

# Unravelling Accident Patterns, Causes, and Solutions for Foreign Workers in Construction Industry: A Case Study in Sarawak, Malaysia

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## Abstract

The construction sector in Sarawak, Malaysia heavily relies on foreign labor for its labor-intensive projects, which significantly contributes to the region's economic advancement. However, the safety and welfare of these workers are frequently compromised due to substandard working conditions, inadequate safety measures, and lack of enforcement on occupational safety and health (OSH) regulations. This study aims to propose an effective strategy to improve the safety of foreign workers in Sarawak's construction industry by examining common accidents, identifying root causes, and recommending safety enhancement approaches through quantitative methodologies, primarily employing questionnaires distributed to construction industry stakeholders in Sarawak. The findings highlighted that scaffolding collapse as the prevalent accident due to inadequate safety training. Recommendations for rigorous enforcement of OSH regulations, increased availability of safety training, and enhanced employer accountability are emphasized. Ultimately, the study highlighted the importance of comprehensive safety measures in the construction industry to ensure the well-being of all stakeholders specifically the foreign workers and at the same time ensuring the project success.

## 1. Introduction

The construction industry in Malaysia, has evolved significantly in recent years, playing a pivotal role in the region's economic development. However, amidst its growth, the sector grapples with various challenges, one of which involves the reliance on foreign workers to meet the demands of labor-intensive construction projects (Khor *et al.*, 2023). Foreign workers, in essence, refer to individuals who relocate from their home countries to Malaysia, to partake in various labor-intensive roles within the construction industry. These workers, often hailing from neighboring countries such as Indonesia, Bangladesh, and Nepal, are supplementing the local workforce, primarily due to their willingness to undertake physically demanding tasks and their proficiency in specific construction-related skills. The decision to employ foreign workers in the Malaysian construction industry, is a strategic response to the persistent shortage of skilled labor and the need for proficient workers to support the rapid expansion of infrastructure and development projects. These workers bring with them specialized expertise, enabling the completion of complex tasks within designated time frames. Additionally, their affordability and flexibility in terms of wages make them an attractive option for construction companies to optimize operational costs without compromising project quality and timelines (Wei *et al.*, 2023).

Foreign workers play a crucial role in driving the construction industry forward, contributing to the timely completion of various infrastructure projects which is crucial for economic growth. Their involvement aids in meeting the escalating demands for skilled labor, enhancing the overall productivity and competitiveness of the construction. However, the reliance on foreign workers also contributes to pertinent issues that warrant attention and resolution (Uddin *et al.*, 2022). According to the International Labour Organization (2011), the lack of enforcement of occupational safety and health (OSH) regulations for foreign workers in the construction industry is a significant problem. Despite the existence of laws and regulations to protect the workers' safety and health, the enforcement of these laws is often weak or non-existent. This lack of enforcement puts foreign workers at greater risk of injury, illness, and death in the workplace. Additionally, Jaafar *et al.*, (2020) mentioned that foreign workers in the Malaysian construction industry faced a high risk of workplace accidents and injuries due to inadequate safety measures and the lack of OSH awareness.

Therefore, the aim of this study is to propose strategies to improve the safety of foreign workers in the construction industry particularly in Sarawak by examining the accidents patterns or common accidents, identifying root causes, and recommending safety enhancement approaches. This study adopted quantitative method by employing questionnaires survey distributed to the construction stakeholders in Sarawak.

## 2. Literature Review

### 2.1 Common Accident in The Construction Industry

Tepic *et al.*, (2021) highlighted accidents involving hazardous substances, such as chemical releases, can lead to severe consequences not just for workers but also for the environment. In recent years, Malaysia's construction industry suffered an increasingly alarming number of fatal falls from heights accidents. Fatal accident numbers that were reported and investigated had a noticeable increase from 2013 to 2017 (Zermane *et al.*, 2022). According to Sheikh azadi *et al.*, (2010) electrocution is among the common accident in construction site, this is due to electricity is a commonly encountered energy source that workers across various occupations used daily while performing their tasks. Even the current drawn by a small 7.5-watt, 120-volt lamp, when passed from hand to hand or hand to foot across the chest, is sufficient to cause electrocution.

As mentioned by Bedi *et al.*, (2021), the movement of materials, equipment, and personnel within constrained space can lead to potential collisions and entanglements, further increasing the risk of accidents. According to Ayob *et al.*, (2018), accidents in construction sites leading to fatalities are diverse, with one major factor being work at heights, particularly involving scaffolding. Moreover, Hamdan *et al.*, (2015) stated that scaffolding accidents typically occur in two ways: either as a result of a worker falling from the scaffold or the scaffold itself collapsing. In addition, Abas *et al.*, (2020) mentioned, struck by object is among the common types of accidents at construction site.

Next, the fact that accidents occurring in excavation works are frequent and severe. According to the study carried out by Arboleda *et al.* (2004) on the importance of trenching operations in the construction industry. Construction companies account for 2.6% of overall construction volume. In 2000, these companies reported 166 deaths, including casualties of trenching operations. Every year, trench-related accidents kill more than 65 construction workers.

Fernandez *et al.*, (2009) highlighted that noise exposure causes several kinds of risks to workers' safety and health. It is commonly believed that noise can cover spoken words and signaling sounds. Workers who must communicate in noisy surroundings with levels more than 85 decibels (dBA) may experience voice difficulties such as nodules, loss of voice, and vocal cord problems. As a result, noise has been highlighted as a factor that might increase the risk of accidents at work. Furthermore, the effects of noise-induced hearing loss, combined with the requirement to use hearing protection devices, contribute to an indirect increase in the rate of accidents due to interferences with sound signals and other non-hearing effects of noise on health, such as stress, loss of attention, increased blood pressure, and so on.

Another common accident is a fire incident. The main causes of fires are negligent conduct of workers as well as technical faults of functional units of constructions and equipment (Kraus *et al.*, 2017). Meanwhile, according to Yabuki *et al.*, (2013), the amount of heatstroke incidents among construction workers is expanding. When the core body temperature reaches around 39°C, the risk of heatstroke increases significantly. Heatstroke takes place when the body's temperature increases excessively as a result of high temperatures and humidity. The construction industry accounts for approximately 70% of all occupational heatstroke fatalities.

### 2.2 Causes of Accident in The Construction Industry

Tight project schedules could increase the risk of accidents in the construction sector. When projects rushed or have tight deadlines, numerous variables enhance the probability of an accident, including

increased pressure and stress. This means that tight timetables frequently cause increased stress and pressure on employees to perform their jobs promptly. Foreign workers may endure increased stress due to cultural differences, language challenges, or unfamiliarity with the work environment, resulting in weariness and burnout. This is due to working long hours to fulfil tight deadlines that might result in fatigue and burnout. Furthermore, fatigued workers are more likely to make mistakes and are typically less aware, raising the likelihood of an accident (Ahmed *et al.*, 2018).

According to Wilkins *et al.*, (2011), foreign workers in construction often do not receive extensive safety training, exposing them to possible dangers. This gap is caused by factors such as insufficient instructional programs, inadequate orientation processes, and a failure to meet foreign workers' special safety concerns. The problem originates from a lack of culturally relevant training materials and language hurdles, which make it difficult for foreign workers to comprehend and apply safety standards. Furthermore, weak orientation processes make them unfamiliar with local safety rules, increasing the likelihood of an accident.

Next, according to Trajkovski *et al.*, (2006), language barriers and cultural differences cause significant challenges for foreign workers in construction, raising the chance of accidents. These barriers prevent effective communication, comprehension of safety guidelines, and incorporation into the current safety culture. To address these issues, language support, such as translation services and cultural competence training, is required to enable clear communication and foster a safe atmosphere. Integrating foreign workers into the current safety culture requires inclusion and open communication to improve overall safety outcomes.

The lack of proper safety equipment is a major contributor to accidents, particularly among foreign workers in construction. Personal Protective Equipment (PPE) is crucial for protecting employees from potential risks. When there is a lack of appropriate safety equipment, the chance of injury and accident rises. Foreign workers have additional challenges as a result of variances in safety standards, cultural traditions, and language problems. As a result, addressing the scarcity of appropriate safety equipment is critical to ensuring the well-being of all workers, including foreign workers in construction. Implementing comprehensive measures, such as rigorous adherence to safety rules, culturally specific training programmes, and multilingual communication methods, is critical to mitigating the increased hazards associated with insufficient Personal Protective Equipment (PPE) (Nelson *et al.*, 2020).

The absence of clear rules to protect foreign workers from problems endangers their well-being. When there are no defined standards or laws in place to handle the particular obstacles that foreign workers confront, issues may occur. Without defined guidelines, there may be insufficient protection measures adapted to the issues faced by foreign workers. Language barriers, unfamiliarity with local legislation, and cultural differences are all possible issues. The other issue is communication barriers. This is because clear rules are required for successful communication among employers, supervisors, and foreign workers. Also, when guidelines are unclear, communication gaps can lead to misunderstandings, risking the safety of foreign workers (Dupper *et al.*, 2007).

Poor supervision is a significant factor in accidents involving foreign workers in construction. Inadequate monitoring and instruction can result in poor adherence to safety standards and an increased risk of accidents. This problem might emerge for a variety of causes, such as inadequate personnel, a lack of skilled supervisors, or a failure to offer clear instructions and assistance. Effective supervision is critical in ensuring that foreign workers, who may be unfamiliar with the workplace, receive the information they need to navigate possible dangers safely (Abd Muein *et al.*, 2023).

At the same time, foreign workers in the construction sector are frequently involved in accidents due to a lack of knowledge of local safety requirements. These workers frequently come from nations with different safety standards and procedures, and their lack of understanding about the host country's safety measures can greatly increase the hazards they encounter. For example, workers on a building site in a nation with strict fall safety standards may be acclimated to less restrictive precautions, placing them at risk of inadvertent breaches. Furthermore, discrepancies in equipment operating requirements may result in noncompliance if foreign personnel are not fully informed about the unique protocols used in the host nation. This lack of awareness highlights the necessity of comprehensive orientation programs and tailored safety training in bridging the knowledge gap and mitigating the risks associated with unfamiliar local safety standards (Shepherd *et al.*, 2021).

Electrical malfunction accidents or electrocution on construction sites can occur as a result of insufficient inspection, maintenance, or knowledge of electrical systems. Foreign workers may lack the necessary skills or experience to identify and resolve issues with electricity, posing additional dangers. Furthermore, language barriers and unfamiliarity with local electrical codes exacerbate the difficulty. As a result, it is critical to create focused training programs for foreign personnel that include complete electrical

system knowledge, emphasize correct inspection and maintenance methods, and provide language assistance Zhao et. al., (2015).

As mentioned by Kaplan *et al.*, (2018), inadequate site sanitation threatens the health and safety of foreign workers. Poor sanitation facilities on construction sites may lead to hygiene difficulties, potentially leading to diseases and accidents. Inadequate access to clean bathrooms, handwashing facilities, and waste disposal can lead to a dangerous and unclean workplace. Addressing workplace cleanliness is critical not only for foreign workers' health, but also for general safety on construction sites. Proper sanitation procedures serve to prevent the spread of infections and provide a safe working environment for all staff. This includes regular facility maintenance, the provision of clean and easily accessible amenities, and raising awareness about the need for workplace hygiene.

### 3.0 Research Methodology

A quantitative method is selected as an alternative to collect the data. Thus, a questionnaire survey method is applied to gather sufficient information needed from the respondents. The respondents were among those with a construction background and currently working in construction companies. 150 questionnaires were distributed using hardcopies, emails and online google form through social media such as WhatsApp and Telegram by using snowballing techniques to the stakeholders in Sarawak construction industry. 105 respondents completed the survey which makes 70% response rate. The data was analyzed by using SPSS version 27.

## 4.0 Findings And Discussion

### 4.1 Demographic

According to Table 1, 31 (29.5%) of the respondents are architects, which is the greatest percentage in this study. Site supervisor and construction manager come in second and third, with a total of 26 (24.8%) and 21 (20%), respectively. This is followed by engineers with a total of 9 (8.6%), and clerks of work with a total of 7 (6.7%). And in the same proportion, there are 5 (4.8%), who work as project managers and safety managers. Overall, the data gathered from this study came from construction players of various professions. This is advantageous since more experts with varying levels of expertise and knowledge are required expressly to provide a more trustworthy source of input for this study.

**Table 1** Position of the Respondents

Position	Frequency	Percentage	Cumulative percent
Engineer	9	8.7	8.7
Architect	31	29.8	38.5
Project Manager	5	4.8	43.3
Construction Manager	21	20.0	63.5
Site Supervisor	26	25.0	88.5
Safety Manager	5	4.8	93.3
Clerk of Work	7	6.7	100
Total	104	100	
Missing (system)	1		
Total	105		

On the other hand, as demonstrated in Table 2, respondents with 1 to 5 years of construction project experience make up the highest part of the total percentage. 39 of them account for 37.1% of the total. The second group consists of 35 respondents (33.3%) who have worked in the field for six to 10 years. This is followed by individuals with 11 to 15 years of experience, 16 to 20 years of experience, and more than 20 years of experience, who account for 18 (17.1%), 8 (7.6%), and 5 (4.8%), respectively.

**Table 2** Respondents experience in the construction project

Experience	Frequency	Percentage	Cumulative percent
1 – 5 years	39	37.1	37.1

6 – 10 years	35	33.3	70.5
11 – 15 years	18	17.1	87.6
16 – 20 years	8	7.6	95.2
More than 20 years	5	4.8	100.0
Total	105	100.0	

#### 4.2 Accident patterns in Sarawak construction industry.

The questions in this section are mainly focused on the familiarity of the respondents about the most prevalent accidents among foreign workers in the construction industry. Table 3 shows the descriptive statistic of the accidents.

**Table 3** Prevalent accidents

Accident with/from	Never	Rarely	Often	Always	Mean	Rank	
Scaffolding collapse	10	25	30	40	2.95	1	
Shocked by electricity	11	24	30	40	2.94	2	
Heat stroke	10	21	40	34	2.93	3	
Hazardous substances	11	23	32	39	2.93	4	
Fires and explosions	11	24	32	38	2.92	5	
Exposure to noise and vibration	10	21	42	32	2.91	6	
Trench collapse	12	23	32	38	2.91	7	
Machines and tools in construction	10	23	40	32	2.90	8	
Struck by objects	10	24	41	30	2.87	9	
Fall from high places	10	24	42	29	2.86	10	
Valid Number	105						

Referring to Table 3, scaffolding collapse is the rank no. 1 which is the first highest mean value at 2.95 for common accidents. Based on this, it is obvious that the majority of the respondents recognize scaffolding collapse incidents as a prevalent accident among the foreign workers in the construction activities. These findings align with the idea that scaffold collapse is the most common and high-risk hazard associated with scaffolding on construction sites (Sheikh azadi *et al.*,2010). At the same time, it demonstrates that there is a genuine need to prioritize workplace safety by strengthening safety measures and training by highlighting the risk connected with scaffolding usage.

The second rank is the shocked by electricity with the mean value 2.94. According to Majano *at.al.*, (2023), exposure to electricity remains a significant contributor to workplace injuries and fatalities. The workers whose occupation is not directly related to electrical work also contributed to 69% of the electrical fatalities' cases.

Next is heat stroke on the third ranking with the third highest mean value of 2.93. The findings supported Yabuki *et.al.*, (2013) study which mention that the amount of heat stroke incidents among construction workers is expanding due to the Malaysia's climate which has high temperatures and humidity.

In the ranking number 4 is hazardous substances with the mean value 2.93. According to Kooi *et.al.*, (2020), 66% of the incidents involving hazardous substances resulting in injuries, victims normally suffered from inhaling toxic or hazardous substances.

Other than that, fires and explosion is in the ranking no. 5 with the mean value 2.92, followed by exposure to the noise and vibration at the ranking no. 6 (mean value 2.91), trench collapsed ranking no. 7 (mean value 2.91), machines and tools ranking no. 8 (mean value 2.90), struck by objects ranking no. 9 (mean value 2.87) and finally the last ranking is fall from high place (mean value 2.86).

#### 4.4 Causes of Accident Among Foreign Workers in Sarawak's Construction Industry

**Table 4** Causes of accidents

Causes of accident	Strongly Disagree	Disagree	Agree	Strongly agree	Mean	Rank
Inadequate safety training	-	-	37	68	3.65	1
Electrical malfunction	-	2	44	59	3.54	2
Not enough safety gear	-	1	50	54	3.50	3

Language barrier	-	-	53	52	3.50	4
Cultural barrier	-	2	51	52	3.48	5
Poor supervision	-	2	52	51	3.47	6
Inadequate worksite sanitation	-	1	56	48	3.45	7
Tight project schedule	-	2	54	49	3.45	8
Not knowing the local safety rules	-	3	54	48	3.43	9
No clear rules to keep foreign workers safe from their difficulties	-	1	58	46	3.43	10
Valid number					105	

The results shown in Table 4, the mean for inadequate safety training is the first in the ranking with the highest mean value 3.65. According to Wilkins *et al.*, (2011), foreign workers in construction often do not receive extensive safety training, exposing them to possible dangers. The second highest mean value in ranking no. 2 is electrical malfunctions with the mean value at 3.54. Foreign workers may lack the necessary skills or experience to identify and resolve issues with electricity resulting in posing additional dangers.

The third-highest mean value in the ranking no. 3 with the mean value at 3.50 is "not enough safety gear. Employing foreign workers has additional challenges to bear as a result of variances in safety standards, cultural traditions, and language problems.

Next is language barriers at the fourth ranking with the mean value at 3.50. The finding is aligned with Trajkovski *et al.*, (2006) study which highlighted language barriers cause significant challenges for foreign workers in construction, raising the chance of accidents. In the ranking no. 5 is cultural barrier with mean value at 3.48. This barrier prevents comprehension of safety guidelines, and incorporation into the current safety culture.

Other causes of accidents in the ranking are poor supervision, ranking no.6 (mean value 3.47). Meanwhile, inadequate worksite sanitation, ranking no. 7 (mean value 3.45), tight project schedule ranking no. 8 (mean value 3.45), not knowing the local safety rules, ranking no. 9 (mean value 3.43), and the last in the ranking is no clear rules to keep the workers from difficulties (mean value 3.43)

#### 4.5 Strategies for Safety Improvement Among Foreign Workers in Sarawak's Construction Industry

**Table 5** The descriptive statistic of strategies for safety improvement

Strategies	Strongly Disagree		Strongly Agree		Mean	Rank
	Disagree	Agree	Disagree	Agree		
Organize practice sessions for emergencies during crucial moments	-	1	47	57	3.53	1
Employ easily understandable and universally clear signs to communicate safety risks and protocols at construction sites	-	2	46	57	3.52	2
Provide training to supervisors for proficiently relaying s safety guidelines and fostering a safety focused environment among their teams	-	1	52	52	3.49	3
Create safety rules that enhance the process of hiring the foreign workers	1	1	54	51	3.49	3
Increasing the availability and proper use of safety equipment and protective gear	-	-	55	50	3.48	4

Tailored safety training programs for foreign workers	-	-	59	46	3.44	5
Deal with language obstacles by offering recruitment resources and directions in various languages frequently used	1	-	58	46	3.42	6
Regular communication and language support	-	-	63	42	3.40	7
Valid Number (listwise)	105					

According to the results in Table 5, The first rank with the highest mean value, 3.53 is to organise emergency practice sessions during critical periods. This entails organising exercises or simulations that let employees practise responding to probable crises like fires, accidents, or natural catastrophes. Workers who practise emergency procedures at critical occasions, such as high-risk work periods, get accustomed to the essential activities and can react more effectively when faced with genuine emergencies (WHO, 2018).

Secondly, the second rank with the second highest mean value at 3.52 is employ easily understandable and universally clear signs to communicate safety risks and protocols at construction sites. It is crucial to make sure foreign construction workers can communicate effectively. These signs efficiently explain safety dangers and processes, ensuring that all workers understand and follow critical safety requirements despite language problems. The use of globally recognisable symbols helps to create a safer work environment by reducing the possibility of misinterpretation and establishing a shared awareness of safety standards among all (Tutt *et al.*, 2011)

Following that, the third rank with the third highest mean value, which is 3.49 is to provide training to supervisors in order to proficiently relaying safety guidelines and fostering a safety focused environment among their teams. According to Czornyj *et al.*, (2019), it is important to provide supervisors with training sessions to ensure that they properly convey safety requirements and foster a safety-focused environment among their workers. This includes providing supervisors with the required skills to accurately communicate safety procedures, handle issues, and develop a safety culture among their team workers. Supervisors must communicate effectively in order to promote a working culture in which everyone know sand prioritises safety.

Sharing the same mean value at 3.59, a created safety rules that enhance the process of hiring the foreign workers is also in the third ranking. According to Buckley *et al.*, (2016), implementing safety rules for hiring foreign workers is essential for making the workplace safer. These policies should contain clear requirements for workplace safety training, communication in several languages as needed, and ensuring that foreign workers understand what to do in an emergency.

Consecutively, others in the ranking are increasing the availability and proper use of safety equipment and protective gear (rank 4, mean value 3.48), tailored safety training programs for foreign workers (rank 5, mean value 3.44), deal with language obstacles by offering recruitment resources and directions in various languages frequently used (rank 6, mean value 3.42) and regular communication and language support (rank 7, mean value 3.40).

## 5.0 Conclusions

This study presents a thorough analysis of accident patterns, causes and suggestions in order to improve the safety and wellbeing of the foreign workers and construction industry stakeholders based on a case study at Sarawak's construction sector. Key findings highlight 'scaffolding collapse' as the primary accident, largely due to 'inadequate safety training'. Safety recommendations include emergency practice sessions and broader safety improvement initiatives. This study highlighted the need for education and training, communication and management involvement to enhance safety among foreign workers in the construction industry.

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## Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

## Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Nur' Isma Ismani, Izatul Laili Jabar; **data collection:** Nur' Isma Ismani, Izatul Laili Jabar; **analysis and interpretation of results:** Nur' Isma Ismani, Izatul Laili Jabar; **draft manuscript preparation:** Nur' Isma Ismani, Izatul Laili Jabar. All authors reviewed the results and approved the final version of the manuscript.

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