

**MITIGATION OF CONTRIBUTING FACTORS TO CONSTRUCTION
ACCIDENT**

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Especially for

*To my mom,
Gayah Binti Jusoh,
“Your unrepayable love motivates me endlessly”*

*My Supervisor,
PM Aziruddin Ressang
“Your encouragement makes me forget the meaning of being a quitter”*

*My friends,
“Thanks for your moral support”*

May Allah ease our journey and bless all of us.

InshaaALLAH

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ABSTRACT

Activities on construction site contribute have a lot of risk. The aim of this research is to study risks that contribute on construction accident, and factor affecting construction accidents. The risk and the factors affecting construction accidents were established from literature review. The questionnaire were prepared and distributed to project managers, engineers on construction site in Johor Bahru and the feedback were analyse using average index and HIRARC. The result shown the highest risks are mechanical and psychological. The results have shown that the highest two factors in management involvement are management commitment and support; and safety leadership (4.22). While for safety (policy), the highest factors are safety inspection (4.29) then followed by the safety protection measure (4.20). To reduce construction accident, there are four control measures were proposed according to the risk which are substitution, administrative control, engineering control and personal protective equipment. However, good safety management such as using PPE and top management support manage to keep the risk at medium level. To enhance construction safety needs management support, planning and training and comprehensive safety and health plan.

ABSTRAK

Aktiviti di tapak pembinaan menyumbang banyak risiko. Tujuan penyelidikan ini adalah untuk mengkaji risiko yang menyumbang kepada kemalangan pembinaan, dan faktor yang mempengaruhi kemalangan pembinaan. Risiko dan faktor-faktor yang mempengaruhi kemalangan pembinaan telah ditubuhkan dari kajian literatur. Soal selidik disediakan dan diedarkan kepada pengurus projek, jurutera di tapak pembinaan di Johor Bahru dan maklum balas menganalisa menggunakan indeks purata dan HIRARC. Hasilnya menunjukkan risiko tertinggi adalah mekanikal dan psikologi. Keputusan telah menunjukkan bahawa dua faktor tertinggi dalam penglibatan pengurusan adalah komitmen dan sokongan pengurusan; dan kepimpinan keselamatan (4.22). Sementara untuk keselamatan (dasar), faktor tertinggi ialah pemeriksaan keselamatan (4.29) kemudian diikuti oleh langkah perlindungan keselamatan (4.20). Untuk mengurangkan kemalangan pembinaan, terdapat empat langkah kawalan yang dicadangkan mengikut risiko yang menggantikan, kawalan pentadbiran, kawalan kejuruteraan dan peralatan pelindung diri. Walau bagaimanapun, pengurusan keselamatan yang baik seperti penggunaan PPE dan sokongan pengurusan tertinggi berjaya mengekalkan risiko pada tahap sederhana. Untuk meningkatkan keperluan keselamatan pembinaan, sokongan pengurusan, perancangan dan latihan serta pelan keselamatan dan kesihatan yang komprehensif.

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LISTS OF ABBREVIATION

GDP – Gross Domestic Product

H&S – Health and Safety

SOCSO – Social Security Organization

NIOSH – National Institute of Occupational Safety and Health

OSHA – Occupational Safety and Health

PPE – Personal Protective Equipment

ORA – Occupational Risk Assessment

HSE – Health, Safety and Environment

AI – Average Index

HIRARC – Hazard Identification Risk Assessment Risk Control

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Malaysia tends to continue developing as in making genuine the fantasy of creating country status. The development area has been assumed a vital part in the total economy of the nation in terming of its commitment to income era, capital arrangement and business creation which at least bolster the gross domestic product (GDP) and the financial advancement of Malaysia. Nikkei Asian Review detailed that the administration reported in the government spending plan 2016 to push ahead the ventures of laying a 600-km rail arrange, named East Cost Rail Line that will cost an expected 55 billion Ringgit. Besides, the administration likewise plans to burn through 1.2 billion ringgit to fabricate and overhaul around 616km streets and scaffolds in this nation.

The construction and their degree are conservative pointer of all the country. It demonstrates the level of development, likewise the state of the nation. If many cranes and construction sites in the city, it implies that economic aspects of the country recovers and begins to rise and by difference, less workslower conservative circumstance in the country. In any case, the advantages of having the vast

improvement in development, the industry by its nature are confronting the high risk of accident. High seriousness of accident may happen the labourers itself as well as may include general society. According to Chi et al. (2013), the site conditions and unsafe act of labourers assumes a critical part of the accident. The review directed by Forteza et al. (2017) announced that the risk on site has an effect on accident rates and the accident rates affects firm economic performance.

Based on the statistics by Department of Safety and Health DOSH (2016) on investigated fatal occupational accidents classified according to sectors, the construction sector stands as the highest sector compared than manufacturing, mining and quarrying, agriculture, forestry, logging and fishery, utility, transport, storage and communication, wholesale and retail trade, hotel and restaurant, financial, insurance, real estate and business services, and public services and statutory bodies sector. Refer to Figure 1.1, rate number of fatalities for construction shows inclining trend while the other sectors shows decreasing trend between of year 2011 to 2015.

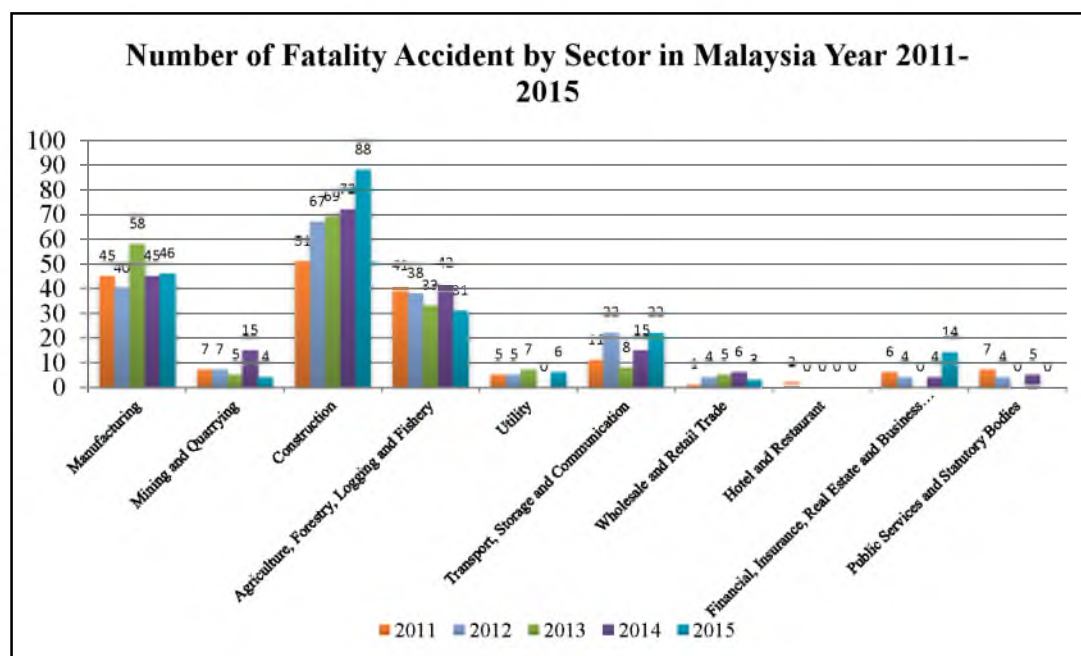


Figure 1.1: Fatal Occupational Accidents By Sector From 2011-2015 (DOSH, 2016)

However, as indicated by DOSH in Malaysia it is accounted for until December 2016, that the construction industry have the high number of accidents which was 99 compared to the other industry which are, mining and quarrying, horticulture, utility, money related, discount and retails and so forth. It demonstrates that safety issue in Malaysia is constantly considered as auxiliary angles as opposed to quality, time and cost issues and it likewise gets to be distinctly rearward sitting arrangement in construction. The high number of accidents in the construction industry similarly gives us an outline that the construction industry is one of the basic parts that need an immense and quick redesign of the safety issue.

Khalid (1996), stressed that although the construction industry involved a very complex process, it should highlighting on finding a management strategy and resolution in reducing the rate of accident occurrence at construction site. For example, safety program have been implemented by some developed country in their construction industry. Good safety programs would certainly help in reducing injuries at construction site and also to minimize construction costs, increase productivity and profitability and more importantly it could save lives of workers and consequently contribute positively to construction industry and nation as a whole.

Therefore, the study on hazard components that contribute to construction accident must be distinguished first to reduce the number of accident in the year ahead. After knowing the construction hazard, it follows by the study of factors that contribute to the construction hazard. This study also purposes some methods that help to mitigate the construction accidents. Overviews utilizing pole structures will be conducted to acquire information from respondents who are for the most part contractual workers and the rest are engineers and expert firms all around nations that are knowledgeable with the construction safety.

1.2 Problem Statement

The standard of safety measures in the construction industry in Malaysia has lingered behind if compared to any other industries. The study conducted by Smallwood & Emuze (2016) reported that, to achieve zero fatalities, injuries and diseases in construction site, the factors of client contributions, ‘designing for construction Health and Safety (H&S)’, integration of design and construction, appropriate procurement, contractor planning, risk assessment, an optimum interface between H&S, quality, and the environment including the respective management systems, H&S education and training for all stakeholders, core competencies, and consciousness and mindfulness will contribute to the realisation of ‘zero’. However, in real construction practice, it was found that the safety programme implementation of the construction companies were at the early stage.

Although a lot of contribution to the national economy comes from the construction industry, the number of accidents, incidents, injuries and fatalities are still reaching a higher rate. This can be proved by the statistic reported by the Social Security Organization (SOCSO) that the number of accident has kept on increasing from year 2010 until 2014 as shown in Figure 1.2.

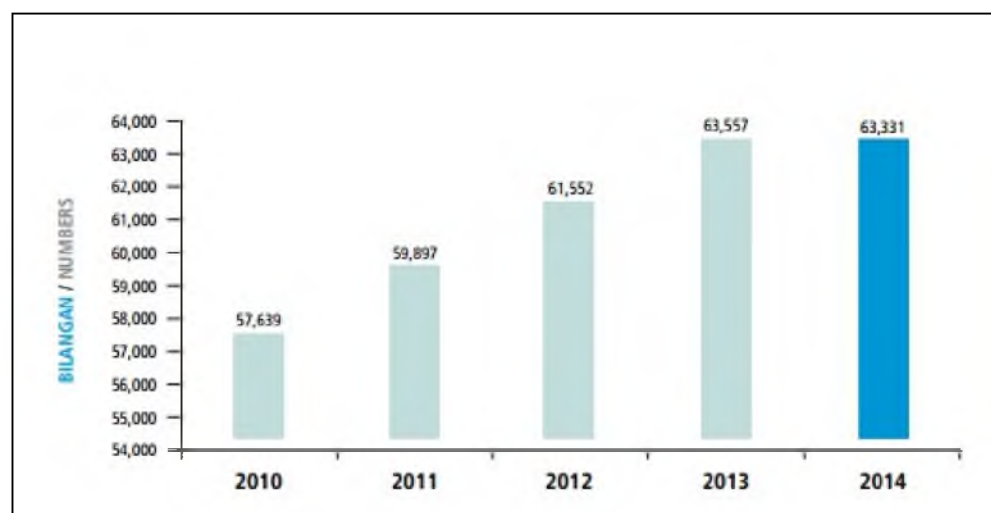


Figure 1.2: Number of accident (2010-2014) (SOCSO, 2017)

Managers seem to ignore the economic consequences of unsafe practices in the workplace (Harshbarger, 2001). For some employers or clients, the implementation of safety management system is often believed to cost more in a project and they make it as a less concentrated matter on construction sites. Based on a study reported by F.A. Zulkefli et.al (2014), in order to reduce accident in the construction industry, the safety incentive programme was to introduce for employees to increase safety performance in the workplace. They found that workers have become motivated and site safety performance has also improved since the implementation of the safety incentive programme. Therefore, safety management needs to create some ideas in order to eliminate the accident in construction industry, although it is a possible matter to eliminate the accident at a construction site.

Apart from that, the deaths of thousands of migrant construction workers in recent years bring Malaysia's safety standards into the serious issue and worried. Based on the statistic reported by DOSH Malaysia (Figure 1.3), it shows that the number of death is more dominant in construction industry. This situation makes it difficult to accomplish zero accidents and building up a safety culture among the personnel working on construction site.

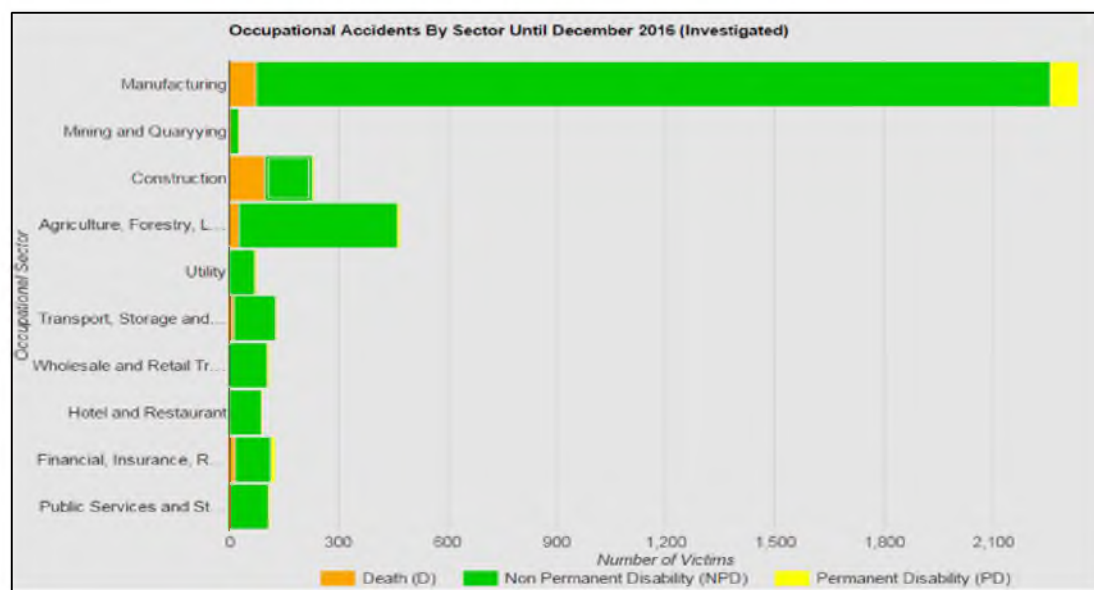


Figure 1.3: Occupational Accidents Statistics by Sector until December 2016 (DOSH, 2017)

The construction industry is often known as 3D conditions which are dirty, difficult, and dangerous. The nature of the construction industry requires physical demand and harsh work. It makes an industry with higher risk of injury other than the lack of awareness of the responsibilities of each party involve in a project to maintain the safety performance. In reality, there are a lot of hazardous activities involved in a construction site. One of the hazardous activities in construction is excavation and trenching has been considered as the most hazardous construction site operation. In recent years, a great number of construction workers usually figure out in trenching and cave-in accidents. These types of hazards can be prevented or reduced if both employee and employer will comply with safety standards and use protective gears while excavating and trenching.

Hence, the safety measure must be an important element in keeping the construction site a better and safer place to work. In order to decrease the accident and improve safety performance in construction industry, the research will be carried out to identify the contributing factors of accidents that leading to the high rate of accidents on construction and to emphasize on the roles and responsibilities of parties involved in this industry.

1.3 Aim and Objectives

The aim of this study is to study the risk on construction site in order to reduce construction accident. In order to achieve the primary objective, the secondary objectives are as follows:

- i. To study the risks that contribute to construction accident
- ii. To study the factors that contribute to construction risk
- iii. To purpose methods to mitigate construction accident

1.4 Scope and Limitation of Study

First of all, this research will study the risks that contribute to the accident at construction site. Then, this research will examine the factors that contribute to the construction hazard. In order to mitigate the construction accident, some methods will be purposed.

Throughout the entire process of this research, the target respondents include all participants involved in the construction project, which are engineers, general workers, safety officer and also safety supervisor.

This study will be conducted on the public and private project of construction site in the state of Johor Baharu, Malaysia. The respondents will be randomly chosen.

1.5 Significance of Study

Generally, safety is not a matter to be taken lightly. In fact, safety needs to be front of mind in every aspect of construction at all times. The construction industry is exposed to many hazards and accident potential. Construction materials, tools, machinery and handling techniques all come with their own dangers. The main types of accidents which cause death or serious injury on construction sites include falls, incidents with site vehicles, collapsing materials and contact with overhead power lines.

Most accidents can be avoided by implementing safety programs and ensuring those programs are constantly maintained. Meanwhile, construction hazard and factor that contribute to the construction hazard must be identifying first. There is simply no excuse for cutting corners when it comes to safety in construction. Poorly implemented safety techniques, design and management can result in accidents, illness and even death. The employer will suffer the loss of an experienced worker and be forced to absorb the incidental cost due to the interrupted project activities, increased insurance premiums and medical expenditure.

Efficient safety at workplace not only ensures that employees are happy and productive, but can also help to reduce both the human and business costs of injuries and unnecessary lawsuits. By making safety the priority, construction companies are effectively communicating that competent employees are a valuable resource in the industry. Additionally, improved safety standards help companies become more effective to finish projects on time and improve their business profile with customers and clients.

Therefore, completion of this study perhaps will provide the method to mitigate the construction accident. In addition, it will increase the effectiveness of safety culture in construction site. So, the safety performance will be improved and numbers of accident on construction site will be reduced.

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