

**SAFETY AND HEALTH MANAGEMENT AT  
CONSTRUCTION SITE OF BUILDING PROJECTS**

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**SCHOOL OF CIVIL ENGINEERING  
UNIVERSITI SAINS MALAYSIA  
2022**

SAFETY AND HEALTH MANAGEMENT AT  
CONSTRUCTION SITE OF BUILDING PROJECTS

By

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This dissertation is submitted to

**UNIVERSITI SAINS MALAYSIA**

As partial fulfilment of requirement for the degree of

**BACHELOR OF ENGINEERING (HONS.)  
(CIVIL ENGINEERING)**

School of Civil Engineering  
Universiti Sains Malaysia

Aug 2022



**SCHOOL OF CIVIL ENGINEERING  
ACADEMIC SESSION 2021/2022**

**FINAL YEAR PROJECT EAA492/6  
DISSERTATION ENDORSEMENT FORM**

Title: Safety and Health Management at Construction Site of Building Projects

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## **ACKNOWLEDGEMENT**

First, I would like to offer my most heartfelt appreciation to my supervisor, Assoc. Prof. Dr. Sharifah Akmam Syed Zakaria, for providing constant guidance and help during each step of my dissertation. I couldn't have done it without her. While completing this dissertation, she will, without a shadow of a doubt, both instruct and assist me in finding solutions to any issues that may arise. This dissertation would not have been attainable without her direction and the steadfast assistance she provided throughout the process.

In addition, I would like to extend my gratitude to the School of Civil Engineering at Universiti Sains Malaysia and construction companies for their help and support during the data gathering process for my questionnaire survey.

Aside from that, I would like to express my deep gratitude to all the respondents who took part in answering my questionnaire and survey. I have received some helpful input from them. Honestly, the data could not be obtained without their cooperation, and the investigation would not be finished if they did not participate.

In conclusion, I want to convey my appreciation to my family and friends for their unwavering support and encouragement over the years that I spent pursuing my education, as well as the time I spent working on completing my dissertation. Without their steadfast support, completing this dissertation would not be possible

## ABSTRAK

Peraturan dan amalan yang berkaitan dengan keselamatan dan kesihatan adalah bertujuan untuk mengelakkan kemalangan atau kecederaan di tempat kerja atau ruang awam. Ia berkaitan dengan melindungi keselamatan pekerja dan kesihatan setiap orang yang boleh dcederakan oleh pekerjaan mereka. Semua organisasi, termasuk dalam sektor pembinaan, harus mematuhi amalan keselamatan dan kesihatan yang sesuai untuk mengurangkan kemalangan di tempat kerja. Iklim ekonomi dan sosial negara dipengaruhi dengan ketara oleh industri pembinaan. Kakitangan di tapak bina memerlukan persekitaran kerja yang lebih selamat untuk kesihatan fizikal dan emosi mereka. Melaksanakan langkah-langkah keselamatan dan kesihatan di tapak pembinaan bangunan mempunyai kesan positif terhadap kesejahteraan pekerja, produktiviti dan kejayaan projek. Tetapi masih terdapat aspek tertentu pelaksanaan tahap keselamatan yang sesuai di tapak pembinaan yang kurang dalam pembinaan bangunan negara kita. Statistik telah menunjukkan kelemahan tertentu dalam piawaian keselamatan dan kesihatan projek pembinaann bangunan sekarang yang perlu diperbaiki dari semasa ke semasa. Tujuan kajian ini adalah untuk menilai pelaksanaan keselamatan dan kesihatan di tapak pembinaan bangunan dari pelbagai perspektif. Dapatan tinjauan menunjukkan bahawa bahagian budaya keselamatan yang paling kuat berkaitan dengan persepsi pihak berkepentingan dalam pembinaan ialah budaya paksa yang memerlukan persekitaran kerja yang selamat untuk menghapuskan risiko kemalangan atau kecederaan yang berlaku. Selain itu, aspek latihan kotak alat keselamatan, yang dilakukan sebelum kerja bermula, adalah yang paling kerap diamalkan dalam situasi sebenar. Aspek penentu utama dalam melaksanakan keselamatan dan kesihatan dalam pembinaan adalah pematuhan kepada peraturan keselamatan dan kesihatan pekerjaan dari perspektif teknikal. Kajian ini dijangka akan memberikan perspektif dan cadangan kepada pihak

berkepentingan dalam industri pembinaan supaya mereka dapat memahami bagaimana melaksanakan langkah-langkah keselamatan dan kesihatan boleh memberi manfaat kepada projek bangunan sambil menjaga kesihatan dan keselamatan mereka yang bekerja dalam industri ini.

## **ABSTRACT**

Regulations and practices related to safety and health are meant to avoid accidents or injuries in workplaces or public spaces. It has to do with protecting workers' safety and the health of everyone that could be harmed by their job. All organisations, including those in the construction sector, should adhere to appropriate safety and health practices to reduce workplace accidents. The construction industry significantly impacts the economic and social climate of the nation. The personnel at the site need a safer working environment for their physical and emotional health. Implementing safety and health measures at a building site positively impacts employees' wellbeing, productivity, and project success. But there are still certain aspects of appropriate safety level execution at construction sites are lacking in our nation's buildings. The data has shown shortcomings in the current building project safety and health standards that will need to be fixed over time. The purpose of this study is to evaluate the implementation of safety and health at building construction sites from various perspectives. The survey's findings indicate that the part of safety culture most strongly connected with stakeholders' perception is the forced culture that requires a safe working environment to eliminate the risk of accidents or injuries. Additionally, the safety toolbox training aspect, which is completed before work begins, is the one that is most often practised in actual situations. The central determining factor in implementing safety and health in construction is compliance with OSH regulations from a technological perspective. It is anticipated that this study will provide views and suggestions to the stakeholders in the construction industry so they can understand how implementing safety and health measures might benefit building projects while safeguarding the health and safety of those employed in this industry.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background Study

The building industry is one of the most important sectors contributing to the expansion of Malaysia's economy and the nation's progress toward becoming a developed nation. The building and construction industry is known as high risk and encompasses a wide variety of operations, including building, modification, repair, and maintenance. It is anticipated that there would be a rapid expansion of infrastructure connected to, for example, the health, transportation, and education sectors to accommodate the needs of an increasing living population, industrialisation, and other causes. However, ever since the beginning of time, it has been well known that this business has a high incidence of accidents and deaths, both of which have negative consequences based on the 3Ds of dirty, dangerous and difficult that are commonly used to describe jobs in the construction industry. This raises concerns and apprehensions concerning the state of health and safety measures currently in place in this industry.

The location where work on a building is performed is known as the construction site, and it is inherently risky because of the nature of work that are involved at the construction site. It is also possible to refer to it as a worksite, which suggests that large-scale building projects such as the construction of residential areas, residences, or government facilities take place. This kind of building construction work encompasses a wide variety of tasks. Typically, at the construction site of building projects, the site manager is to be responsible for supervising the project. Additionally, the site manager will assist in the planning and coordinating resources, general scheduling, smooth communication between teams and contractors, progress monitoring, and reports to provide a safer working environment for construction workers.

Establishing a safety culture among construction workers requires effective safety management by either the organisation or the employer. In terms of safety and health aspect, components that should be managed properly include a written safety policy, accident investigation and report, safety records, safety handbook, safety checklist, accident statistical analysis, and formal organisational structure. (Halim et al., 2020).

Construction safety and health are vital to ensure that a project completion from the beginning to the end with the fewest number of issues or problems that might disturb or interrupt the course or implementation of a building project. The stakeholders in the construction industry have their responsibility to ensure that a suitable level of practices in the execution of safety and health aspects in building projects particularly at the construction sites are maintained and this is necessary for Malaysia to realise its goal of moving towards a developed country (Asari et al., 2016).

Due to the nature of construction business and project factors that contribute to an abnormally high risk of accidents or injuries as compared to the other sectors, the construction safety and health aspect presents various problems. The health and safety of construction workers are important not only during the construction phase, but they must also be maintained throughout the project, from the planning phases to the point when construction works are completed. The occupational safety and health (OSH) programme depend on various factors, including the economy, regulation, and humanity. The factors that determine how well safety measures are performed should be both at the project and organisational levels. This indicates that OSH aspect should not be confined to the construction site workers only but should be managed throughout the company, including all personnel involved in a construction project (Jaafar et al., 2018).

In the end, many benefits can be gained from implementing OSH practices in the construction industry in an effective manner. Some of these benefits include increasing responsibilities, boosting the employee's morale, improving the worker's attitude, creating a positive work environment, and reducing injuries. On the other hand, the construction sector has a poor level of awareness in terms of the long-term advantages of safety standards as the bidding process of a project often ignores safety, which resulted in cost-cutting and corner-cutting that need to be avoided (Shafii et al., 2019).

The level of health and safety aspects in the construction industry should be raised accordingly to increase the overall quality and performance of a construction project while ensuring that the well-being of employees in the construction industry remain safe and healthy. The outcomes of a construction site's safety and health performance or practice will be determined by its safety standards and objectives, as well as its safety management, including employee commitment, communications, workplace dangers, and the physical environment in which workers execute their jobs (Asari et al., 2016).

Guidelines on Occupational Safety and Health Act (OSHA) 1994, passed in 1994 to guarantee the safety, health, and welfare of all employees, are used to implement safety and health regulations in the construction industry (DOSHS, 2006). The concept that occupational safety should be self-regulated was the impetus for creating OSHA in 1994. This means that companies should comply with the recommendations of OSH out of their self-interest rather than the fear of government actions and consequences (Aziz and Hussin, 2003). It is the goal of this initiative to make sure that no one gets hurt or injured while they are on their job or duties by ensuring that there is a safe working environment and appropriate safety measures are taken throughout the construction phase.

Therefore, it is the responsibility of the Department of Occupational Safety and Health (DOSHS), which falls under the Ministry of Human Resources, Malaysia to ensure

that all economic sectors comply with safety and health legislation. This department also has the authority to inspect workplaces, enforce safety laws, and bring criminal charges against lawbreakers (Aziz and Hussin, 2003). In addition, the government of Malaysia, acting through the Construction Industry Development Board (CIDB), has placed a greater emphasis on occupational safety and health (OSH) on construction sites. Despite this, the growth of OSH at sites is still a cause for concern, and this issue needs to be mitigated (Yakubu et al., 2012).

## **1.2 Problem Statement**

It is a common knowledge that the construction industry is hazardous in nature which requires a considerable amount of control over the safety and health of its workforce. Due to a lack of standard work procedures, the Malaysian construction sector's safety and health management has to deal with various problems and challenges. Construction projects in Malaysia and other parts of the globe are both subjected to dangerous circumstances, which increase the likelihood of accidents, casualties and health problems that impacted on a project's safety performance. The casualties are connected to the one-of-a-kind characteristics of the construction industry, incorrect site circumstances, unsafe human behavior, unsafe equipment, unsafe work practices, and unsafe procedures, all of which are resulted from poor safety performance in construction projects (Abas et al., 2020).

The Department of Occupational Safety and Health reported 169 fatalities and 3,911 accidents in the construction industry in 2018, the country's most significant number among other economic sectors (Babulal, 2020). In addition, according to the National Occupational Accident Report for the year 2020 as shown in Figure 1.1, the



total number of accidents in the construction industry was 3958, and 81 people died because of injuries (Department of Statistics Malaysia, 2021).

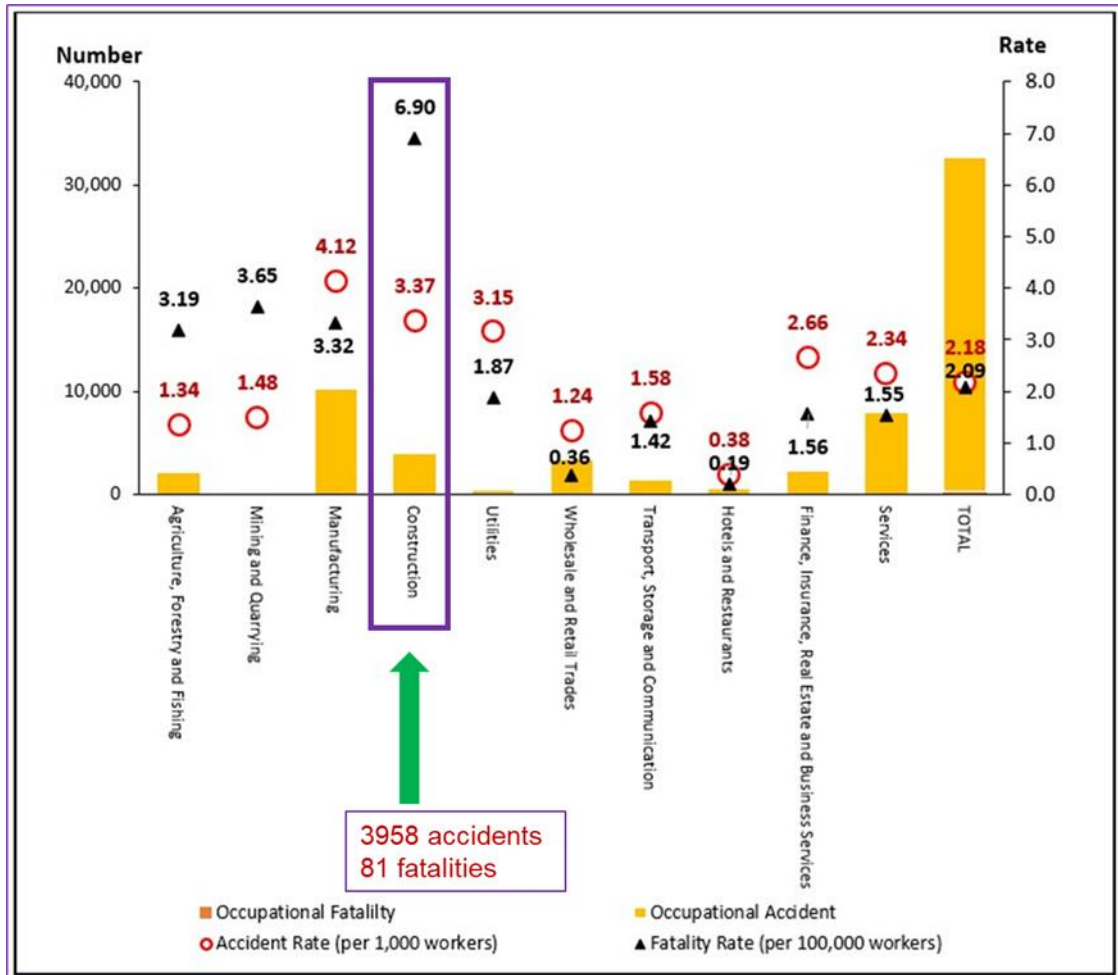


Figure 1.1: Occupational Accidents and Fatality by OSHA Sector, 2020 (Source: Department of Statistics Malaysia Official Portal, 2021)

Generally, the lives of 48,000 individuals were involved in accidents in various developing nations like India, with the construction industry accounting for 24.20 % of the total deaths (EHS, 2019). These figures should raise severe concerns as they have reached an alarming level. The number of accidents and deaths in the construction business affects not only the victims' families but also the employer, who will lose an

experienced worker and be forced to bear incidental costs due to project delays, higher insurance premiums, and medical bills. Although the construction sector makes a substantial contribution to the economy's overall performance, the number of accidents and fatalities that occur in this industry affects not only the families of the victims but also their employers (Halim et al., 2020). Thus, improving occupational safety and health in the Malaysian construction sector is challenging, despite the existence of appropriate safety laws and regulatory organisations.

Based on these problems, this research aims to evaluate the implementation of safety and health management practices in construction projects. In addition, this research also intends to determine various project elements that impacted on safety and health implementation aspects conducted during construction projects. There is a lack of awareness about safeguarding the well-being of people involved in site work regarding their safety and health concerns. Given the circumstances, it is important to determine the advantages of adopting safety features to improve project performance.

### **1.3 Objectives**

This research aims to investigate the application of safety and health management practices at the construction site of building projects. The insights of construction industry specialists, such as contractors, consultants, developer, and other professionals working in the industry, are essential to accomplish the purpose of the research. The following is a list of the objectives of the study:

1. To identify the culture of safety and health management and practices at the construction sites of building projects as perceived by the construction stakeholders.

2. To examine current aspects of safety and health that are practised at the construction sites of building projects by construction companies.
3. To compare technical and non-technical factors that influence the health and safety practices at the construction sites of building projects.

#### **1.4 Scope of Study**

The construction site of a building project will serve as the exclusive focus of the investigation, dictating its extent and restrictions. This research includes several key participants, including local industry players, consultants, developer, and contractors, all considered stakeholders in the project. The management of stakeholders has a significant impact on the performance outcomes of construction projects. However, despite numerous case studies that have been conducted in this field, there is a severe lack of research in this area in Malaysia, and the perspectives of construction stakeholders have not been investigated (Kerry et al., 2021). For this study, a survey was performed, and questionnaires were distributed to respondents located in the study's research region, which is comprised of the states of Penang, Kedah, and Perak.

#### **1.5 Importance Of Study**

Based on the results of this study, it is anticipated that the construction sector will alert and become more conscious of how critical it is to maintain the high standards of occupational health and safety in the working environment, particularly in the built environment. A preventive action that improves the working environment of construction projects become more hospitable, not only helps employees feel safer but also leads to higher productivity at work, which can be planned for and in turn reduces the number of

accidents that result in injuries or deaths in a certain duration of construction project implementation.

## **1.6 Dissertation Outline**

This research project is divided into five chapters; each delves into a distinct facet of the research being conducted. Each chapter is its independent unit that may be read in its entirety and adds to the overall argument of the book. The work done on the research topic will be presented in the outline in a manner consistent with the study's progression.

The first chapter, which acts as an introduction, describes the background research, problem statements, research questions, aims, and scope of the work. It provides a general notion and a deeper comprehension of the subject of the inquiry.

The past research on the topic of safety and health management on the construction site of building projects is explained in detail in Chapter 2, which reviews the relevant literature. Papers, journals, articles, and other types of writings relevant to the present study subject make up this compilation.

The methodology is discussed in Chapter 3. It outlines the processes and methods of the research in acquiring the outcomes of the study as well as the data collected. This chapter also discusses concerns about the design of research instruments, such as the characteristics of the respondents and the data that must be gathered.

The findings and subsequent discussion are presented in Chapter 4. Data analysis was performed on the survey's responses once they have been gathered. The study results are then shown in the form of a table, chart, or figure, depending on the data visualization chosen, to illustrate the patterns and findings backed by the reasoning. A summary of the results will be produced in line with the goals.

The findings and implications of the study are summarized in Chapter 5, which is often known as the conclusion and suggestion section. In addition to proposing possible future applications, a summary of the research findings will be presented. We will talk about several problems that haven't been addressed yet and some prospective future research projects.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The prior work and research that were performed about the variables of this study are presented in this chapter. The objective of the literature review is to understand the ongoing research, issues and discussion pertinent to the subject being examined and communicate this information in the form of a written report. A critical analysis of the material on safety and health at construction sites is included in the literature review so that the research may be situated within the context of previous work.

As it provides a more comprehensive grasp of the subject under investigation, performing a literature review on safety and health management contributes to enhancing the research process of this topic in relation to the performance of construction projects. In this case, this chapter presents the aspect of safety and health management in the building's construction history, including the development, actual practises, influencing factors, importance, and significance, as well as the lesson that can be learned at the end literature review.

#### **2.2 Overview of Construction Industry**

The process of constructing physical infrastructure, superstructure, and accompanying facilities is usually referred to as construction, and the word "construction" is widely used to describe this activity while construction also may alternatively be defined as all the operations related to the constructing and maintenance of permanent buildings and facilities, including the installation of temporary structures and facilities. Through the actualization of a wide variety of construction development projects, the building and construction industry plays a significant and essential part in

bringing the hopes and dreams of individuals closer to becoming a reality (Ibrahim et al., 2010).

Since it provides the basis for a diverse range of economic activities and contributes to the accomplishment of a nation's social and environmental goals, the construction industry is significant on a global scale due to its enormous size and enormous production because it serves as the foundation for a wide range of economic activities and accidents can take place at any time on a construction site, including before work starts, while a site is being assessed and investigated for a project, and even after construction has been finished. Those who are slain or wounded on construction sites include not only the employees who are engaged in the project but also others who are not working on the job, such as passers-by and local tenants who are killed or injured because of the activities taking place on the building construction site (Ulang et al., 2014)

The fast expansion of the construction industry is reliant on the productivity of construction employees, which in turn has repercussions on their health because of various influences that impacted employee health, nutrition, and industrial discipline. Accordingly, these influences have also impacted on the reliable availability of labour and workers' productivity in the construction industry is strongly reliant on these aspects of employee life. The construction business is known as hazardous with the significant amount of manual labour that it requires. It is generally accepted that the construction industry has a high accident rate because of the nature of the work involved, which includes working at heights, utilizing electrical instruments, being exposed to toxic chemicals, noise, vibration, and uncomfortable temperatures, results in a high accident rate, thus the sector is susceptible to sizeable monetary loss due to workplace accidents (Zainon et al., 2018).

There are many kinds of construction stakeholders currently working in the industry, each of which has its own unique goals to accomplish within the construction sector, including the consultants, designers, builders, subcontractors, and building developers etc. Several issues contributed to the development of unexpected tragedies, including inadequate systematic ways for implementing safety and health standards, a lack of institutionalized rules, and a lack of commitment by construction stakeholders (Mahmoud et al., 2021).

### **2.3 History of Safety and Health in Construction**

In general, the construction industry is one of the most important businesses in terms of its contribution to the gross domestic product (GDP). The construction sector is generally considered one of the essential businesses in terms of its contribution to the country's overall gross domestic product (GDP) (Sanchez et al., 2017). However, in the most industrialised countries of the globe, the construction sector is routinely recognised as one of the jobs with the highest risk of injury or death. Throughout the years, the safety and health concerns plaguing the construction industry are closely tied to the organisation of the construction industry and the way the work is performed.

In recent years, accident statistics have grown in visible patterns, which has prompted the construction industry's worry about these problems to expand, while observable trends include an increase in the number of accidents that have occurred. As a direct consequence of this, significant efforts have been made to obtain a zero-accident target, which focuses on making systemic and fundamental improvements in construction safety because the high accident rate in the construction business is a significant contributor to the immense amount of misery experienced by society.



When there are issues with construction site safety, workers and their families are placed in danger, which has ramifications for the social welfare of the sector and the viability of society in general. In addition, an accident affects the productivity of the remaining workers and work teams, which involves reorganising the task and giving psychological and emotional assistance to individuals who have been impacted in some way (Rivera et al., 2021).

The statistics about injuries and deaths that occur on the job have a disproportionately high representation in the construction, and this is a significant issue that must be addressed on a global basis because when an employee suffers an accident on the job, their social circles do not just at work but also at home and on the broader community are shaken up to a substantial degree. These social and professional implications include a reduction in an individual's goodwill and reputation in the corporate world and a significant impact on the individual's networks.

The notion of a safety culture is rapidly being recognised as a vital component of safety and health management in the construction sector. However, there is no specific or adequate model that can provide an integrated view of safety culture and the structures that are linked with it, as well as how to relate it to the degree of safety performance in the construction sector (Jebb, 2015).

The primary focus of occupational safety and health in the construction industry are the development, promotion, and maintenance of workplace policies and programmes that ensure the physical, mental, and emotional wellbeing of the employees and that keep the workplace environment free of any potential hazard that could cause injury to the employees. In addition, the primary focus of occupational safety and health in this industry is to ensure that the workplace environment is free of any potential hazards that could cause injury to the employee. (Sanchez et al., 2017).

In relation to safety and health management at construction sites, all construction stakeholders must be included in the construction process at all stages, including the planning and constructing phases. This is due to the condition of safety and health evaluations that are required at each level, thus safety, health, and environmental management must come first in every aspect of a construction project to maintain control over the safety management systems. These systems include policies, organisations, management controls, and resources, and in addition, safety management must be supported by the role of engineers, contractors, subcontractors, and other construction site personnel. This condition guarantees that all aspects of management, including health, safety, and the environment, are carried out appropriately (Kerry et al., 2021).

#### **2.4 Overview of Safety and Health in Building Projects**

Construction activities and its development are considered as complex processes, with a wide variety of building components gathered from local and foreign sources. These components were sourced or obtained from various suppliers. For example, a building structure can be considered as sustainable by ensuring all specifications and project requirements are met. Therefore, the impact that it has on its surrounding environment must consider not only the health and well-being of the building occupants but also the health and well-being of those who construct, operate, maintain, and decommission the facility after the project has been handed over.

Even though there are many clear benefits of good safety and health compliance to building design aspects, there are still various incidences that involve safety problems in construction projects. The construction of buildings raises substantial concerns over higher-risk work situations that are not managed or well-controlled and are exacerbated

by the fact that safe and healthy scenarios are not being created (Dewlaney and Hallowell, 2012).

The construction industry is regularly one of the sectors that have the highest rates of injuries and fatalities, which makes it among the most dangerous businesses in the world. Moreover, due to the globalisation of the construction business, employees in the construction sector across the globe are exposed to substantial risks and difficulties in implementing their tasks or activities. Workers in the construction business are exposed to a wide range of dangers, such as the possibility of falling from great heights, being injured by moving machinery and tools, being exposed to dangerous levels of noise, and facing the possibility of being electrocuted, and so on. The key variables that are crucial to be considered at construction sites include a lack of access to fall protection equipment, poor planning, insufficient construction time, and an inadequate number of appropriate anchoring points (Tarique 2021).

Even though the initial safety concerns are considered throughout the design and building of a facility, there might be individual acts on the employer's part rather than a duty that is imposed by law or regulation. This situation is due to the traditional manner of construction procurement that creates an environment in which there is a strong incentive to investigate many alternative building materials, techniques, and safety paths since the overall cost of the project is linked to the cost of the professional fees. On the other hand, in line with such procurement and contractual agreements, the owner could not be obligated to pay for the cost of the time that was spent searching for other solutions on safety and health aspects at construction sites (Zekri, 2013).

Residential, commercial, and other construction projects are only some of the many varied subcategories of building endeavours. Accidents that happened at the construction site of a building project have a psychological and financial impact on its

operations as they could cause delays in the project, increased expenditures, and a loss of reputation for the builders; all these things should be grounds for concern. The pace at which buildings are growing upwards is directly linked to the increasing likelihood of an accident although traditional structures are distinguished by using materials that are of a high grade, resistant to the effects of the weather and with decent quality.

Therefore, it is important that architects and designers should avoid the decisions or actions of selecting poor grade materials, which may lead to higher risks in terms of construction failure due to the low quality of a building. Indeed, this can be avoided by carefully considering the long-term implications of these decisions because poor decision-making process in relation to safety and health management aspects in construction projects may results in low building quality besides increases the risk of structure failure. On a construction site, one of the most common types of accidents that might take place is the collapse of an existing building as it is challenging to control all potentially dangerous activities that take place on a construction site for building projects (Misnan, 2018).

Due to the rapid increase in the number of high-rise buildings being constructed around the nation, the construction industry must pay a more considerable amount of attention to issues about worker safety and health as numerous accidents and mishaps happen every year on the construction sites of brand-new homes and buildings (Goh et al., 2016).

## **2.5 Safety and Health in Construction Development in Malaysia**

The Occupational Safety and Health Act (OSHA) of 1994 is the legislation of safety and health management in Malaysia, ensuring that safety and health precautions are taken, and it is the responsibility of the Department of Occupational Safety and

Health (DOSH), which falls under the Ministry of Human Resources. The function DOSH is to ensure the safety, health, and welfare of those who are employed, as well as to protect others from the risks of injuries and to ensure their safety and health aspects at work. A situation of total physical, mental, and social well-being, rather than only the absence of disease, is referred to as a health aspect, while safety is defined as the lack of danger to harm (DOSH, 2006).

As various efforts have been taken throughout the planning and design phases of construction projects, significant number of occupational safety and health (OSH) concerns associated with the construction industry are becoming more recognised. In construction projects, worker will get benefits based on occupational safety and health performance as OSHA is the contractor's duty; nevertheless, this commitment is ultimately transferred to safety professionals hired by the contractor (Abas et al., 2020).

The Occupational Safety and Health Act of 1994 (OSHA) has offered recommendations for occupational health and safety systems, but it seems ineffective since many construction contractors' firms still lack numerous significant characteristics that should be employed to avoid accidents on construction sites. Every company should ensure that the protection of their employees' health and safety as a major concern, due to the construction sector as one of the highest rates of on-the-job injuries of any occupation (Affandi, 2009). Even though the management of project safety and health aspects has been a challenge in the construction industry for quite some time, the sector seems to be afflicted by a general inability to manage workplace safety and health to the point where a proactive culture of zero accidents prevails.

OSH aspects are essential to be implemented during the progress of construction projects since they would affect the work quality and time, and also engaged in various construction tasks at every level, beginning with the pre-construction phase and until the

final post-construction stage. In addition, it is also discovered that accidents that happened throughout a construction stage can be divided into three categories: during the design, during the planning, and during the construction. Therefore, to exterminate any potentially damaging effects on the construction sector, the management of building projects should integrate occupational safety and health measures into its daily operations (Saifullah and Ismail, 2011).

In addition, the Malaysian government initiated the "Master Plan for Occupational Safety and Health in Construction Industry" in 2009, intending to establish a culture of safe and healthy working environment and to improve the nation's overall well-being. This includes a wide variety of strategic core principles to reduce the incidence of workplace accidents, fatalities, and disease transmission but the success of this strategy is contingent upon implementing its guidelines in the businesses and commercial operations of the stakeholders (Razali et al., 2020).

## **2.6 Stakeholders in the Safety and Health Culture of Building Projects**

Construction stakeholders' roles in the safety and health culture of building projects have progressed from the paradigm of project progress and its performance as a part of the sustainable development agenda of the construction industry. Details on the culture of safety and health in construction projects are presented as follows:

### **2.6.1 Type of Culture**

Generally, culture influences human behaviors and mental processes in performing the daily activities of construction employees. In the implementation of safety and health management at construction sites, the stakeholders of building projects

are influenced by various types of culture to rationalize their actions in in the built environment as presented below:

### **2.6.1(a) Forced Culture**

The concept of protective culture and forced culture may be used to differentiate between the two approaches to safety and health management in the construction industry. A kind of enforcement related to safety and health aspect is known as forced culture which is related to significant injuries or adverse effects on the employees of building projects. The purpose of forced culture is to educate other people on how they should behave by modifying their behavior via rewards and punishments. For example, the compliance of safety and health aspects must be mandated based on anything that relates to any facts or data concerning the current state of the construction site that proofed that a particular action on safety and health requirements is not performed in construction projects.

Another example is when the intention of having health and safety officers is to detect workers engaging in unsafe behaviors so that they can have control over these behaviors. However, fear is not an effective motivator for high levels of performance in the workplace, as most firms with imposed cultures obtain subpar job performance from their employees' achievements. Moreover, the construction industry's particularly high incidence rates may, in part, be attributed to the culture of a significant number of its employees (Razali et al., 2020).

### **2.6.1(b) Protective Culture**

The term protective culture refers to a sort of behavior that, in comparison to forced culture, is either more widespread or has less influence on the employees having primary function with the production of policies and operating procedures, which it uses

to conduct safety initiatives for employees. When an employee breaks a policy or process, the immediate response of management is to develop additional rules and procedures, even when this results in average job performance within an industry. A protective culture is like a preventive culture in that it is directed at the society and places emphasis on the preservation of health and its advancement (Kim et al., 2016).

### **2.6.2 Stakeholders' Involvement with Safety and Health Culture**

The term "stakeholder" refers to any individual or group of individuals who have either participated in the decision-making process or been impacted by the procedure. The group is comprised of a variety of internal and external stakeholders to the organization; for example, the owner and the contractor are internal stakeholders, whereas the local community and the government are external stakeholders. When the rights of each stakeholder are altered, the multiple stakeholders in the building process represent a wide variety of interests, most of which are likely to be safeguarded; in addition to this, the responsibilities of stakeholders include the enforcement of health and safety rules on construction sites and the development of a more robust institutional framework for the management of construction activities. For example, incidents can occur on the site involving other persons if the stakeholders fail to provide excellent working gear and platforms (Osei-Asibey et al., 2021).

Safety culture is a product of individual and group qualities, attitudes, competencies, and behavior patterns that form an organization's commitment to health and safety management's style and basic competence (Jebb, 2015). The management of stakeholders has a considerable influence on the safety of construction projects, particularly regarding the complexity and inter-connections of the project, as



stakeholders can make concessions and adjust to the project approach, and they are critical components that influence the overall success of the project.

The risk mitigation process requires participation from all parties involved in the building industry, as well as feedback from those parties to accomplish the set goals for the construction project's safety. Therefore, it is essential for the various parties involved in a building project to discuss all related dangers and hazards that they foresee. A significant number of occupational safety and health (OSH) risks that are connected to construction activities may be attributed to various activities during the planning and design phases of building projects. In this case, accident management requires the participation of a wide variety of stakeholders throughout the construction phase and the project's lifecycle (Abas et al., 2020).

It is the responsibility of employers to provide their workers with safety training and to establish comprehensive safety plans to improve safety performance while on construction sites. Hence, construction stakeholders, including engineers, contractors, and subcontractors, are expected to conduct themselves ethically since they are responsible for prioritizing workers' safety and health aspects. On the other hand, contractors should monitor their projects' safety performance to ensure that they are aware of the safety and well-being of their organizations (Kerry et al., 2021).

Despite several case studies, the perspectives of those involved in the construction industry of Malaysia towards safety aspects have either not been fully investigated or are insufficient (Kerry et al., 2021). It is discovered that there is a gap in the existing body of research that does not cover the various stakeholders' perceptions of safety and health aspects, particularly risks and hazards in the sense of Malaysian building projects in a precise manner based on the question of whether these stakeholders

have comparable or dissimilar views on the dangers of risk and hazards in building projects.

## **2.7 Current Safety and Health Practiced by Construction Companies**

For building projects to be completed on a fast-track basis without compromising the safety and health compliance that must be satisfied, it is important to determine and assess the current practice of safety and health aspect in building projects.

### **2.7.1 Type of Safety and Health Aspects**

This section discovers various types of safety and health aspects in building projects based on management leadership, employee engagement, safety analysis, hazard prevention, control etc. that are associated with the development and performance of building projects.

#### **2.7.1(a) Management Leadership and Employee Engagement**

Specific management tasks need to be taken into action and prioritizing it to create a safe working environment for construction employees. First is the management leadership and employee engagement task, which concentrates on the communications and participation between the employer and the worker or employees regarding workplace safety and health concerns, such as encouraging worker participation in policy-making for health and safety concerns, as well as worker participation in safety programs and awareness. In this case, an employer can motivate its workers to propose new ideas with hazard and risks assessment mechanisms by explaining the significance of such behaviors and trying to reassure workers that adverse effects would not arise from such behavior while becoming accessible, available, and open allows the employer to convey the expectations of safety and health compliance (Carmeli et al., 2010).

### **2.7.1(b) Workplace Safety Analysis**

The next step is the workplace safety analysis, which identifies workplace safety hazards with recommendations and deployments to eliminate safety dangers at workplace and decrease the elements of accident risks, for instance, making sure that workers are informed on the hazard assessment for each job and construction process besides making sure that the layout of construction worksite focuses on the external aspects of technical work. A stable operating environment and healthy conditions for workers are maintained in the workplace through the identification of hazards and risk management as workplace safety analysis should be performed by making a list of important tasks that need to be carried out while classifying the dangers that are affiliated with each action (Wang et al., 2021).

### **2.7.1(c) Safety Hazard Prevention and Control**

The third is the safety hazard prevention and control, which is important to predict the types of hazards that are present in building projects and the kinds of accidents that might occur by performing routine maintenance on vehicles, machineries and equipment. This is vital to make sure that construction workers know how to handle these tools, including the use of protective equipment (PPE). Construction workers who have the potential to be exposed to various risks and hazards that they are not aware of, which may result in injuries if they are not taken care of appropriately, should take extra precautions and make sure that these dangers are identified, and employees can adopt work techniques that are both efficient and safe, so that the chance of workers sustaining injuries drops dramatically (Namian et al., 2016).

### **2.7.1(d) Safety and Health Training**

Training is another aspect that is important in safety and health management in the construction industry. This aspect includes having appropriate safety working procedures for construction sites including working at heights, first aid CPR, entry into confined space etc. that require proper training for all employees at workplace. This includes from the top management to operational staffs including part-time workers. By having and allowing employees who are authorized and instructed to perform specialized tasks can reduce the risk of accidents and fatalities. One of the critical factors that contribute towards a high rate of injury and fatality in this sector is inadequate training because when training is delivered or performed properly, this develops a culture of good practices among workers with added value based on training programs they received (Wilkins, 2011).

### **2.7.2 Problems of Local Safety and Health Practices**

According to Hamid et al. (2019), Malaysia has a high rate of construction accidents, which suggests that accidents occur on Malaysian construction sites due to the violation of safety laws by utilizing unskilled workers to erect scaffolding for high-rise buildings. This situation is dangerous and risky when scaffolding tasks do not match the specifications which increases the risk of building collapse that may result in worker death or serious injury as they also use of faulty scaffolding materials for construction. Accordingly, most Malaysian contractors fail to create a safety culture for their employees besides safety and health (SHO) officers also lack the authority to enforce the regulations of safety and health aspects (Yakubu et al., 2012). In addition, a safety officer who is not well-versed in the safety aspects of construction activities would result in inadequate site safety management practices.