



**6th UNDERGRADUATE  
SEMINAR ON BUILT  
ENVIRONMENT  
AND TECHNOLOGY  
(USBET) 2023**

**SUSTAINABLE BUILT  
ENVIRONMENT**

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# e-Proceeding

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# CRITICAL FACTORS CONTRIBUTE TO NON-COMPLIANCE OF SAFETY PRACTICES ON CONSTRUCTION SITE IN KUALA TERENGGANU

Nursyafiqah Alyaa Zainuddin<sup>1</sup>, Nurul Fadzila Zahari<sup>1\*</sup>

<sup>1</sup>Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA, Perak Branch, 32610, Seri Iskandar, Perak, Malaysia

2021847054@student.uitm.edu.my, \*nurul998@uitm.edu.my

## ABSTRACT

*Accidents in construction sites are often caused by dangerous behaviour, hazardous conditions, or a combination of factors. Safety issues are crucial in the building industry, but many practices are neglected, leading to fatalities. This research study aims to analyse the Critical Factors Contributing to Non-Compliance of Safety Practices in Construction Sites using Google forms-based online questionnaires which complete with 100 of respondent. The data collected will be analysed using bar charts, tables, and pie charts. A new assessment framework will be developed, using Microsoft Excel 2020 for the calculation of the mean index. This framework will help employees and employers on construction sites recognize and address the critical factors contributing to non-compliance.*

**Keywords:** *safety practices, construction site, accidents, critical factors.*

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## INTRODUCTION

Critical factors are essential elements in the decision-making process that determine the success or failure of a decision. These factors improve organizational performance and propel companies towards success. Before starting a project, it is crucial to identify the critical success criteria (Radford, 2011). Construction accidents often result from risky behaviour, harmful surroundings, or both. Understanding these factors can help increase safety performance and create more beneficial working conditions. Malaysian construction sites have the highest number of fatalities and permanent disabilities due to dangerous working environments (Hamid et al., 2008).

The construction sector prioritizes safety concerns due to high fatalities and incidents. Contractors must implement safety precautions from the design stage to the completion and handover of structures. Workers in the construction sector are exposed to accidents and health hazards, resulting in financial losses. Accident analysis is crucial for preventing future incidents and developing risk control policies (Aksorn & Hadikusumo, 2008). To enhance site safety performance, safety programs should be implemented, focusing on preventative measures, and fostering a good safety culture. Project employees should be trained on safety-related issues, including protective gloves and eye protection. Encouraging collaboration between management and employees is essential for reducing accidents and promoting a safe work environment (Alaloul et al., 2020).

## LITERATURE REVIEW

### Critical Factors

Critical factors are essential elements in decision-making, determining the success or failure of a decision. Recognizing and implementing these factors is crucial for decision-making success, improving organizational performance and propelling a company towards success (Radford, 2011).

- Occupational Safety and Health (OSHA)

The construction industry, including Malaysia, faces challenges in safety management due to inadequate safety standards and high fatality rates. OSHA 1994 mandates employers and employees to maintain workplace health and safety, with penalties for non-compliance. (Hamid et al., 2019) The Malaysian Occupational Safety and Health Act of 1994 aims to regulate workers' safety on construction sites. However, OSHA compliance in the construction industry is weak, with many prosecution cases involving similar issues. Additionally, DOSH's enforcement and monitoring are less stringent, possibly due to a lack of law enforcement agencies. (Ning et al., 2018).

Occupational safety in the construction industry remains inadequate, despite numerous improvements and safety management systems. The industry faces high risk due to fatal and nonfatal work-related incidents, as well as employees' physical and emotional health. Poor hazard detection and assessment contribute to many incidents. (Tajul Ariffin et al., 2020) To achieve zero injuries, it is crucial to involve all stakeholders, including clients, designers, engineers, and quantity surveyors. Designers should identify health and safety hazards during the project design stage to reduce accidents. Factors such as human behaviour, poor site conditions, unsafe work practices, equipment, and processes contribute to accidents in the construction industry (Abas et al., 2020).

- Construction Site

The construction sector faces challenges due to its complex operations and requires professional skills. Proper project planning and hazard recognition are crucial for safety throughout the project lifecycle (Abas et al., 2020). Monitoring, contractor knowledge, and reacting to dangers are essential. A well-designed construction site enhances efficiency, productivity, and safety, reducing costs and material travel distances. (Webb & Langar, 2019).

Construction significantly contributes to global economic growth and demand for construction-related activities. However, it is also responsible for high accidents resulting in fatalities. (Kanchana et al., 2015) Construction workers are at a higher risk of dying on the job than other industries. Large-scale construction projects have designated safety departments, but small-scale contractors are unaware of these regulations. The construction industry is complex and prone to workplace injuries, with skilled, semi-skilled, and unskilled workers being particularly vulnerable. (Vitharana et al., 2015).

- Hazard

Risk refers to the potential for injury or negative health impacts due to exposure to a hazard. Construction site employees can be directly affected by physical harm risks, such as noise, vibration, radiation, and temperature extremes. Project staff should be informed about safety-related issues and provided with safety equipment. (Alaloul, 2021) Supervisors should develop a list of items, assess existing safety controls, and use technical methods to reduce risks to the lowest level possible. Legal requirements should be followed to ensure compliance with safety regulations. (Priya et al., 2016).

Construction workers face numerous health risks, including falls, electric shocks, ladder work, lifting, transporting equipment, dangerous chemicals, plant and machinery, tool usage, fire, emergency, digging, and protective clothing. (Gambatase et al., 2005). Designing projects for construction safety

considers workers' safety, as the industry is the most hazardous due to its unique business character and higher risk of work-related fatalities. (Halim et al., 2020).

- Safety Practice

To reduce fatalities, it is crucial to determine the strengths and weaknesses of safety practices in construction projects. Benchmarking can help organizations identify weaknesses and implement the best safety procedures. Poor safety practices can negatively impact safety management and workplace security. (Choudhry & Zahoor, 2016) Subcontractors often recruit unskilled individuals with limited OHS knowledge. Lack of safety statistics and lack of safety statistics hinders examining safety measures' strengths and weaknesses, making it difficult to maintain safety levels in the nation. (Belayutham & Ibrahim, 2019).

Safety legislation, enforcement, best practices, worker involvement, safety meetings, equipment safety, and training are crucial for construction safety. (Gambatese et al., 2005) The hierarchy of controls supports planning for construction safety as an intervention. Subcontractors should create site-specific safety plans for construction operations. The company should track unsafe worker conduct and modify work procedures and rules of conduct to ensure site safety (Choudhry et al., 2008).

- Non-compliance

Effective site safety control requires strict regulation enforcement. Management should issue warnings and penalties for violations, ensuring employees follow rules. Non-compliance may lead to high accident rates and a lack of safety culture on construction sites. (Lee & Jaafar, n.d.) Lack of training is a major factor contributing to workers' non-compliance with OSH requirements in the Malaysian construction sector. Factors include managerial commitment, expense, lack of training, oversight, and time constraints. Proper training is crucial for workforce competence. (Jamalullah, n.d.).

This literature review explores safety and health issues in construction work, focusing on hazard and safety practices. Construction sites are full of risks and adhering to the best safety procedures is crucial. Prioritizing safety is essential for a business's protection and fostering a culture of safety. Ensuring compliance with safety rules is a requirement for employment, as it is crucial for workforce protection, public safety, and project completion.



## METHODOLOGY

A quantitative research method confirms observations by gathering, analysing, and measuring numerical data from a large sample. Data gathering strategies include survey questionnaires distributed to construction project respondents. The questionnaires aim to identify critical factors contributing to non-compliance with safety practices in construction sites. The research aims to understand practical considerations and resource limitations.

**Table 1: Methodology**

Primary Data	This study utilized background research methods, including reading and writing, to support the validity of research studies. Secondary data was gathered from academic output, journal articles, websites, and research papers, accessible online.
Quantitative Methods	This study uses Google Forms-based online questionnaires for data collection, utilizing social media platforms like WhatsApp for straightforward and economical survey methods.
Questionnaire Design	The study aims to develop a systematic questionnaire for construction professionals to assess factors contributing to non-compliance with safety practices on construction sites. The questionnaire will be distributed online for data gathering.

This study examines non-compliance with safety practices on construction sites through questionnaires distributed to experienced workers. The justifications include lack of communication, awareness, and not wearing personal protective equipment (PPE). The study will support primary data, literature analysis, and academic evaluations. The table's Summary of Critical Factors Contributing to Non-Compliance of Safety Practices in Construction Sites highlights three significant features as justifications for the highest rating components. The literature review focuses on respondents' awareness of important safety practices on construction sites, indicating their interest, belief, and potential counterargument.

The questionnaire is tailored to target respondents' competence and based on research, literature review, and current practice. Authorized by panellists, it is distributed through surveys. The questionnaires are written in clear English and Bahasa Melayu, with well-structured sentences. The online Google Forms questionnaires are self-completed and based on thoughtful research questions. This study aims to provide high-quality results to end users. A questionnaire was circulated with many 100 respondents, but responses were not tallied until a few days. Results will be presented to those who answered the questionnaire. The target audience consisted of construction industry professionals. A sample of 80% respondents was sent using a survey method and Google Forms online instrument. The sample

represents the entire population, exceeding acceptable sample sizes and percentages.

The respondents may not have provided the true ideas, and this can be determined from the data that has been collected, according to the research's limitation. Additionally, because each firm has its own set of privacy laws, it is not possible to access individual papers or statistics for this research in accordance with business policies. These have limited the research's ability to collect data, but it was still possible to gather useful information regarding safety procedures that will improve safety performance. (Choudhry & Zahoor, 2016).

## FINDINGS AND DISCUSSION

This section analyses a 2020 Microsoft Excel questionnaire distributed to target respondents, utilizing carefully chosen answers from Sections A, B, and C. The analysis includes charts and charts to provide a comprehensive understanding of the data. Data from distribution questionnaires shows 100 responses, meeting the target population for a small-scale study. This aligns with the required sample size and response rate for analysis. Three primary factors, each with four to five sub-factors, will be included in a questionnaire for this research study. The focus will be on the selected three variables, with 4 to 5 sub-factors under each primary factor.

**Table 2: Factors 1**

<b>Factor 1: Lack of communication among the several appointed persons</b>				
<b>Factor 1</b>	<b>F1(a)</b>	<b>F1(b)</b>	<b>F1(c)</b>	<b>F1(d)</b>
Significant Factor	There is a regular communication between employees and management about safety issues on the construction site.	Health and Safety Meetings held regularly on construction site.	Toolbox talks being held on a regular basis such as weekly meeting.	Provide details of accidents reporting and investigation procedures.
Average Mean Score	<b>2.51</b>	<b>2.42</b>	<b>2.42</b>	<b>2.29</b>
Classification	Medium / moderate ineffective	Low / ineffective	Low / ineffective	Low / ineffective

The average mean score for questionnaire factors using Microsoft Excel (2020) indicates that the highest value is 2.51, indicating that the sub-factors are considered medium/moderate ineffective. These critical factors need to be considered for analysis. The remaining low/ineffective scores are considered less crucial.

**Table 3: Factors 2**

<b>Factor 2: Lack of awareness or disregard for the safety procedures</b>					
<b>Factor 2</b>	<b>F2(a)</b>	<b>F2(b)</b>	<b>F2(c)</b>	<b>F2(d)</b>	<b>F2(e)</b>
Significant Factor	Everyone receives the necessary workplace health and safety training when starting a job on site.	There is a communication about workplace health and safety procedures is done in a way that the employee easy to understand.	The site provides First Aiders and First Aid facility in case of emergencies	Safety report is provided weekly or monthly in the construction site	The construction site has a health and safety policy
Average Mean Score	<b>2.18</b>	<b>2.26</b>	<b>2.25</b>	<b>2.24</b>	<b>2.26</b>
Classification	Low / ineffective	Low / ineffective	Low / ineffective	Low / ineffective	Low / ineffective

The average mean score for questionnaire factors using Microsoft Excel (2020) is 2.26, indicating medium/moderate ineffectiveness. The remaining low/ineffective scores are critical safety practice factors that are less crucial. The analysis table highlights the need for further consideration in safety practice.

**Table 4: Factors 3**

<b>Factor 3: Did not wear personal protective equipment (PPE)</b>					
<b>Factor 3</b>	<b>F3(a)</b>	<b>F3(b)</b>	<b>F3(c)</b>	<b>F3(d)</b>	<b>F3(e)</b>
Significant Factor	Action is taken if there is an accident due to not wearing full personal protective equipment (PPE)	The site has complete minimum set of the PPE such as wear a hard hat, safety glasses, vests and boot.	The employees use the PPE necessary to do their jobs safely on site.	Site walking every week to observe for unsafe behaviour or equipment on site for weekly or monthly safety report	Construction equipment and personal protection equipment (PPE) handled with utmost care
Average Mean Score	<b>2.44</b>	<b>2.44</b>	<b>2.60</b>	<b>2.39</b>	<b>2.49</b>
Classification	Low / ineffective	Low / ineffective	Medium / moderate ineffective	Low / ineffective	Low / ineffective

The average mean score for questionnaire factors using Microsoft Excel (2020) indicates that the highest value is 2.60 for sub-factors, indicating medium/moderate ineffectiveness. These factors need to be considered as crucial critical factors in safety practice analysis. The remaining low/ineffective scores are considered less crucial.

Respondents surveyed on reducing critical factors for non-compliance in construction site safety practices. The highest percentage of respondents (38%) used personal protection equipment (PPE), followed by 23% stating sufficient signage to warn of dangers and hazards. 22% believed worksite inspections were necessary to identify potential hazards. The lowest percentage (17%) believed fall protection protocols and equipment should be mandatory for all employees.

## CONCLUSION

This study aimed to analyse critical factors contributing to non-compliance of safety practices on construction sites. After a thorough literature review, three key factors were selected for method analysis. These factors were divided into three related sub-factors, which were used in the distribution of questionnaires to identify the factors. Twelve of the 14 factors were found to be low/ineffective, while two were medium/moderate ineffective. The focus of this inquiry was on the two criteria mentioned above. The study was conducted through a quantitative case study, distributing questionnaires to construction site-related individuals. However, the study had limitations, such as not being comprehensive and perfect. Future studies should propose the best possible safety practices factors and increase the number of respondents for more precise information analysis.

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## REFERENCES

- Abas, N. H., Yusuf, N., Suhaini, N. A., Kariya, N., Mohammad, H., & Hasmori, M. F. (2020). Factors Affecting Safety Performance of Construction Projects: A Literature Review. *IOP Conference Series: Materials Science and Engineering*, 713(1). <https://doi.org/10.1088/1757-899X/713/1/012036>
- Aksorn, T., & Hadikusumo, B. H. W. (2008). Critical success factors influencing safety program performance in Thai construction projects. *Safety Science*, 46(4), 709–727. <https://doi.org/10.1016/j.ssci.2007.06.006>
- Alaloul, W. S. (2021). Health and Safety for Infrastructure Projects: PPE Adaptation and Barriers.
- Alaloul, W. S., Bin Ismail, A. S. I., Ammad, S., & Saad, S. (2020). Health and Safety for Infrastructure Projects: PPE Adaptation and Barriers. 2020 2nd International Sustainability and Resilience Conference: Technology and Innovation in Building Designs. <https://doi.org/10.1109/IEEECONF51154.2020.9319985>
- Amirah, N. A., Asma, W. I., Muda, M. S., & Mohd Amin, W. A. A. W. (2013). Safety culture in combating occupational safety and health problems in the Malaysian

- manufacturing sectors. *Asian Social Science*, 9(3), 182–191. <https://doi.org/10.5539/ass.v9n3p182>
- Ayhan, B. U., Tokdemir, O. B., Sanni-Anibire, M. O., Mahmoud, A. S., Hassanain, M. A., & Salami, B. A. (2020). A risk assessment approach for enhancing construction safety performance. *Journal of Construction Engineering and Management*, 121(August 2019), 15–29. [https://doi.org/10.1061/\(asce\)co.1943-7862.0001762](https://doi.org/10.1061/(asce)co.1943-7862.0001762)
- Bavafa, A., Mahdiyar, A., & Marsono, A. K. (2018). Identifying and assessing the critical factors for effective implementation of safety programs in construction projects. *Safety Science*, 106(February), 47–56. <https://doi.org/10.1016/j.ssci.2018.02.025>
- Belayutham, S., & Ibrahim, C. K. I. C. (2019). Barriers and strategies for better safety practices: The case of construction SMEs in Malaysia. *Construction Economics and Building*, 19(1). <https://doi.org/10.5130/AJCEB.v19i1.6331>
- Choudhry, R. M., Fang, D., & Ahmed, S. M. (2008). Safety management in construction: Best practices in Hong Kong. *Journal of Professional Issues in Engineering Education and Practice*, 134(1), 20–32. [https://doi.org/10.1061/\(ASCE\)1052-3928\(2008\)134:1\(20\)](https://doi.org/10.1061/(ASCE)1052-3928(2008)134:1(20))
- Choudhry, R. M., & Zahoor, H. (2016). Strengths and Weaknesses of Safety Practices to Improve Safety Performance in Construction Projects in Pakistan. *Journal of Construction Management Professional Issues in Engineering Education and Practice*, 142(4). [https://doi.org/10.1061/\(ASCE\)EI.1943-5541.0000292](https://doi.org/10.1061/(ASCE)EI.1943-5541.0000292)
- Gambatese, J. A., Behm, M., & Hinze, J. W. (2005). Viability of Designing for Construction Worker Safety. *Journal of Construction Engineering and Management*, 131(9), 1029–1036. [https://doi.org/10.1061/\(asce\)0733-9364\(2005\)131:9\(1029\)](https://doi.org/10.1061/(asce)0733-9364(2005)131:9(1029))
- Kanchana, S., Sivaprakash, P., & Joseph, S. (2015). Studies on labour safety in construction sites. *Scientific World Journal*, 2015. <https://doi.org/10.1155/2015/590810>
- Ning, X., Qi, J., & Wu, C. (2018). A quantitative safety risk assessment model for construction site layout planning. *Safety Science*, 104(October 2017), 246–259. <https://doi.org/10.1016/j.ssci.2018.01.016>
- Priya, M. M. M., Kothai, P. S., & Kohilambal, M. E. (2016). Study on Safety Practices and their Performance in the Construction Industries. January.

- Tajul Ariffin, H. L., Mohd, N. I., Lim Carmen, N. N. S., Kidam, K., Ismail, M., Binti Ali, K. N., Mustafa, N. E., Rohani, J. M., Abdullah, S., Mat Ali, N. Bin, & Fetri, M. S. A. M. (2020). Occupational safety and health in construction industry management (OSHCIM) implementation - Academician's perspectives. IOP Conference Series: Materials Science and Engineering, 849(1). <https://doi.org/10.1088/1757-899X/849/1/012017>
- Vitharana, V. H. P., De Silva, G. H. M. J. S., & De Silva, S. (2015). Health hazards, risk and safety practices in construction sites – a review study. Engineer: Journal of the Institution of Engineers, Sri Lanka, 48(3), 35. <https://doi.org/10.4038/engineer.v48i3>

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**SITI BASRIYAH SHAIK BAHARUDIN**  
Timbalan Ketua Pustakawan

*nar*

*Setuju.*

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