personnel working under the principal's guidance.
- Section S18B (1), every employer, self-employed person, or principal is required to perform risk assessments to identify potential risks or hazards that might be exposed to any individual who is in the workplace.
- Section S18B (2), employers or principals are required to implement risk control strategies and measures aimed at eliminating the risks associated with safety and health.
- Section S29A, employers that have five or more workers are required to appoint an employee to act as an occupational safety and health representative to manage workplace safety and health issues.
- Section S31A, the new duty to employers is to guarantee that certain categories of employees participate and complete an OSH training course.

## 2.4 Construction Industry Standard 15:2019 (Prevention of fall at construction site)

This standard was issued by CIDB Malaysia. It offers a comprehensive framework for the construction industry in preventing falls-related accidents and fatalities. The guideline serves as a reference to help employers, contractors, and workers establish a safer construction workplace through effective fall prevention strategies.

Scope (Section 1)

It sets out the essential requirements and recommended practices for minimizing fall hazards at construction sites. Its main objective is to provide a systematic guideline that ensures safe work at height through the adoption of preventive measures.

Duty Holder Responsibilities (Section 2)

It emphasizes that fall prevention is a shared responsibility, where clients are responsible for ensuring safe project design and management, designers are responsible for highlighting or eliminating fall hazards, contractors are responsible for implementing protective measures, training, and compliance in place, and workers must adhere to safe practices and instructions to protect themselves and others.

Managing Risk to Prevent Falls (Section 3)

It highlights the process of identifying hazards, evaluating risks, and implementing control measures, which must be regularly reviewed to manage fall risks. Moreover, it also highlights the importance of worker involvement and lists common fall hazards such as fragile surfaces, scaffolds, ladders, open edges, and floor or roof openings.

Risk Assessment (Section 4)

It emphasizes the need to perform a comprehensive risk assessment before any work at height. It provides detailed procedures for identifying potential hazards,

analysing the level of risk, and applying control measures to reduce the likelihood of falls.

Application of Physical Fall Prevention Measures (Section 5)

It provides detailed guidelines on the Level 1,2,3, and 4 controls, which include work on the ground and work from a solid construction, passive fall prevention devices such as temporary work platforms and scaffolds, work positioning systems such as travel restraint systems, and fall injury minimization systems such as catch platforms.

## 2.5 Construction Industry Standards 22: 2017 (Safe use of scaffolding in construction)

The FMA 1967 (Building Operations And Works of Engineering Construction – BOWEC) (Safety) Regulation 1986, the CIDB Act 520 (Amendment 2001), and the MS 1462 on scaffolding are the applicable requirements that are addressed in this CIS, which focuses on the safe way of using scaffolding for construction works. Besides, it highlights the responsibilities of the Professional Engineer for Temporary Works (PETW) on the design and supervision of the scaffolding works under the PETW responsibility, as well as the responsibility of the Designated Person of the contractor in the procurement, erection, maintenance, alteration, and dismantling of the scaffolding.

## 2.6 Guidelines for Approval of Design Scaffolding 2016

This guideline guides compliance with Regulation 75 of BOWEC 1986 regarding the approval, erection, and use of scaffolding at a height of 3 metres and above.

There are eleven types of installation or erection of scaffold under the BOWEC 1986, including Independent scaffold, Ladder jack scaffold, Outrigger

scaffold, Plasterers inside scaffold, Single line scaffold, Suspended scaffold or Slung scaffold, Swinging scaffold, Trestles scaffold, Window jack scaffold, Mobile scaffold or scaffold on wheels or skids, and Cantilever, jib, figure or bracket scaffold.

Under Regulation 75 (1) of BOWEC 1986, metal tube scaffold above 40 metres, and other scaffold that is above 15 metres, must be constructed in accordance with the design and drawings that are prepared by a Professional Engineer. Other metal tube scaffolding must have its approved design and drawings from the Chief Inspector. Besides, scaffolding members of steel tubing must comply with the standards BS 1139 / EN 74.

## 2.7 Scaffolding

Scaffolding is primarily used to support and assist in construction activities at elevated heights and in areas with restricted or difficult access. Furthermore, scaffolding is commonly used not only in the construction industry but also in various other fields such as building billboards, creating temporary event space, and renovation projects (Błazik-Borowa and Szer, 2015). This is due to the reason that scaffolding serves a variety of purposes; there is a chance that an unforeseen operation could result in unsafe and dangerous conditions and put workers in the scaffolding area at risk.

## 2.8 Factors Influencing Scaffolding Accident

### 2.8.1 Technical Factors

Technical problems that contribute to scaffold accidents include inadequate fall protection, an unstable foundation, failure at connection points, unsafe structure

design, overloaded scaffolding platforms, unskilled erectors, insecure or inadequate bracing, and material handling (Haslinda Abas et al., 2019).

The primary cause of the fatal accident at the construction site was the inadequate stability of the scaffolding. A scaffold may collapse for a few causes, including when the scaffold is positioned on an uneven surface or the base cannot support the weights of the scaffold (Hoła et al., 2017).

Besides, a fall from scaffolding accident in the Gaza Strip found that scaffolding failure was a result of inadequate components of scaffold support and guardrails. These two components directly affect the load-bearing capacity of the scaffolding and raise the possibility of failure happening. The strength of scaffolding support highly depends on the condition of the soil substrate, but it is usually placed on pavement or concrete. However, the surface must be properly levelled and compacted first if they are mounted directly on the ground. This is due to the reason that inadequate compaction of the ground substrate will weaken the support. While guardrails will create a dangerous situation and give workers a false sense of safety if they are not assembled correctly (Enshassi and Shakalaih, 2015).

Furthermore, another cause of scaffolding accidents is the unsafe design. This is because there was a lack of regulation, leading to no design for scaffolding in any building in the Gaza Strip. This shows that inaccurate design or scaffolding without a professional engineer's design can result in design failure and cause the scaffold to collapse. However, the Regulation 75 of BOWEC 1986 have sets the requirements for metal tube scaffolding that exceeding 40m and other types of scaffolding that exceeding 15m are required to be built in compliance with the design and drawings of Professional Engineers (Enshassi and Shakalaih, 2015).

### 2.8.2 Environment Factor

According to Enshassi and Shakalaih (2015), the setup of the plank is a crucial aspect of scaffolding, as it supports the temporary load. Numerous accidents related to scaffolding have been attributed to errors made during the assembly of the plank. If a scaffold plank is unstable, improperly secured, in bad condition, or overloaded, it can easily slip off and break.

Moreover, the various work environments and different natural phenomena like rain and wind can lead to unforeseen accidents on the job site. Prolonged exposure to direct sunlight can result in heat rashes, heat exhaustion, and heatstroke. This may result in more significant health problems and accidents, particularly for individuals working at elevated locations (Haslinda Abas et al., 2019). Besides, weather conditions like strong winds can result in the collapse of scaffolding, potentially causing severe injuries and even fatalities (Enshassi and Shakalaih, 2015).

### 2.8.3 Human Factors

According to Hamdan and Awang (2015), many project managers believe that all employees understand safety protocols on construction sites, but inspections found that most of them are new employees, lack safety knowledge, and lack training. Without providing proper training to the workers, it would be challenging for them to perform their duties effectively, leading to a rise in incidents of injuries and fatalities at construction sites (Hoła et al., 2017).

Furthermore, workers improperly use personal protective equipment (PPE) and do not put on the PPE at the construction site, putting themselves at higher risk of injuries and accidents. Since PPE is the key tool of injury prevention, it is crucial to ensure that the chosen equipment is dependable and efficient, utilized and maintained appropriately (Błazik-Borowa and Szer, 2015).

Besides, workers ignoring safety rules and regulations on construction sites is another serious cause of unwanted incidents, leading to severe injuries and jeopardizing the lives of workers. It is crucial to follow the safety regulations to prevent such incidents from happening (Hoła et al., 2017).

### 2.8.4 Organizational Factors

A lack of safe work procedures was also a frequent cause of fatal accidents related to scaffolding. Safe work procedures consist of standard methods for executing tasks within the workplace. It aims to minimize health and safety risks at work and to decrease the chances of injury by making sure that all employees adhere to safety guidelines while performing their assigned duties. This standard procedure will be most effective if it is clearly communicated to the workers, they are provided with the appropriate tools for the task, and they receive oversight from qualified individuals (Haslinda Abas et al., 2019).

According to Hoła et al. (2017), the lack of monitoring by site supervisors endangers the health and safety of workers at construction sites. Supervisors are tasked with managing daily duties at the workplace, and effective supervision helps in preventing accidents from occurring.

## 2.9 Safety training

A key element of a safety management system is safety training, which aims to raise knowledge of possible risk hazards. Therefore, comprehensive safety training is an essential element of every successful organization and its safety and health program. Safety training helps to improve employees' behaviour, skills, knowledge, and attitude. Aziz and Osman (2019) stated that the incidence of workplace accidents and injuries, particularly falls from heights, has been rising over the years in Malaysia.

Besides, the government has utilized rules and regulations to initiate the enforcement of OSH, as seen in Malaysia's OSHA 1994, revised in 2006. The revised emphasized the necessity of providing a list of tasks associated with high-risk hazards in order to acquire a certificate of practice from DOSH.

According to Goh et al. (2015), OSH training is an essential initiative aimed at reducing workplace accidents and improving the safety and health of workers in the construction sector by increasing the awareness and understanding of safety practices. To provide Safety and Health Induction for Construction Workers (SICW), commonly referred to as Green Card Training, CIDB, the governing body for the construction industry in Malaysia, has collaborated closely with the National Institute for Occupational Safety and Health (NIOSH).

OSHA stated that the goal of safety training is to ensure that workers can carry out their jobs safely by setting expectations for how they should perform job tasks (Goh et al., 2015). It has been predicted that safety training might raise workers' understanding of workplace safety and help in mitigating accidents, injuries, compensation costs, and medical costs. As a result, construction workers must receive sufficient training so that they can recognize and address the risks and hazards that are linked to their job and workplace.

While safety training is essential for every worker in the construction industry, it is important to highlight that SICW continues to be the only compulsory safety training recognized by Malaysia law since 1997. Due to the high cost required for training, it was also discovered that not all construction companies would offer their employees additional safety-related training, especially those small companies, which would become an extra high expense (Goh et al., 2015).

According to Bahari (2013), safety training has been considered the primary measure to prevent accidents and mitigate potentially dangerous situations. The reason for the first line of defence being considered is that some construction workers, such as SICW, might be the only safety training they received from their employers. SICW plays an important role and is not allowed to be ineffective in the

construction industry. Thus, it is crucial to make sure that this specific SICW is efficient in providing the workers with the required safety and awareness.

In Malaysia, before being permitted to enter construction sites, all workers involved in construction must complete the required safety training course (SICW). A green card serving as evidence of registration with CIDB will be issued after completing the training. Due to this reason, SICW training has been attended by an enormous number of construction workers in Malaysia, and more are going to attend in the future (Goh et al., 2015).

## 2.10 Green Card Program

Safety and Health Induction for Construction Worker (SICW) by CIDB

CIDB organizes and regulates the safety training program, which is known as the SICW or Green Card program. In 1997, the green card was regarded as a vital credential for entering the construction site. This also means that it is a must for all workers who work on the construction site (Goh et al., 2015). Therefore, construction workers are required to register and attend one day of the SICW course to get a green card before entering the construction site. A NIOSH-registered SICW trainer will conduct the training in a classroom. The goals of this program include ensuring that construction workers recognize the significance of a safe and healthy work environment, informing them about the legal safety and health obligations, and providing essential knowledge regarding safety and health on the construction site (Wahab et al., 2023). All participants can get a safety helmet and a CIDB Green Card upon completion of the training. The individual who is the owner of this Green Card, which is renewed every two years, covers the insurance. The construction site is defined under FMA67 Section 2. Moreover, the main contractor is responsible for implementing the green card program at their site.

According to Goh et al. (2015), the mission of SICW is to prevent workplace accidents from occurring by educating employees about safety knowledge, raising

awareness, and helping them to develop safe work behaviour. In an effort to improve employees' safety attitudes and behaviours at work, safety training has been implemented. SICW assists the employees to gain on-site safety knowledge, improving their skills, fostering a positive attitude or mindset, and becoming more capable in carrying out their duties regarding safety and health. Additionally, insurance benefits will be offered to persons who attended the green card training by SICW. Those who complete will receive a green card, which is an identity card issued by the Construction Industry Development Board (CIDB). A special insurance plan will cover the green card holders automatically to ensure the construction workers are protected against death and accidents. For instance, if the green card holder passes away due to an accident on site, Takaful National will payout an amount of RM 21,500.00 in insurance compensation to the family members of the deceased.

Training Module

The training module is purposely designed for construction workers by NIOSH. The training module is straightforward to understand because construction workers come from different backgrounds, from those who are illiterate to highly skilled professionals such as engineers. To accomplish this, fewer words are written, and more pictures are shown in the contents of presentations.

The criteria used in the program are slightly the same as the training guidelines for construction workers, including those from the Safety Association of Ontario (1993), International Labour Office (1995), and the Construction Industry Training Board (1996). According to Goh et al. (2015), the module consists of six topics, which include OSHA 1994, cleanliness and housekeeping, five preventions, electrical hazards, transportation and mobile plant safety, excavation, roof work, working on live roads, chemical hazards, working at heights, and personal protective equipment. This training module is being utilized by CIDB for safety training in the Green Card Program.

Training Method

The training is conducted and delivered by a qualified trainer in a classroom setting. The training session takes seven hours a day. The maximum number of participants is forty, and attendance is required and recorded for the whole session. Besides, there is no assessment required if the entire session is completed. As evidence of attendance, the signature of each participant will be collected and given to the CIDB office. However, for those who fail to complete the course, the session will be considered as not attending the course. The Green Card will only be awarded to the person who has completed the program.

Program Effectiveness

Since its establishment in 1997, the Green Card Program has received positive feedback from the construction industry. CIDB has taken a commendable initiative due to the reason that encourages the construction industry to engage in the Green Card Program, which includes various incentives like low cost, insurance benefits, a safety helmet, and a handbook. To increase the availability of certified trainers who can provide or coordinate safety and health inductions for the construction community. This program is considered one of Malaysia's most effective safety and health initiatives in terms of response rates.

Program Challenges

It is challenging to make sure the participants are receiving safety and health information effectively in the absence of any assessment. This is due to the reason that there is no specific tool available to measure the knowledge gain of participants. The training is important, but some may complete the entire induction session without fully engaging with the training. However, it is difficult to make a systematic analytical strategy to enhance the efficiency of SICW without a good training assessment, which leaves information about the training effectiveness unclear. An evaluation of the training is necessary to determine if participants have achieved the learning outcome. (Kraiger et al., 1993).

## 2.11 Problems in Safety Practices Faced on Site

The attitude of a worker is the primary concern regarding the safety issue at a construction site. According to Krishnamurthy (2025), it was found that because of ignorance, carelessness, recklessness, and overconfidence, most of the workers who work on the construction site do not wear Personal Protective Equipment (PPE) in a proper way, and some do not wear it. Besides, construction workers in India and Taiwan have a low level of safety awareness on site (Mahalingam & Levitt, 2007). For instance, the workers did not wear safety shoes and a safety helmet during construction work.

According to Keng and Razak (2014), although safety measures have been put in place at the construction site, there are still areas that require enhancement. The case studies revealed that both the workers and the management team lack sufficient safety awareness. For example, some workers chose not to wear safety helmets while carrying out their tasks on site, as they found them uncomfortable.

Consequently, employees often utilize faulty equipment or tools that are at hand, as long as they allow them to finish their tasks more quickly. Nevertheless, there are occasions when workers improperly use these tools, indicating that they are disregarding the provided tool guidelines and the work procedures mandated by safety rules and regulations, which raises the likelihood of accidents occurring.

Moreover, despite issues arising on-site from the workers, the management team fails to take prompt action against those who disregard safety regulations, indicating a lack of safety awareness within the management. Additionally, the language barriers between the supervisors and workers contribute to the challenges in maintaining safety practices. This is because most of the construction workers are from Indonesia, Bangladesh, and Myanmar, and supervisors face problems to communicate with workers (Keng & Razak, 2014).

# CHAPTER 3

# METHODOLOGY

## 3.1 Introduction

This chapter outlines the research methodology adopted to achieve the objectives of this study, which focuses on assessing the effectiveness of OSH training in reducing fall-from-height incidents among scaffolding workers in Malaysia. The chapter explains the research design, data collection methods, target population, sampling strategy, and data analysis techniques used. Since the study investigates both the content and delivery of training programs, as well as barriers to on-site implementation, a qualitative approach is employed to capture rich, in-depth insights from participants who are directly involved in scaffolding operations.

## 3.2 Research Approach

This research adopts a qualitative methodology to enhance understanding of the effectiveness of Occupational Safety and Health (OSH) training in reducing fall-from-height incidents among scaffolding workers in the Malaysia construction industry. To achieve this objective, it is essential to examine not only the content and delivery of safety training but also how it is applied on-site, and to identify the key barriers that affect its implementation.

The study employs a case study approach, which is widely recognized for its effectiveness in qualitative research (Seale et al., 2004). This approach allows for an in-depth investigation of safety training practices and on-site behaviours within a real construction project. By focusing on a specific construction site, the research can capture detailed and context-specific insights into the relationship between training, worker compliance, and actual safety performance, particularly in scaffolding works where fall hazards are prevalent.

In addition to the case study approach, the research utilizes semi-structured interviews and on-site observations as the primary data collection methods. Interviews are conducted using hardcopy questionnaires and face-to-face interactions with key stakeholders, including scaffolding workers, safety officers, and site managers. This helps to gather comprehensive insights into training experiences, understanding levels, and challenges faced in complying with safety practices.

Complementing the interviews, direct on-site observations are carried out using a structured checklist to evaluate actual safety conditions and workers' behaviours, such as the use of personal protective equipment (PPE), proper scaffolding practices, and adherence to fall prevention measures. This method is particularly important in identifying discrepancies between reported practices and actual on-site conditions.

By integrating both interviews and observations, the study achieves data triangulation, allowing for a more comprehensive and reliable analysis. Overall, the research approach supports the study objectives by providing in-depth insights into the effectiveness of current OSH training, the level of on-site safety compliance, and the key barriers affecting its practical implementation among scaffolding workers. This approach is crucial for documenting the precise conditions of construction site safety, which may not be accurately stated in official documents or reports.

## 3.3 Sampling Strategy

The study adopts a purposive sampling strategy, a non-probability sampling method, to select participants who possess direct knowledge and experience related to scaffolding safety and Occupational Safety and Health (OSH) training. The target population consists of individuals actively involved in construction site operations, specifically scaffolding workers, safety officers, and site managers. These groups are selected as they represent different levels of responsibility in the implementation, supervision, and compliance of safety practices on-site.

The study is conducted using a case study approach focusing on a single construction site. Although three construction sites located in Selangor were initially approached, only one site granted access due to confidentiality and privacy restrictions imposed by the respective companies. Selangor was selected as the study area because recent industry statistics indicate that fall-from-height incidents are among the highest in this state, making it a relevant context for this research.

The selected case study site is located in Puchong and involves a landed residential development project consisting of 86 housing units undertaken by the main contractor (referred to as Company A for confidentiality purposes). At the time of data collection, the project had completed structural works and was in the building stage, involving multiple trades such as bricklaying, plastering, and painting. These activities require the frequent use of scaffolding, making the site highly suitable for investigating fall-from-height risks and the effectiveness of related safety training.

Due to time limitations by Company A, there were 21 respondents selected for this study, which consisted of 15 scaffolding workers, 3 safety officers, and 3 site managers. The selection of participants was based on their direct involvement in scaffolding-related work and safety management, ensuring that the data collected are rich, relevant, and aligned with the research objectives. Furthermore, the inclusion of multiple respondent groups allows for data triangulation, enhancing the reliability and credibility of the findings by capturing perspectives from different roles within the construction site.

Overall, purposive sampling combined with a focused case study approach ensures that the data collected are sufficiently detailed and context-specific, enabling a comprehensive evaluation of OSH training effectiveness and the identification of practical barriers to its implementation.

## 3.4 Data Collection Method

Data for this study were collected using a combination of semi-structured interviews and direct on-site observations. Semi-structured interviews allow participants to provide detailed responses while enabling the researcher to probe deeper into specific topics such as training content, delivery methods, and perceived challenges. Different sets of questions are prepared for scaffolding workers, safety officers, and site managers to capture their unique perspectives. On-site observations complement the interviews by providing real-time insights into actual work practices, the application of training, and safety compliance at construction sites. This combination of methods ensures triangulation, enhancing the reliability and validity of the findings.

### 3.4.1 Semi-Structured Interviews

Semi-structured interviews were selected to collect in-depth data while allowing flexibility to probe participants' responses. The interviews were conducted face-to-face at the selected construction site using a set of prepared questions focusing on safety training, understanding, compliance, and implementation challenges related to scaffolding works. Participants included scaffolding workers, safety officers, and site managers. Responses were recorded manually during the sessions, and confidentiality was maintained with the use of pseudonyms.

Several challenges were encountered during the interviews. Some workers were unable to read or write due to their educational background and language barriers. Therefore, the interviews were conducted verbally, explained questions in simple terms, and recorded the responses on their behalf. In addition, time constraints on-site limited the duration of interviews, so sessions were kept brief and conducted during suitable periods such as breaks. Initial hesitation from participants was managed by assuring confidentiality and clarifying that the study was for academic purposes only. Overall, this method enabled the collection of relevant and reliable data despite on-site constraints.

Interview Questions by Group:

1) Scaffolding Workers (Focus: Training experience, daily practices, compliance challenges)

**Table 3.1 Interview Questionnaire for Scaffolding Workers**

| | |
|---|---|
| i) | Can you describe the safety training you have received related to scaffolding or working at height? |
| ii) | How is the training usually conducted? (For example: classroom training, on-site demonstrations, or during toolbox meetings) |
| iii) | Is the training easy to understand and helpful in your daily work? Please explain |
| iv) | In your daily work, do you apply the safety knowledge you have learned? |
| v) | What difficulties do you face in complying with all safety procedures while working on scaffolding? |
| vi) | Do supervisors or safety officers frequently remind workers about safety? How do they do it? |
| vii) | Have you ever experienced time pressure or workload that makes it difficult to follow all safety procedures? |
| viii) | In your opinion, what improvements can be made to make safety training more effective for scaffolding workers? |

2) Safety Officers (Focus: Monitoring, compliance, adequacy of training, observed gaps)

**Table 3.2 Interview Questionnaire for Safety Officers**

| | |
|---|---|
| i) | What types of OSH training are usually provided to scaffolding workers in this company? |
| ii) | In your opinion, is the current training content sufficient to reduce fall-from-height accidents? Please explain. |
| iii) | How do you monitor whether workers apply the safety knowledge learned during training? |
| iv) | What are the most common safety violations committed by scaffolding workers? |
| v) | What are the main challenges in ensuring workers comply with safety procedures? |
| vi) | To what extent does management support the provision of resources such as time, budget, or manpower for safety training? |
| vii) | In your opinion, what improvements can be made to enhance the effectiveness of safety training? |

3) Site Managers (Focus: Policy, management, resource allocation, implementation barriers)

**Table 3.3 Interview Questionnaire for Site Managers**

| | |
|---|---|
| i) | What types of safety training programs are provided for scaffolding workers in this company? |
| ii) | How does the company determine the appropriate training methods (e.g., classroom training, practical demonstrations, or toolbox meetings)? |
| iii) | How does the company evaluate the effectiveness of the safety training? |
| iv) | What are the main challenges in implementing safety training programs on-site? (e.g., cost, time constraints, or worker turnover) |
| v) | In your opinion, what are the main barriers affecting workers' compliance |

| | |
|---|---|
| | with safety procedures on-site? |
| vi) | How does management ensure that safety officers and supervisors consistently enforce safety procedures? |
| vii) | What additional measures can be introduced to reduce the risk of falls from height during scaffolding work? |

### 3.4.2 On-Site Observation

The data were collected through direct on-site observation, documenting worker behaviour and environmental conditions. Evidence, including photographs and written notes, was gathered during site visits (Appendix A). By engaging with scaffolding workers, safety officers, and site managers and participating as an observer, insights were captured into safety practices. To protect the identities of the construction company involved, no specific site or corporation is intentionally targeted in this study. Instead, the company anonymized using an alternative name: Company A.

Observation Checklist:

1. Use of PPE – helmets, harnesses, safety shoes, gloves.
2. Scaffolding Setup & Usage – proper installation, presence of guardrails/toe boards, safe access.
3. Work Practices – tie-off usage, material handling, safe distance from edges.
4. Supervision & Monitoring – presence of safety officers, toolbox talks, enforcement actions.
5. Behaviour & Attitude – compliance with safety rules, risky shortcuts, teamwork in safety.
6. Work Environment – site signage, condition of scaffolding materials, housekeeping.

## 3.5 Target Population

The target population for this study comprises individuals directly involved in construction site safety management and scaffolding operations. Including:

1) **Scaffolding workers**, who face direct risks of falls and are the primary beneficiaries of OSH training.
2) **Safety officers**, who responsible for monitoring safety compliance.
3) **Site managers**, who oversee operations and ensure adherence to regulations.

A sample size of approximately 15–20 scaffolding workers, 3–5 safety officers, and site managers was considered sufficient for this study, as qualitative research prioritises data depth over numerical representation. These participants provide diverse yet complementary insights into the effectiveness of OSH training and its on-site application.

## 3.6 Data Analysis Method

The collected qualitative data are analysed using thematic analysis, which involves identifying, coding, and categorizing patterns and themes within interview transcripts and observation notes. Thematic analysis allows the researcher to systematically interpret the data, revealing insights into training effectiveness, compliance levels, and implementation barriers. Observational data are used to validate interview findings, ensuring a comprehensive understanding of real-world practices. The process includes transcription of interviews, coding responses according to relevant themes, grouping codes into categories aligned with research objectives, and interpreting the results to develop practical recommendations for improving OSH training delivery and on-site implementation.

## 3.7 Chapter Summary

This chapter has presented the methodology used to investigate the effectiveness of OSH training and the barriers to its on-site implementation among scaffolding workers in Malaysia. The study adopts a qualitative approach, employing semi-structured interviews and on-site observations with purposively selected participants, including scaffolding workers, safety officers, and site managers. Thematic analysis is used to interpret the collected data, providing insights into training content, delivery methods, compliance levels, and practical challenges. The methodology is designed to ensure the findings are rich, contextual, and directly relevant to the objectives of the study, laying a solid foundation for the analysis presented in the subsequent chapters**.**

# CHAPTER 4

# RESULTS AND DISCUSSIONS

## 4.1 Introduction

This chapter elaborates and discusses the results and analysis of findings obtained from interviews and on-site observations conducted at a construction site in Selangor, Malaysia. A series of interviews was carried out involving scaffolding workers, safety officers, and site managers to gather insights into safety training practices, level of understanding, and challenges in implementing safety measures related to working at height. The interview questions were prepared in hardcopy form and administered directly on site, while responses were recorded immediately during the interview sessions to ensure accuracy and completeness of data.

In addition to interviews, on-site observations were conducted to examine actual working conditions, worker behaviour, and compliance with scaffolding safety requirements. The findings from both interviews and observations are integrated and analysed to provide a more comprehensive understanding of the effectiveness of Occupational Safety and Health (OSH) training and its practical implementation on site.

The analysis was organised into key themes, including safety training and understanding, compliance with safety practices, monitoring and supervision, and

barriers to effective implementation. These themes were aligned with the study's objectives of assessing the effectiveness of OSH training in reducing fall-from-height incidents among scaffolding workers and identifying the challenges faced in ensuring proper safety compliance on construction sites.

## 4.2 Interview Results

### 4.2.1 Interviewee Demographics

**Table 4.1 Interviewee Demographics**

| Category | Works | No. interviewees | Nationality | Years of Experience |
|---|---|---|---|---|
| **Scaffolding Workers** | Bricklaying work | 5 | Bangladesh, Indonesia, Myanmar, Nepal | 2 - 6years |
| | Plastering work | 5 | | |
| | Painting work | 5 | | |
| **Safety Officers** | | 3 | Malaysia | 5 - 7years |
| **Site Managers** | | 3 | Malaysia | 10 – 15years |

### 4.2.2 Interview Analysis

**Table 4.2 Interview Analysis of Safety Training Content and Delivery Method on all interviewee (n=21)**

| Safety Training | Summary |
|---|---|
| Training Content | • Work at height safety<br>• Proper use of harness<br>• Scaffolding Standard (structure & usage)<br>• Hazard awareness & risk identification |
| Delivery Method | • Lecture & practical session<br>• Safety induction before work<br>• Toolbox meetings |

**Table 4.3 Interview Analysis on 15 Scaffolding Workers (*n*=15)**

| Aspect | Key Findings | *n*=15 | Interpretation |
|---|---|---|---|
| Safety training received | Not all workers attended training | 13 | Some did not received training |
| Understanding of training | Some unclear due to language/fast delivery | 11 | Communication barrier exists |
| Do not fully comply with safety | Workers admit not fully comply | 13 | Major gap in practice |
| Time pressure / rushing | Workers rushing to meet deadlines | 13 | Main cause of unsafe behaviour |

| Aspect | Key Findings | *n*=15 | Interpretation |
|---|---|---|---|
| Uncomfortable PPE (harness) | Restricts movement | 12 | Reduce compliance |
| Insufficient equipment | Insufficient PPE | 9 | Resource limitation |
| Lack of safety officer reminders | Lack of safety officer reminder on site | 12 | Enforcement inconsistent |

**Table 4.4 Interview Analysis on 3 Safety Officers and 3 Site Managers (*n*=6)**

| Aspect | Key Findings | Interpretation |
|---|---|---|
| Safety training provided | Safety induction, toolbox meeting, practical demonstrations | Standard training system |
| Training NOT fully effective | Cannot fully prevent fall incidents | Gap between theory & actual practice |
| Monitoring & inspection | Daily site observation and PPE checks | Enforcement exists but limited effectiveness |
| Common safety violations | No use of safety helmet, harness, rushing work, improper use of scaffold | Frequent non-compliance |
| Challenges: Time pressure | Workers rushing to meet deadlines | Main cause of worker's unsafe behaviour |

| Aspect | Key Findings | Interpretation |
|---|---|---|
| Barriers: Worker's behaviour | Not comfortable and restricts movement when wearing PPE, affect productivity | Main barriers on site |
| Limited management support | Insufficient PPE, budget and time constraints | Safety not always priority |
| Suggested improvements | Practical training, better PPE, stricter enforcement, better planning | Need spend more and prioritize safety |

### 4.2.3 Safety Training Content and Delivery Method (n=21)

Based on the responses from all 21 interviewees, the findings indicate that safety training provided on site generally covers essential areas related to scaffolding work. The training content mainly focuses on work-at-height safety, proper use of safety harnesses, scaffolding standards including both structure and usage, as well as hazard awareness and risk identification. In terms of delivery, the training is conducted through a combination of lecture-based sessions and practical demonstrations to enhance understanding. In addition, all workers undergo safety induction before commencing work, while regular toolbox meetings are carried out to reinforce safety practices on site. Overall, this suggests that a structured and comprehensive safety training system is implemented across the site.

### 4.2.4 Safety Training, Understanding, and Compliance of Scaffolding Workers (n=15)

The results showed that even though the majority of workers (13 out of 15 respondents) have attended safety training, there are still a gaps in both understanding and practical application. Furthermore, due to language problems and quick delivery techniques, a significant proportion of workers (11 respondents), especially foreign workers, reported having trouble fully understanding the training. As a result, although training has been provided, it is not fully effective in ensuring safe behaviour. This is further supported by the fact that 13 respondents admitted they do not fully comply with safety practices on site. This combined result shows a critical issue where training does not translate into actual compliance, demonstrating a clear gap between knowledge acquisition and on-site implementation.

### 4.2.5 Factors Influencing Unsafe Behaviour On-Site (n=15)

Several key factors contribute to unsafe practices among scaffolding workers. The results showed that the majority of respondents (13) reported time pressure and rushing to meet project deadlines, which leads them to prioritize spending and productivity over safety. In addition, 12 respondents stated that personal protective equipment (PPE), particularly safety harnesses, is uncomfortable and restricts movement, reducing their willingness to use them consistently. Workers choose convenience over safety when performing tasks at height. Besides, 9 respondents highlighted insufficient PPE and equipment, making compliance difficult even when workers are aware of safety requirements. This indicates a resource limitation issue. Lastly, 12 respondents stated that safety officers do not consistently remind workers about safety practices. This reflects inconsistent enforcement, which reduces the effectiveness of safety policies on-site. In conclusion, these factors demonstrate that unsafe behaviour is not caused by a single issue, but rather a combination of time

constraints, discomfort, limited resources, and inconsistent supervision, all of which significantly reduce overall safety compliance.

### 4.2.6 Safety Training Implementation and Effectiveness by Safety Officer and Site Manager (n=6)

The results showed that safety officers and site managers have established a structured safety system on site, which includes safety induction, toolbox meetings, and practical demonstrations. In addition, daily monitoring and inspections, such as PPE checks and site observations, are consistently carried out to ensure compliance. However, despite these efforts, respondents admitted that training is not fully effective in preventing fall-from-height incidents. This indicates that while both training and enforcement mechanisms are present, there remains a gap between safety procedures and actual worker behaviour on site, indicating the practical efficacy of current safety management practices is limited.

### 4.2.7 Observed Safety Issues, Challenges, and Implementation Barriers (n=6)

The respondents identified several recurring safety issues and barriers affecting site safety performance. Common violations include failure to wear safety helmets and harnesses, rushing work, and improper use of scaffolding, reflecting frequent non-compliance among workers. A major challenge highlighted is time pressure, where workers rush to meet tight project deadlines, leading to unsafe practices. In terms of behavioural barriers, workers often find PPE uncomfortable and restrictive, which discourages consistent usage and affects productivity. Furthermore, respondents pointed out limited management support, including insufficient PPE provision, budget constraints, and a lack of time allocated for safety practices. These combined factors demonstrate that safety issues on site are influenced by a mix of worker

behaviour, project constraints, and organisational limitations, eventually limiting effective safety implementation.

## 4.3 Summary of Interview Analysis

The interview findings reveal that although a structured safety training system is implemented on site, its effectiveness remains limited. Most scaffolding workers have attended training, while not all have. However, issues such as language barriers and unclear delivery methods reduce their understanding, resulting in low compliance with safety practices. This highlights a significant gap between safety knowledge and actual on-site behaviour.

In addition, several key factors contribute to unsafe practices. Time pressure and rushing to meet deadlines are identified as the main causes, leading workers to prioritize productivity over safety. Other contributing factors include uncomfortable PPE (such as harnesses), insufficient safety equipment, and inconsistent supervision or reminders from safety officers, all of which reduce compliance levels.

Moreover, from the perspective of safety officers and site managers, although training, monitoring, and inspections are regularly conducted, they are not sufficient to fully prevent safety violations. Common issues such as failure to use PPE, improper scaffold usage, and rushing work continue to occur. Furthermore, wider issues such as worker attitudes, resource limitations, and limited management support (budget, time, and equipment) further obstruct effective safety implementation.

Overall, the findings indicate that the main issue is not the absence of safety systems, but workers' poor implementation of these systems on site, influenced by behavioural, operational, and organisational constraints.

## 4.3 Observation Results

**Table 4.5 On-site Observation Results (n=15) & (n=3) (photos can be found in Appendix A)**

| No | Observation Aspect | Compliant (No.) | Remarks |
|---|---|---|---|
| **A. Personal Protective Equipment (PPE)** | | | Observation: (B1, B2, B3, PA1, PA2, PA3, PA1, PA2) |
| 1 | Workers wear safety helmets | 14 | Only few not wear helmets |
| 2 | Workers wear safety shoes | 2 | Mostly wear rubber boots |
| 3 | Workers wear safety harness when work at height | 2 | Mostly wear safety vest |
| 4 | PPE is used correctly and consistently | 0 | Incomplete PPE used |
| **B. Scaffolding Structure Safety** | | | Observation: (S1, S2, S3, S4) |
| 5 | Scaffolding platform is stable and installed properly | 10 | Bricklaying scaffolds were not erected properly |

| | | | |
|---|---|---|---|
| 6 | Scaffolding is in good condition (no corrosion) | 0 | All poor in condition and corrosion |
| 7 | Safe access provided (ladder/stair access) | 10 | Some scaffolds did not have proper ladders, workers just climb |
| 8 | Scaffolding platform not overloaded with materials | 11 | Bricklaying scaffolds overloaded with bricks |
| **C. Worker Safety Behaviour** | | | |
| 9 | Workers access scaffolding safely | 10 | Unsafe access observed: ladders missing, workers climbed directly |
| 10 | Workers follow safety procedures during work | 0 | Not all workers were fully compliant |
| 11 | Workers demonstrate awareness of safety hazards | 0 | Some workers lacked safety awareness and focused on working quickly |
| **D. Safety Supervision** | | | |
| 12 | Safety officer present on site | 3 | Not frequent |
| 13 | Supervisors remind workers about safety procedures | 3 | Sometimes given, but workers often ignore after supervisor leaves |
| 14 | Toolbox meeting or safety briefing conducted | 3 | Only conducted once per week |
| **E. Site Environment** | | | |

| | | | |
|---|---|---|---|
| **and Conditions** | | | |
| 15 | Ground/foundation for scaffolding is stable | 15 | Ground stability was satisfactory in all observed areas |
| 16 | Work area around scaffolding is clean and organized | 8 | Several bricklaying and plastering areas were messy due to cement paste |

### 4.3.1 Summary of Observation Results

Firstly, the observation results showed that the overall safety compliance on site is generally low, particularly in relation to PPE usage, scaffolding conditions, and worker safety behaviour. While basic PPE, such as safety helmets, recorded a high compliance rate (14 out of 15 workers), other critical protective equipment showed very poor compliance. Only 2 workers wore proper safety shoes, with most using rubber boots, and similarly, only 2 workers used safety harnesses when working at height, with many relying only on safety vests. More critically, none of the workers used PPE correctly and consistently, indicating that although some equipment is present, it is not properly applied in practice.

Secondly, results for scaffolding structure safety show moderate but inconsistent compliance. A total of 10 observations in plastering work and painting work show that scaffolding platforms were stable and properly installed. However, issues were still found, particularly for scaffolds in bricklaying works that were not erected correctly. Furthermore, a major concern is that all scaffolding components were in poor condition with signs of corrosion, representing a significant structural risk. Although observations carried out found that safe access, such as ladders, was provided, there are still some scaffolds that lacked proper access, leading workers to

climb unsafely. Additionally, 11 observations showed no overloading, but some bricklaying scaffolds still had excessive material loads.

Thirdly, worker safety behaviour further reflects the weak implementation of safety practices. Although 10 workers accessed scaffolding safely, unsafe practices were still observed when proper access was unavailable. More importantly, none of the workers were fully compliant with safety procedures, and all were assessed as lacking adequate awareness of safety hazards, as many prioritised completing work quickly over following safe practices. This suggests that safety knowledge is either insufficient or not effectively translated into actual behaviour on site.

Fourthly, for the safety supervision on site, observations found that safety officers were present on site but not continuously available throughout working hours. They were sometimes in the office or attending to other duties and, therefore, unable to monitor all workers at the same time. Besides, supervisors sometimes remind workers about safety procedures, but sometimes choose to ignore, not to remind them. This is due to the reason that workers often ignore after the supervisor leaves. Moreover, safety briefings were conducted once per week, which may not be sufficient to reinforce safety awareness consistently.

Lastly, the site environment and conditions show generally acceptable but still imperfect performance. The ground stability for scaffolding was satisfactory in all 15 observations, indicating that foundational support is not a major issue. However, housekeeping was only moderately maintained, with 8 compliant observations, while several bricklaying and plastering areas were found to be messy due to cement paste and poor organization.

Overall, the findings highlight that while certain basic safety measures are present. However, there are significant gaps in proper PPE usage, scaffolding condition, worker behaviour, and supervision effectiveness, which collectively increase the risk of accidents, particularly fall-from-height incidents on site.

# CHAPTER 5

# CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusion

This study set out to assess the effectiveness of OSH training approaches in reducing fall-from-height incidents among scaffolding workers, while also identifying on-site implementation barriers. Based on the findings from both the conducted interview analysis and on-site observations, it can be concluded that although safety training systems and regulatory frameworks such as CIDB Malaysia guidelines and the Occupational Safety and Health Act 1994 requirements are in place, their effectiveness in practice remains limited.

The results showed that most workers have received some form of safety training. However, the training is not fully effective in influencing actual behaviour on site. Issues such as language barriers, limited understanding, and inadequate training delivery methods reduce the ability of workers to apply safety knowledge in real working conditions. This has resulted in a clear gap between safety knowledge and on-site compliance.

Furthermore, the study identified several key barriers affecting safety implementation, including time pressure, uncomfortable PPE, insufficient equipment, inconsistent supervision, and limited management support. These factors collectively contribute to unsafe practices, where workers tend to prioritise productivity over safety. The observation findings strongly support this, disclose low compliance in

PPE usage, poor scaffolding conditions, unsafe worker behaviour, and ineffective supervision.

Overall, the study concluded that the main challenge is not the absence of safety systems, but the weak implementation and enforcement of these systems on-site. The effectiveness of OSH training is significantly influenced by behavioural, operational, and organisational constraints, which must be addressed to improve safety outcomes and reduce fall-from-height incidents in the construction industry.

## 5.2 Recommendations

Based on the findings of this study, several recommendations are proposed to improve the effectiveness of Occupational Safety and Health (OSH) training and enhance scaffolding safety practices among construction workers in Malaysia.

Firstly, the delivery method of safety training should be reinforced to ensure that workers fully understand and apply safety knowledge on site. Since many scaffolding workers in Malaysia are foreign workers, multilingual training approaches should be implemented by using languages commonly understood by workers, such as Bahasa Melayu, Bengali, Myanmar, and Nepali. Training should also focus more on practical and visual-based learning methods, including on-site demonstrations, videos, illustrations, and toolbox meetings, instead of relying heavily on classroom-based theoretical sessions. Effective communication and practical safety training significantly improve workers' understanding and safety compliance on construction sites (Lingard, 2004). Moreover, hands-on and demonstration-based safety training is more effective in improving safe work behaviour among construction workers compared to lecture-based methods (Kaskutas et al., 2009). Therefore, improving the delivery method of OSH training can help reduce misunderstandings and increase workers' ability to apply safety practices during scaffolding work.

Secondly, supervision and monitoring systems should be strengthened through the employment of Certified Scaffolding Safety Officers or competent scaffold supervisors to continuously monitor scaffolding activities on site. The findings of this study revealed that inconsistent supervision contributes to unsafe practices such as improper PPE usage, unsafe climbing behaviour, and overloading of scaffolding platforms. Certified safety personnel should conduct regular inspections, provide immediate corrective actions, and continuously remind workers regarding safe working procedures. According to Tam and Fung (2011), active supervision and frequent monitoring play an important role in improving workers' compliance with safety regulations in construction projects. Furthermore, the Construction Industry Development Board (CIDB) Malaysia emphasises that competent supervision is essential in ensuring scaffolding structures are erected, maintained, and used safely in accordance with CIS 22:2021 standards. Therefore, strengthening supervision can help reduce unsafe behaviour and improve overall site safety performance.

Thirdly, a stricter enforcement system should be implemented to improve workers' compliance with safety procedures on construction sites. Construction companies should apply a structured disciplinary system, such as verbal warning, financial penalties, and temporary work suspension for workers who repeatedly violate safety regulations. Strict enforcement is necessary because some workers tend to ignore safety procedures due to rushing work, carelessness, or discomfort when using PPE. According to Choudhry and Fang (2008), weak enforcement and poor safety discipline are major contributors to unsafe behaviour among construction workers. Therefore, enforcement measures and management commitment are important factors in improving workers' safety compliance and reducing unsafe acts on site. In addition, regular safety inspections and immediate corrective actions should be implemented to ensure continuous compliance with safety requirements. CIDB Malaysia also emphasises that strict compliance and enforcement are necessary to ensure safer construction practices and reduce workplace accidents in the industry.

In addition, the construction industry should adopt Smart Personal Protective Equipment (Smart PPE) technologies, such as safety helmets and safety harnesses equipped with sensors. Smart PPE can detect whether workers are wearing PPE properly and can monitor workers' movement, position, and fall risks in real time. For example, smart harness sensors can automatically alert supervisors when workers fail to attach safety harnesses correctly or enter high-risk zones without protection. According to Fang et al. (2018), wearable safety technologies have significant potential in improving hazard detection and reducing workplace accidents in the construction industry. The implementation of Smart PPE can enhance real-time safety monitoring and provide early warning systems to prevent fall-from-height accidents among scaffolding workers.

Furthermore, AI CCTV monitoring systems should be implemented to detect unsafe worker behaviour and unsafe site conditions automatically. Artificial Intelligence (AI)-based surveillance systems can identify safety violations such as workers not wearing helmets or harnesses, unsafe climbing activities, and dangerous scaffold conditions. These systems can provide immediate alerts to safety officers for quick intervention before accidents occur. According to Ding et al. (2018), AI and computer vision technologies can significantly improve construction safety management by enabling automated safety monitoring and hazard detection. Moreover, AI-based monitoring systems help reduce reliance on manual supervision and improve the effectiveness of safety enforcement on construction sites (Zhang et al., 2015). Therefore, integrating AI CCTV systems into construction projects can improve continuous monitoring and strengthen preventive safety measures.

In conclusion, improving OSH training delivery methods, strengthening supervision and enforcement systems, and adopting advanced technologies such as Smart PPE and AI CCTV monitoring can significantly enhance scaffolding safety practices in the Malaysia construction industry. These recommendations can help reduce the gap between safety knowledge and actual on-site practice while minimizing fall-from-height incidents among scaffolding workers.

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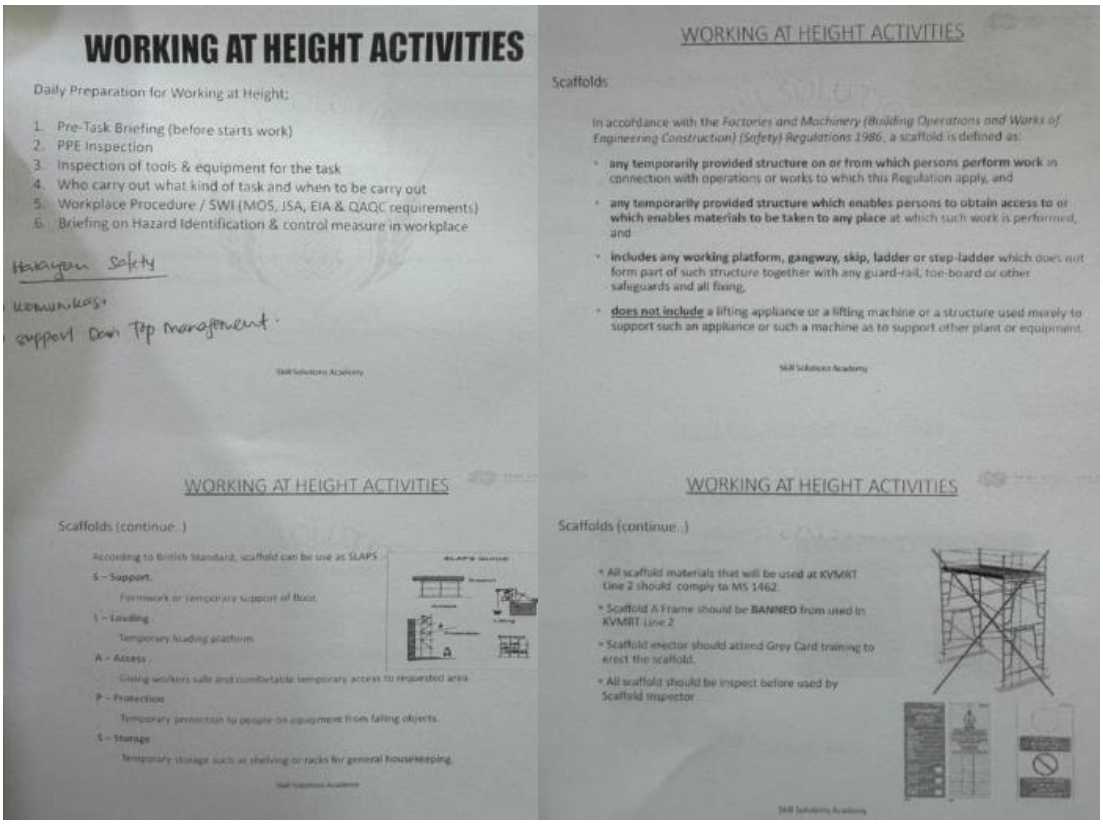
# APPENDICES

## APPENDIX A: Safety Training Notes Provided by Safety Officer

Safety training content covered and provided printed notes to each attender.



WORKING AT HEIGHT ACTIVITIES

Daily Preparation for Working at Height:

1. Pre-Task Briefing (before starts work)
2. PPE Inspection
3. Inspection of tools & equipment for the task
4. Who carry out what kind of task and when to be carry out
5. Workplace Procedure / SWI (MOS, JSA, EIA & QAQC requirements)
6. Briefing on Hazard Identification & control measure in workplace

Harayan Safety
support Dari Top management.

WORKING AT HEIGHT ACTIVITIES

Scaffolds

In accordance with the *Factories and Machinery (Building Operations and Works of Engineering Construction) (Safety) Regulations 1986*, a scaffold is defined as:

- **any temporarily provided structure on or from which persons perform work** in connection with operations or works to which this Regulation apply, and
- **any temporarily provided structure which enables persons to obtain access to** or **which enables materials to be taken to any place** at which such work is performed, and
- **includes any working platform, gangway, skip, ladder or step-ladder** which does not form part of such structure together with any guard-rail, toe-board or other safeguards and all fixing,
- **does not include** a lifting appliance or a lifting machine or a structure used merely to support such an appliance or such a machine as to support other plant or equipment.

WORKING AT HEIGHT ACTIVITIES

Scaffolds (continue..)

According to British Standard, scaffold can be use as SLAPS :

S – Support.
Formwork or temporary support of floor.

L – Loading.
Temporary loading platform.

A – Access.
Giving workers safe and comfortable temporary access to requested area.

P – Protection
Temporary protection to people or equipment from falling objects.

S – Storage
Temporary storage such as shelving or racks for general housekeeping.

WORKING AT HEIGHT ACTIVITIES

Scaffolds (continue..)

- All scaffold materials that will be used at KVMRT Line 2 should comply to MS 1462.
- Scaffold A Frame should be **BANNED** from used in KVMRT Line 2
- Scaffold erector should attend Grey Card training to erect the scaffold.
- All scaffold should be inspect before used by Scaffold Inspector

# APPENDIX B: Observation Photos

Observation B1, Unsafe practices were observed, including wearing rubber boots instead of safety boots, lack of safety harnesses and helmets at height, scaffolding without ladders, and brick overloading.

Observation B2, Workers working at height were not using safety harnesses or safety boots, and scaffolding had no proper ladder access.

Observation B3, Workers were not wearing safety boots and helmets, and unsafe behaviour such as throwing bricks was observed.

Observation PA1, No safety harness was used by workers working at height, safety boots were not worn, and scaffolding lacked proper ladder access.

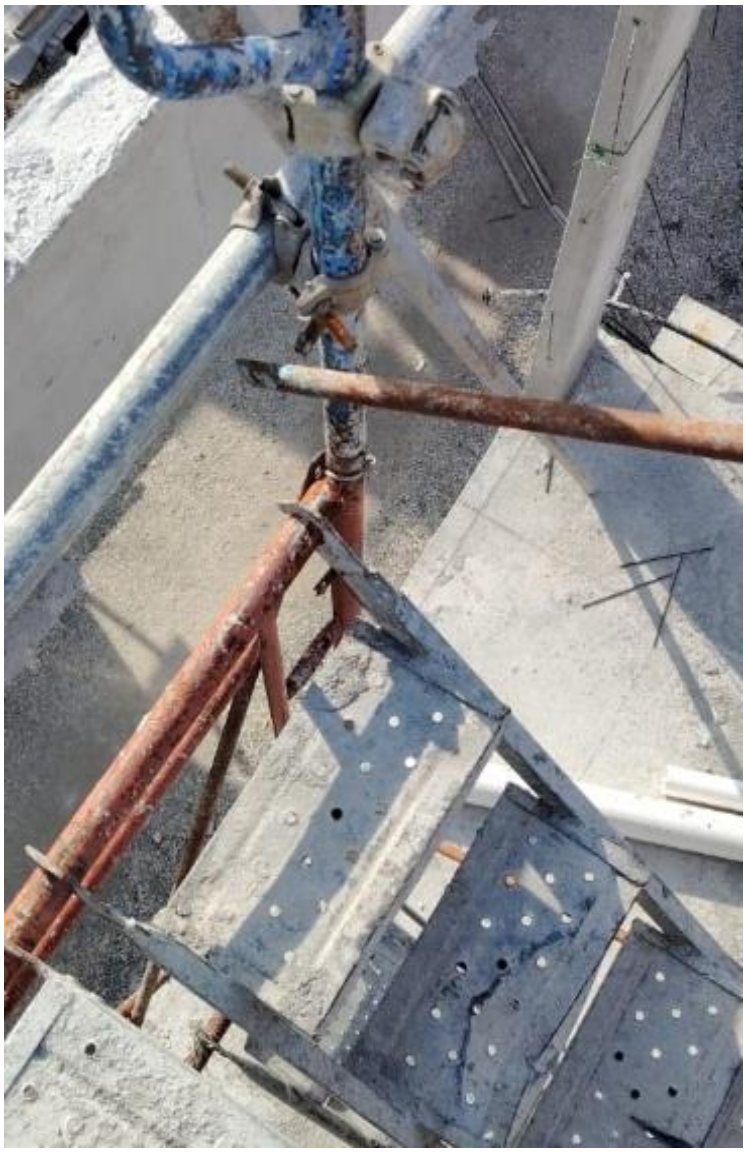
Observation PA2, No safety harness was used by workers working at height, and scaffolding lacked proper ladder access.

Observation PA3, Unsafe worker behaviour was observed, including accessing scaffolding by climbing due to the absence of proper ladders.

Observation P1, Unsafe worker behaviour was observed, including playing in high-risk areas and not wearing PPE.

Observation P2, Unsafe worker behaviour was observed, with workers accessing the area without using ladders.

Observation S1, Improper installation of scaffolding bracing and poor scaffolding condition due to corrosion were observed.



Observation S2, Broken components and poor scaffolding condition due to corrosion were observed.

Observation S3, Broken components and poor scaffolding condition due to corrosion were observed.

Observation S4, Broken components and poor scaffolding condition due to corrosion were observed.

APPENDIX C: Interview Questionnaire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**UNIVERSITI TUNKU ABDUL RAHMAN**

**TOPIC:**

**AN ASSESSMENT OF OSH TRAINING APPROACHES IN REDUCING FALL FROM HEIGHT INCIDENTS: EFFECTIVENESS AND ON-SITE IMPLEMENTATION BARRIERS**

## BORANG TEMU BUAL: KAJIAN AKHIR (FYP)

### 1. PENYERTAAN

Tuan/Puan yang dihormati,

Saya merupakan pelajar Ijazah Sarjana Muda dari Universiti Tunku Abdul Rahman yang sedang mengikuti program Ijazah Sarjana Muda Teknologi (Kepujian) Pengurusan Pembinaan. Nama saya ialah **Wong Shun Kai (21AGB04926)** dan saya sedang menjalankan satu kajian bertajuk:

**"Penilaian Pendekatan Latihan OSH dalam Mengurangkan Insiden Jatuh dari Tempat Tinggi: Keberkesanan dan Halangan Pelaksanaan di Tapak"**

Kajian ini bertujuan untuk:

- Menilai keberkesanan pendekatan latihan OSH sedia ada dalam mengurangkan insiden jatuh dari tempat tinggi dalam kalangan pekerja perancah di Malaysia; dan
- Mengenal pasti halangan yang mempengaruhi pelaksanaan latihan keselamatan di tapak bina.

Penyertaan dalam temu bual ini dijangka mengambil masa kurang daripada **10 minit** untuk melengkapkan semua soalan.

## 2. KERAHSIAAN

Semua maklumat yang dikumpulkan dalam temu bual ini akan dirahsiakan sepenuhnya. Tiada maklumat pengenalan peribadi seperti nama individu atau maklumat syarikat akan direkodkan dalam kajian ini. Segala maklum balas yang diberikan hanya akan digunakan untuk tujuan penyelidikan akademik.

Temu bual ini dijalankan dengan kebenaran dan kerjasama pihak pengurusan projek. Semua jawapan yang diberikan akan kekal tanpa nama dan tidak akan digunakan untuk menilai prestasi individu.

Dengan menyertai temu bual ini, Tuan/Puan dianggap telah memahami dan bersetuju bahawa maklumat yang dikongsikan boleh digunakan bagi tujuan penyelidikan berkaitan kajian ini.

## 3. MAKLUMAT RESPONDEN

Sila tandakan (✓) pada kategori yang berkenaan:

☐ Pekerja Perancah (Scaffolding Worker)
☐ Pegawai Keselamatan (Safety Officer)
☐ Pengurus Tapak (Site Manager)

## 4. SOALAN TEMU BUAL

### A) Pekerja Perancah (Scaffolding Workers)

**Bahagian A: Maklumat Latar Belakang**

i) Apakah jenis kerja pembinaan yang anda terlibat sekarang?

_____

ii) Berapa lama anda telah bekerja dalam bidang ini?

_____

iii) Anda berasal dari negara mana?

_____

**Bahagian B: Soalan Temu Bual**

iv) Boleh ceritakan latihan keselamatan apa yang pernah anda terima berkaitan kerja perancah atau kerja di tempat tinggi?

_____

v) Bagaimanakah latihan tersebut biasanya dijalankan? (Contohnya: latihan dalam kelas, demonstrasi di tapak bina, atau semasa *toolbox meeting*)

_____

vi) Adakah latihan tersebut mudah difahami dan membantu dalam kerja harian anda? Sila jelaskan.

_____

vii) Dalam kerja harian, adakah anda mengamalkan pengetahuan keselamatan yang telah dipelajari?

_____

viii) Apakah kesukaran yang anda hadapi untuk mematuhi semua prosedur keselamatan semasa bekerja di perancah?

_____

ix) Adakah penyelia atau pegawai keselamatan sering mengingatkan pekerja tentang keselamatan? Bagaimanakah mereka melakukannya?

---

x) Pernahkah anda mengalami tekanan masa atau beban kerja yang menyebabkan anda sukar untuk mematuhi semua langkah keselamatan?

---

xi) Pada pendapat anda, apakah penambahbaikan yang boleh dilakukan bagi menjadikan latihan keselamatan lebih berkesan kepada pekerja perancah?

---

## 5. PENGESAHAN PENYERTAAN

Saya dengan ini mengesahkan bahawa saya telah memahami tujuan kajian ini dan bersetuju untuk menyertai temu bual ini.

Tandatangan Responden: _____

Tarikh: _____

**Terima kasih atas kerjasama Tuan/Puan.**

## B) Pegawai Keselamatan (Safety Officers)

**Bahagian A: Maklumat Latar Belakang**

i) Apakah jawatan anda di tapak bina ini?

_____

ii) Berapa lama anda telah bekerja sebagai pegawai keselamatan?

_____

iii) Apakah jenis projek pembinaan yang anda terlibat sekarang?

_____

iv) Adakah anda mempunyai sijil OSH?

_____

**Bahagian B: Soalan Temu Bual**

i) Apakah jenis latihan OSH yang biasanya diberikan kepada pekerja perancah di syarikat ini?

_____

ii) Pada pendapat anda, adakah kandungan latihan sedia ada mencukupi untuk mengurangkan kemalangan jatuh dari tempat tinggi? Sila jelaskan.

_____

iii) Bagaimanakah anda memantau sama ada pekerja mengamalkan pengetahuan keselamatan yang dipelajari semasa latihan?

_____

iv) Apakah pelanggaran keselamatan yang paling kerap dilakukan oleh pekerja perancah?

_____

v) Apakah cabaran utama dalam memastikan pekerja mematuhi prosedur keselamatan?

_____

vi) Sejauh manakah pihak pengurusan menyokong penyediaan sumber seperti masa, bajet, atau tenaga kerja untuk latihan keselamatan?

---

vii) Pada pendapat anda, apakah penambahbaikan yang boleh dilakukan untuk meningkatkan keberkesanan latihan keselamatan?

---

## 5. PENGESAHAN PENYERTAAN

Saya dengan ini mengesahkan bahawa saya telah memahami tujuan kajian ini dan bersetuju untuk menyertai temu bual ini.

Tandatangan Responden: _____

Tarikh: _____

**Terima kasih atas kerjasama Tuan/Puan.**

## C) Pengurus Tapak (Site Managers)

**Bahagian A: Maklumat Latar Belakang**

i) Apakah jawatan anda di projek ini?

---

ii) Berapa lama pengalaman dalam pembinaan?

---

iii) Apakah jenis projek yang anda uruskan?

---

iv) Berapa ramai pekerja di bawah anda?

---

**Bahagian B: Soalan Temu Bual**

i) Apakah jenis program latihan keselamatan yang disediakan untuk pekerja perancah di syarikat ini?

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ii) Bagaimanakah syarikat menentukan kaedah latihan yang sesuai (contohnya latihan kelas, demonstrasi praktikal, atau *toolbox meeting*)?

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iii) Bagaimanakah syarikat menilai keberkesanan latihan keselamatan tersebut?

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iv) Apakah cabaran utama dalam melaksanakan program latihan keselamatan di tapak bina? (Contohnya kos, kekangan masa, atau pertukaran pekerja)

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v) Pada pendapat anda, apakah halangan utama yang mempengaruhi pematuhan pekerja terhadap prosedur keselamatan di tapak?

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vi) Bagaimanakah pihak pengurusan memastikan pegawai keselamatan dan penyelia sentiasa menguatkuasakan prosedur keselamatan?

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vii) Apakah langkah tambahan yang boleh diperkenalkan bagi mengurangkan risiko jatuh dari tempat tinggi semasa kerja perancah?

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## 5. PENGESAHAN PENYERTAAN

Saya dengan ini mengesahkan bahawa saya telah memahami tujuan kajian ini dan bersetuju untuk menyertai temu bual ini.

Tandatangan Responden: _____

Tarikh: _____

**Terima kasih atas kerjasama Tuan/Puan.**

# APPENDIX D: On-Site Observation Checklist

**On-site Observation Checklist (Scaffolding Workers)**

| No | Observation Aspect | B 1 | B 2 | B 3 | B 4 | B 5 | P 1 | P 2 | P 3 | P 4 | P 5 | PA 1 | PA 2 | PA 3 | PA 4 | PA 5 | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A. Personal Protective Equipment (PPE)** | | | | | | | | | | | | | | | | | |
| 1 | Workers wear safety helmets | x | / | / | / | / | / | / | / | / | / | / | / | / | / | / | Only few not wearing |
| 2 | Workers wear safety shoes | x | / | x | x | / | x | x | x | x | x | x | x | x | x | x | Most wearing rubber boots |
| 3 | Workers wear safety harness when working at height | x | x | x | x | x | x | x | x | x | x | / | x | x | / | x | Only wearing safety vest |
| 4 | PPE is used correctly and consistently | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | Not complete |
| **B. Scaffolding Structure Safety** | | | | | | | | | | | | | | | | | |
| 5 | Scaffolding platform is stable and properly installed | x | x | x | x | x | / | / | / | / | / | / | / | / | / | / | B did not erect properly |
| 6 | Scaffolding is in good condition (no corrosion) | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | All is not good in condition, corrosion |
| 7 | Safe access provided (ladder/stair access) | x | x | x | x | x | / | / | / | / | / | / | / | / | / | / | some did not install ladder |
| 8 | Scaffolding platform is not overloaded with materials | x | / | x | x | x | / | / | / | / | / | / | / | / | / | / | B place bricks overload |
| **C. Worker Safety Behaviour** | | | | | | | | | | | | | | | | | |
| 9 | Workers access scaffolding safely | x | x | x | x | x | / | / | / | / | / | / | / | / | / | / | Those without ladder they climb |
| 10 | Workers follow safety procedures during work | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| 11 | Workers appear aware of safety hazards | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | All just wanted to work fast |
| **D. Safety Supervision** | | | | | | | | | | | | | | | | | |
| 12 | Safety officer present on site | Not so frequent | | | | | | | | | | | | | | | |
| 13 | Supervisors remind workers about safety procedures | Sometimes remind, but most of time ignore because workers still not follow after walked away | | | | | | | | | | | | | | | |
| 14 | Toolbox meeting or safety briefing conducted | Conducted, only once a week | | | | | | | | | | | | | | | |
| **E. Site Environment and Conditions** | | | | | | | | | | | | | | | | | |
| 15 | Ground/foundation for scaffolding is stable | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | |
| 16 | Work area around scaffolding is clean and organized | x | / | x | / | / | x | x | x | x | x | / | / | / | / | / | B & P area around with cement paste |

APPENDIX E: Student Confirmation letter for interview

**UNIVERSITI TUNKU ABDUL RAHMAN**
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Our Ref: FEGT/CM/FYP/2026.022
Date: 31st March 2026

To Whom It May Concern:

Dear Sir/Madam,

**RE: CONFIRMATION OF STUDENT STATUS – FINAL YEAR PROJECT**

This is to confirm that the following student is a registered full-time student at the Faculty of Engineering and Green Technology, Universiti Tunku Abdul Rahman, Kampar Campus.

| | |
|---|---|
| Name | : Wong Shun Kai |
| NRIC | : 030222-08-0999 |
| Reg. No. | : 21AGB04926 |
| Programme | : Bachelor of Technology (Honours) Construction Management |
| Current Year / Sem | : Year 3 Trimester 3 |
| FYP Duration | : 2 February 2026 – 14 June 2026 |

We would appreciate if you could allow the above-mentioned student to collect some data / information from your esteemed organization for her final year project.

Should you need further clarification please do not hesitate to contact the supervisor, Ts. Dr. Tan Zi Yi at 05-468 8888 ext: 4430 or e-mail: tanzy@utar.edu.my.

Thank you.

Yours faithfully,

Ts. Tey Kim Hai
FYP Coordinator for
Department of Construction Management

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