

Unsafe Action on Construction Sites: Identifying Behaviors and Influencing Factors

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Abstract

Unsafe working practices are often associated with accidents on the construction site. Workers' irresponsibility is responsible for 80% of accidents. Between January and November 2022, 148 accidents and injuries occurred in the construction industry. The study aims to identify unsafe actions and factors that influence their behavior. Cakna Enterprise Sdn. Bhd. is constructing an additional building for college matriculation minorities in Kelantan, covering 107 acres and 36,698.05 m². A survey questionnaire was administered to gather data on the workers at Cakna Enterprise Sdn Bhd. With an average reading of 2.8, the study's analysis revealed that without following directions was the most dangerous conduct. The analysis of surveys found that the most unsafe act on the site was to deny orders. With a mean reading of 3.34, time pressure is the working factor that achieves the highest mean reading. Roughly 90% of participants concurred that a significant contributing element to the work factor was time stress. This is due to the need to boost output. When a job is prepared more quickly than it needs to be, employees will choose to take risks to save time and boost output.

1. Introduction

A building project's success is greatly impacted by the people involved in the construction industry, such as consultants, contractors, workers, and clients. Policymakers and law enforcement agencies must take the necessary steps to guarantee worker safety. When compared to other industries, including mining, quarrying, lodging, dining, civil services, and statutory authorities, the construction sector has a greater accident and injury rate. The condition of the construction industry, which involves many activities that could lead to hazardous situations, is the primary cause of the high frequency of accidents in this area. Workplace accidents are mostly caused by the unsafe behaviors of construction workers, which include wearing personal protection equipment improperly, not identifying and reporting hazards, and not following safety protocols.

Being a major predictor of dangerous behavior and accidents in the construction industry, inadequate training is a serious issue. Comprehensive and ongoing training programs emphasizing hazard identification, equipment operation, and safety protocols are essential (Yan, 2018). Reducing dangerous activities also requires supervision and accountability. Effective supervision keeps an eye on work activities, provides guidance, and enforces safety rules to reduce the likelihood of accidents and injuries. Creating a culture where workers are held responsible for their actions and noncompliance with safety protocols is necessary to promote safe behaviors (Gambatese, 2016).

2. Literature Review

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Several behaviors and factors influencing unsafe action on construction sites according to previous studies conducting similar studies and related to this study.

2.1 Unsafe Actions on Construction Sites

Common unsafe actions on construction sites can lead to accidents, injuries, and fatalities. The table below shows a summary of unsafe actions:-

Table 1 Existing research related to unsafe actions performed by workers on construction sites

No.	The Unsafe Action Performed	Findings
1	Work Without Following Orders	The decision to ignore orders should be made with careful consideration of the potential impacts and in alignment with the organization's values and mission (Bradt, 2017)
2	Transfer, Handling, and Movement of Goods in Inappropriate Conditions	The worker must comply with the legal obligation to ensure the safety of the worker while handling and transporting the material. This includes using suitable transport forms, protecting goods with proper packaging, and ensuring proper markers and containers (Safely Handle and Transport Substances Business Gateway, n.d.)
3	Storage and Arrangement of Goods in Unsafe Places	The construction site must assess the risks arising from the storage of goods and materials, determine how likely they will occur, and take measures to reduce them (Storing Goods and Materials Business Gateway, n.d.)
4	Using a Tool With No Right	Using a tool inappropriately can lead to various hazards and risks. It is essential to use the right tool for the right job to ensure safety, efficiency, and quality of work. The improper use of tools can result in personal injuries, damaged equipment, environmental damage, and increased workplace hazards (Williams, 2019)
5	Using Equipment That is Defective or Damaged	Addressing defective equipment promptly is key to minimizing risks and maintaining a safe work environment (Thacker, 2023)
6	Equipment Usage Self-Protection	PPE, such as gloves, safety glasses, shoes, earplugs, hard hats, and respirators, is essential for protecting yourself from various hazards in the workplace (Personal Protective Equipment - Overview Occupational Safety and Health Administration, n.d.)

2.2 Factors Influencing Unsafe Action

Three primary factors are identified as occurring in the location. First, people's actions and behavior on the building site are greatly influenced by personal factors. These factors can impact an individual's perception of danger, motivation to adhere to security protocols, and overall attitude toward security. Second, professional consideration plays a major role in determining safe behavior on building sites. This component relates to work design, workplace policies, and organizational processes. Finally, a lot of the factors that affect management also affect encouraging safe behavior on the site. These components affect leadership, organizational policies, and procedures. The following table provides a summary of all the factors:-

Table 2 Existing research related to factors

Factors	Findings	Types of Factors
Laziness	On construction sites, apathy, and laziness can result in risky practices such as having too many workers in one area at once, not marking emergency exits clearly, and improperly maintaining work zones. Injury-causing behaviors such as complacency, disengagement, laziness, and bad habits can arise from irregular safety training. (Chan et al, 2023)	Personal Factors
Lack of Experiences	Inadequate understanding of safe work practices on construction sites might result from a lack of expertise. (Buniya et al, 2021) (Westbrook, 2022)	
Hurrying Attitude	On building sites, a hasty mindset can result in subpar safety practices and mishaps. Rushing can cause irresponsibility, which breeds mishaps. Workers may decide to hurry "just this one time" and remove safety barriers or shields before using the equipment (Skinner, 2020).	
Showing Off	Because of their behavior, employees' actions at work are dangerous (Kittleson, 1995).	
Overconfident	Workers behave dangerously when they have too much faith in one other's work cultures (Hirsh, 1998)	
Being Uncomfortable	Promoting safe work practices and thwarting arrogance, ostentation, and hurried attitudes can both be accomplished by creating a culture of safety that places a higher priority on safety than production (Plotnek, 2023)	
Too Much Work	The lack of workers in the construction sector may result in overwork for present workers and inexperienced workers on job sites. This may lead to lower output, lower quality work, postponed completion dates, increased work hours for present staff members, and safety concerns. (Westbrook, 2022)	Job Factors
Time Pressure	claimed that workers would decide to take risks to save time and increase output (Timm, 1986)	
Management Pressure	In the construction sector, management pressure is a factor that can cause worker stress, scheduling issues, and production pressures. The adverse consequences of production demands include elevated stress levels among workers, diminished craftsmanship, a rise in accident-prone areas, and a decline in worker safety conduct (Neale & Gurmu, 2021).	Management Factors
Lack of Management Support	Errors may be made by management. They don't care about the workers at building sites (Ladou, 1994).	

Inadequate Supervision	One aspect of the construction business that can cause stress for workers, scheduling issues, and production constraints is inadequate supervision (Nixon, 2022).
Reward	Paying workers is a good method to encourage them to work more and collaborate with others. It's also a good technique to honor and reward workers who follow safe and healthy work practices (C., & C., 2021).
Penalty	determining a fine based on the amount of garbage generated by building sites (Nawaz et al, 2022).

3. Methods

The present study adopted the questionnaire survey method.

3.1 Data Collection

Primary and secondary procedures are two categories of data collection techniques that are essential for research. The survey question, the type of data, and the resources available all influence the data collection method selection. While secondary data is obtained from sources like books, journals, and articles, primary data is obtained via methods like questionnaires and interviews. Journals, articles, books, and other secondary data sources are used by the researcher to pinpoint the attitudes and practices that lead to risky behavior on building sites. Several risky behaviors and key elements that employees frequently engage in on building sites were utilized to generate primary data, which is then employed to assist and accomplish Goals 1 and 2 through the usage of a questionnaire.

3.2 Questionnaire

Well-designed questions are crucial for obtaining positive responses from respondents. The study consists of three main parts: Part A, which focuses on workers' backgrounds; Part B, which examines unsafe actions; and Part C, which identifies factors influencing unsafe behavior. The questionnaire format includes a start page outlining the study's objectives, format, and sequence, and a questionnaire describing the study's objectives and sequence.

3.3 Sample Size Determination

Research samples are essential to the validity and reliability of studies. These are populations that data is taken from. Larger sample sizes enhance difference detection, while smaller ones may hinder extrapolation. Based on the known population size, methods such as the Taro Yamane formula and the Krejci and Morgan tables can be used to calculate the sample size. Only when the population percentage is 0.1 and the confidence coefficient is 95% is the Yamane formula valid. The target sample for this study was a worker on the construction site of an additional matriculation building. The purpose of selecting workers on the construction site is to study unsafe behavior and factors on the site so that the objectives can be achieved. Data for the number of employees obtained from the diary will be updated by the person responsible for the item. A total of 53 construction site workers are updated in the diary. The data will be used to calculate how many survey targets will be assigned to employees on the site. Workers on the site will always change according to the needs of the work that will be done on that site.

$$n = \frac{N}{1 + N\epsilon^2} \quad (1)$$

$$= \frac{53}{1 + 53 (0.1)^2} = 34.6 @ 35$$

Where:-

n = required sample size

N = the population size

e = the acceptable sampling error

3.4 Software Application

A software program called Statistics for Social Sciences (SPSS) is mainly used for statistical analysis of data gathered from study research. It is extensively employed in many different domains, including the social sciences, medicine, marketing, and educational research. The program has a feature-rich feature set and an intuitive interface that makes it suited for projects of all sizes and complexity levels, making it usable by users of all ability levels. After that, all the data needed for this study's survey is gathered and presented in a more accurate flow chart. This is so that a more precise and better explanation may be provided. The data submitted by study participants for each parameter is entered into the Statistics for Social Sciences (SPSS) software. Because it has an intuitive interface with point-and-click options for non-programmers, SPSS is well-known for being user-friendly. Additionally, it offers the capacity to carry out more intricate analyses through coding. One statistical technique for encapsulating and elucidating the fundamental properties of data sets is descriptive analysis. It entails computing measures of variability like ranges, standard deviations, and variances, in addition to core trend data like averages, medians, and modes. Early in the data analysis process, descriptive analysis is frequently employed to obtain an understanding of the data and to look for any data input errors or statistical assumption violations. To examine the information gleaned from the respondent's question, descriptive analysis will be used. Factors like risky behaviors and harmful conditions will define the interpretation. The highest reading average will determine the maximum number of workers on the construction site.

4. Results and Discussion

The data was analyzed using SPSS version 27. The finding was analyzed according to the objectives of the study and the outcomes of the analysis were presented in the form of a pie chart and table. There are 35 people of respondents.

4.1 Respondent's Demographic

Regarding gender, there are two target respondents: a female and a male. The gender response improvement, as illustrated in Figure 1 below, reveals that there are only 5 female respondents compared to 30 male respondents, who make up the majority of the workforce on the construction site.

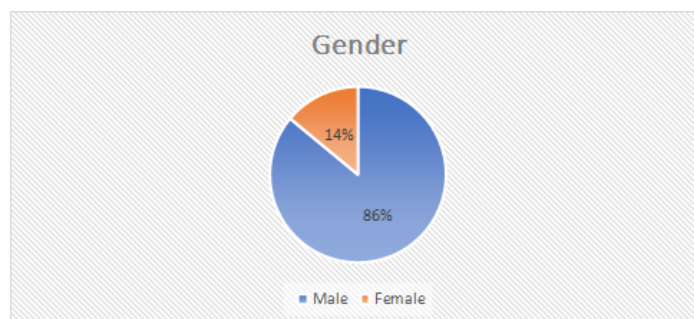


Fig. 1 Gender of the respondents

The respondents were divided into four age groups: 20 years old and below, 21– 30 years old, 31–40 years old, and 41 years old and above. According to Figure 4.2, the majority of respondents are between the ages of 21 and 30 years old, accounting for 60% of all respondents (21 out of 35). The second-largest age group followed by respondents is those aged 20 and under, who account for 6 responses and 18% of the total. The remaining age groups, 31-40 years old and 41 years and older, each have 11%.

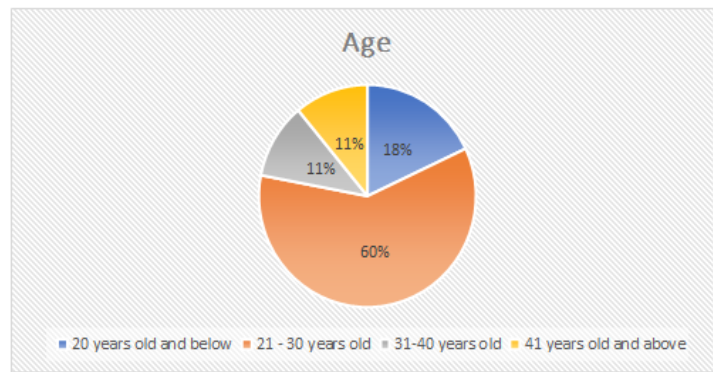


Fig. 2 Age of the respondents

Figure 4.3 below shows the result of the respondents' working experience in the construction industry. The majority of respondents' working experience in the construction industry is 1 – 3 years which are 19 respondents consisting of 54%. The second highest of respondents' working experience is 5 – 7 years which is 6 respondents out of 35 respondents consisting of 18%. Next, followed by 3 – 5 years and 7 – 10 years of working experience, of which 5 respondents consisting of 14% are the same.

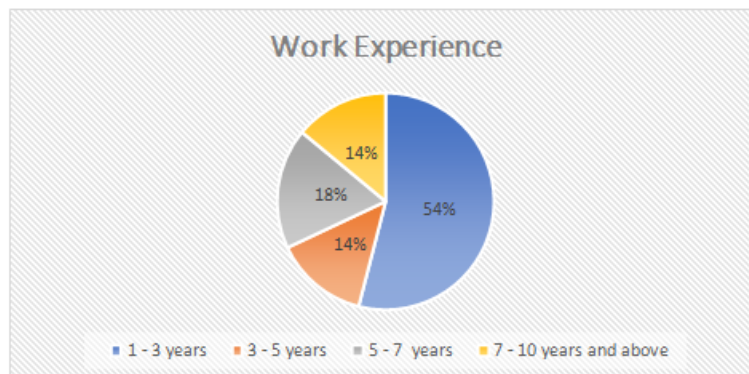


Fig. 3 Working experience of respondents

Three countries in all, Bangladesh, Indonesia, and Malaysia, were listed on this questionnaire. Out of the entire number of respondents, 17 made up the majority of the country that Indonesia undertook, or 49%. Bangladesh accounted for 37% of the total responders, with 13 of them. The five responders from Malaysia make up the lowest percentage of 14%.

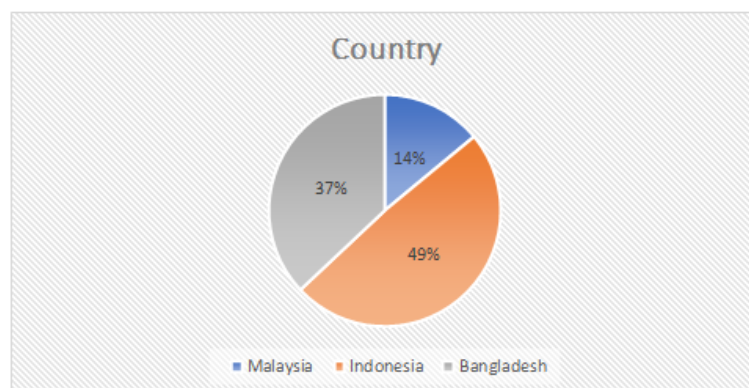


Fig. 4 Country of respondents

The study above indicates that men outnumber women as workers on the building site. Most of the laborers on the construction site are between the ages of 21 and 30, and the bulk of them have more than one to three years of experience. Most of the people who work on the site are foreigners.

4.2 Types of Unsafe Construction Worker's Action

Most of the risky behaviors on construction sites had lower mean scores, according to the examination of these behaviors. Construction workers routinely work without adhering to their supervisors' directions, which could be troublesome, as indicated by their lowest score of 2.8. Enforcing safety laws and preserving excellent working relationships are vital for companies and employees alike. A mean of 2.9 is also assigned to the handling, alteration, and transportation of objects in good condition, indicating that workers frequently change items when it is not acceptable. Other frequent issues include the improper handling, alteration, and movement of goods on the grounds. Properly maintaining safe and suitable working conditions at the location is an essential duty for both employers and staff.

Using the right instruments and equipment is another crucial duty. Inadequate equipment utilization and damage incurred on the job site might result in workplace mishaps. Properly maintaining safe and suitable working conditions at the location is an essential duty for both employers and staff. Periodically discarding sharp objects and nails in the same spot is regarded as an unsafe practice. The typical values for the arrangement and storage of products in safe places are 3.11 and 3.2, respectively. The property's position is inappropriate for storing products, thus decisions about material management need to be restricted and made near the deviation. Using personal defense mechanisms has a mean score of 3.3, which could be attributed to the high student population and location's overlap with matriculation. A healthy body has the highest mean of 3.5, demonstrating that employees cannot work from the top if they are not fit and capable of performing their jobs.

Table 3 Analysis of Types of Unsafe Construction Workers' Actions

No.	Unsafe Acts	Respondent's frequency (%)				Mean Score	Ranking
		Very Never	Never	Ever	Very Ever		
1	Work by command	11.4	17.1	51.4	20.0	2.8	1
2	Transfer, Handling, and The movement of inward objects is the right situation	8.6	14.3	54.2	22.9	2.9	2
3	Storage and arrangement of goods in a safe place	0	14.3	51.4	34.3	3.2	6
4	Using the tool correctly	8.6	22.9	28.6	40	3.0	3
5	Using equipment in good condition	8.6	11.4	28.6	40	3.0	4
6	Not throwing nails or stuff sharp all over the place	5.7	14.3	34.3	51.4	3.3	5
7	Using self-protection equipment	0	14.3	34.3	51.4	3.3	7
8	A healthy body	0	11.4	25.7	62.9	3.5	8

The analysis reveals four common unsafe actions performed by workers on construction sites, primarily due to building issues. These actions have a mean score of less than 3.0, with the lowest score obtained when workers follow instructions. Workers often ignore instructions, such as opening formwork when ordered, due to

the difficulty in correcting mistakes. This behavior is common on construction sites, where workers often try their best to follow orders in front of their employers. However, when they do not, they may not follow instructions, leading to potential accidents or issues. Maintaining work safety on construction sites requires workers to obey orders, which can help reduce communication errors between the company and its employees, promoting a harmonious work environment. By ensuring workers obey orders, both employers and employees can work in safety and harmony on the site.

4.3 Factors Influencing Accidents on Construction Sites

This part will address three elements: work, personal, and management. I will gather important factor information for every one of the three parts of this analysis. The primary activity that employees conduct on the site every day is the one with the highest mean readings.

4.3.1 Personal Factors

Table 4 *Personal Factors*

No.	Personal Factors	Respondent's frequency (%)				Mean Score
		Strongly Disagree	Disagree	Agree	Strongly Agree	
1	Laziness	11.4	17.1	45.7	25.7	2.86
2	Experience	0	22.9	48.6	28.6	3.06
3	Being in hurry	0	17.1	51.4	31.4	3.14
4	Showing off	5.7	14.3	48.6	31.4	3.06
5	Overconfident	0	22.9	34.3	42.9	3.20
6	Being uncomfortable	11.4	11.4	37.1	40	3.06

Table 4 reveals six personal factors that contribute to workers acting unsafe on construction sites. The highest personal factor is too confident, which can lead to insecurity and disregard for rules. Workers who have been working on the site for a long time may be too confident in their work culture, disregarding superior orders and adhering to rules. The second highest factor is a rushing attitude, as workers often rush to finish work quickly, assuming that completing it quickly allows them to relax and talk to colleagues. Work experience, behavior, and discomfort also contribute to unsafe behavior. Most workers have become accustomed to their work and assume that it won't cause accidents, leading to repeated unsafe actions. However, some workers may not follow safety procedures due to their expertise or lack of interest in the work. The lowest personal factor is laziness, with an average reading of 2.86. Laziness is a major factor in encouraging unsafe behavior, as workers who do not comply with rules or regulations during work are more likely to cause accidents on the construction site. Workers who prioritize safety at the time on the building site may not prioritize safety and may not take safety seriously.

4.3.2 Job Factors

Table 5 *Job Factors*

No.	Job Factors	Respondent's frequency (%)				Mean Score
		Strongly Disagree	Disagree	Agree	Strongly Agree	
1	Too much work	0	11.4	45.7	42.9	3.31
2	Time Pressure	5.7	0	48.6	45.7	3.34

The study reveals that working factors can lead to workers acting unsafely on the job site. Time pressure and too much work are two main factors causing unsafe behavior. Time pressure is the most common factor, with 90% of respondents stating that it is a major reason for unsafe actions. Accelerating job preparation can lead to increased productivity, but too much work can also lead to unsafe actions. Employees often prioritize safety over self-security, as they may use unsafe methods to complete tasks at the appointed time. Overall, these factors contribute to unsafe work practices on the job site.

4.3.3 Management Factors

Table 6 Management Factors

No.	Management Factors	Respondent's frequency (%)				Mean Score
		Strongly Disagree	Disagree	Agree	Strongly Agree	
1	Management Pressure	5.7	20.0	45.7	28.6	2.97
2	Lack of management support	5.7	17.1	51.4	29.7	2.97
3	Inadequate supervision	0	25.7	54.3	20.0	2.94
4	Reward	17.1	54.3	17.1	11.4	2.23
5	Penalty	14.3	8.6	40.0	37.1	3.0

Table 6 reveals five management factors that contribute to employees acting unsafely. The highest management factor is punishment, with an average score of 3.0, as poor punishment leads to unsafe behavior. Management often focuses on productivity, causing workers to act unsafely to avoid pressure and lack of support. Insufficient monitoring, with an average score of 2.94, is another factor, as workers often take advantage of insufficient supervisors on the site. The lowest management factor is reward, with an average score of 2.23, as workers are dissatisfied with their employer's lack of recognition, such as a raise, leading them to act unsafely to show dissatisfaction. In summary, poor punishment, pressure from management, lack of support, insufficient monitoring, and dissatisfaction with rewards contribute to unsafe work practices.

4.4 Factors That Influencing Workers to Act Unsafely on Construction Sites

Based on Figure 5 below shows the study identifies the main factors influencing workers to behave unsafely on the site. The working factor, with the highest mean scores of 3.34 and 3.31, is the main factor causing workers to act unsafely. Time stress factors, such as time constraints, cost reduction, and rushing attitudes, can lead to unsafe practices, cheap materials, and a lack of supervision, resulting in construction accidents. Prioritizing safety and ensuring safe construction practices on the site are crucial. Workers may also behave unsafely due to their self-sufficiency, believing they won't be able to finish the job at the appointed time. Therefore, it is essential to prioritize safety and ensure safe construction practices on the site.

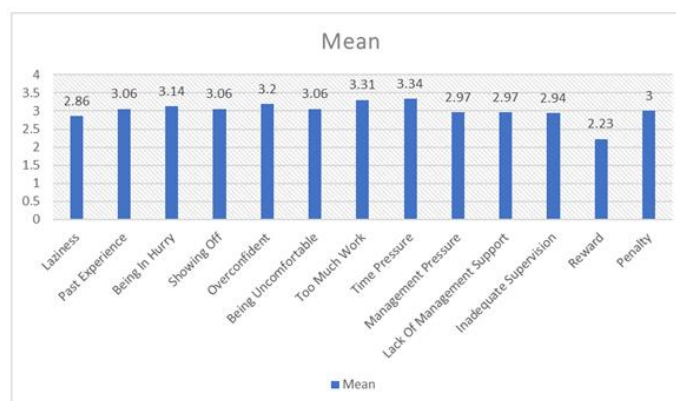


Fig. 5 Factor unsafe action

5. Conclusion

This study aimed to identify risky behaviors and drivers of such behavior on construction sites. Thirty-five respondents involved in the design and construction of buildings for Kelantan Mathematics College met the study's achievement criteria. One of the most common unsafe actions is working without orders, which is an insecure act and often causes accidents. Workers often fail to follow site rules, such as wearing self-protection equipment (PPE) and following safety instructions. Time stress is a significant factor influencing workers to act unsafely on the site. The study's findings show that the objectives of the study have been effectively accomplished. The study highlights the importance of safety on construction sites and the need for proper training and protection for workers.

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