THE RELATIONSHIP BETWEEN SAFETY CLIMATE, SAFETY COMMUNICATION, AND WORK ENVIRONMENT WITH UNSAFE BEHAVIOUR AMONG CONSTRUCTION WORKERS

By

GHAZALI BIN ABD AZIZ

Dissertation Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the
Master of Science (Occupational Safety and Health)

Pusat Pengajian Pengurusan Perniagaan
SCHOOL OF BUSINESS MANAGEMENT
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK
(Certification of Project Paper)

Saya, mengaku bertandatangan, memperakukan bahawa
(I, the undersigned, certified that)
GHAZALI BIN ABD. AZIZ (809066)

Calon untuk Ijazah Sarjana
(Candidate for the degree of)
MASTER OF SCIENCE (OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT)

telah mengemukakan kertas projek yang bertajuk
(has presented his/her project paper of the following title)

THE RELATIONSHIP BETWEEN SAFETY CLIMATE, SAFETY COMMUNICATION, AND WORK ENVIRONMENT WITH UNSAFE BEHAVIOUR AMONG CONSTRUCTION WORKERS

Seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of the project paper)

Bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan.
(that the project paper acceptable in the form and content and that a satisfactory knowledge of the field is covered by the project paper).

Nama Penyelia : **DR. NOR AZIMAH CHEW BINTI ABDULLAH**
(Name of Supervisor)

Tandatangan :
(Signature)

Tarikh : **30 APRIL 2018**
(Date)

PERMISSION TO USE

In presenting this project paper in partial fulfillment of the requirements for a Post Graduate degree from the Universiti Utara Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this project paper in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my project paper. It is understood that any copying or publication or use of this project paper or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholarly use which may be made of any material in my project paper.

Request for permission to copy or to make other use of materials in this project paper in whole or in part should be addressed to:

Dean of Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman

ABSTRACT

The primary objective of this research was to determine the relationship between safety climate, safety communication, and work environment with unsafe behaviour. A survey was carried out among construction workers in Selangor. A total of 112 construction workers became the respondents in this research. This research used structured questionnaire comprising of 41 questions to measure four main variables i.e. safety climate, safety communication, work environment and unsafe behaviour. In this research, all the variables were measured by 6-point Likert's scale. Analysis of the study was carried out through descriptive and multiple regression method. Data was analysed using IBM SPSS Statistics 21. The results showed all the three hypotheses were accepted. The implication of this study towards practical and future study is also discussed for the management of construction industry to provide a conducive working environment. Specifically, this research has important findings for safety policy implementation, rules and procedures in the construction industry practices. The empirical results of this research offered strategic direction to avoid workers unsafe behaviour while at work for a successful implementation of construction projects. This research had provided insight into factors affecting theoretical perspective for understanding unsafe behaviour research in the construction industry. Policy makers within the construction industry must be clear about the objectives of safety rules and procedures and they must be communicated effectively within the organization.

Keywords: Safety Climate, Safety Communication, Work Environment, Unsafe Behaviour

ABSTRAK

Objektif utama kaji selidik ini adalah untuk menentukan hubungan antara iklim keselamatan, komunikasi keselamatan, dan persekitaran kerja dengan tingkah laku yang tidak selamat. Satu tinjauan telah dijalankan di kalangan pekerja pembinaan di Selangor. Sejumlah 112 pekerja pembinaan menjadi responden dalam kajian ini. Kaji selidik ini menggunakan kaedah soal selidik berstruktur yang mengandungi 41 soalan untuk mengukur empat pembolehubah utama iaitu iklim keselamatan, komunikasi keselamatan, persekitaran kerja dan tingkah laku yang tidak selamat. Dalam kajian ini, semua pembolehubah diukur menggunakan skala Likert 6-poin. Analisis kajian dijalankan melalui kaedah deskriptif dan regresi berganda. Data dianalisis menggunakan Statistik SPSS IBM 21. Keputusan menunjukkan kesemua tiga hipotesis telah diterima. Implikasi kajian ini terhadap praktis dan masa depan telah juga dibincangkan iaitu pengurusan industri pembinaan haruslah menyediakan persekitaran kerja yang kondusif dan selamat. Secara khusus kaji selidik ini, memperolehi dapatan yang sangat penting untuk pelaksanaan dasar keselamatan, peraturan dan prosedur dalam amalan industri pembinaan. Keputusan empirikal kajian ini merupakan panduan ke arah yang strategik bagi memperbaiki tingkahlaku tidak selamat yang diamalkan oleh pekerja semasa projek pembinaan dilaksanakan. Kajian ini telah memberikan pandangan tentang faktor-faktor yang mempengaruhi perspektif teori untuk penyelidikan tingkah laku yang tidak selamat. Pembuat dasar dalam industri pembinaan mestilah jelas mengenai objektif peraturan dan prosedur keselamatan dan mesti dibinmcangkan secara terbuka dengan berkesan dalam organisasi.

Kata Kunci: iklim keselamatan, hubungan keselamatan, persekitaran kerja, tingkahlaku tidak selamat

ACKNOWLEDGEMENTS

First and foremost, I wish to convey my thanks to Dr. Nor Azimah Chew Abdullah for her concerned and advices in making the completion of the project paper a success.

My sincere thanks is extended to Mr Megat Kamil Azmi Megat Rus Kamarani, the Senior General Manager of the Construction Industry Development Board (CIDB) Malaysia for for providing a list of contractors in the State of Selangor.

Last but not least, a special thanks to my spouse Jamaliah Alias and my sons, Muhammad Fakhruddin and Muhamad Aqil for their patience and support throughout my studies at Univeriti Utara Malaysia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BNM	:	Bank Negara Malaysia
CIDB	:	Construction Industry Development Board
DOSH	:	Department of Safety and Health
ILO	:	International Labour Organization
NIOSH	:	National Institute of Safety and Health
NTT	:	Nusa Tenggara Timur
OSHA	:	Occupational Safety and Health Act
OSQ	:	Offshore Safety Questionnaire
SPSS	:	Statistical Package for the Social Science
UUM	:	Universiti Utara Malaysia

CHAPTER ONE
INTRODUCTION

1.1 Background of Study

Construction industry is one of the industries that is responsible in providing notable contributions to the development and growth of the country's economy including Malaysia. The success of a country is seen from the aspect of building infrastructure and other physical facilities. Therefore, the construction industry is closely related to the economic development of a country. According to Rahman (2012), the construction industry is the industry that carries out the construction of a building or infrastructure such as housing, commercial buildings, public utilities and roads. Construction industry is classified as one of the most hazardous industry in relation to fatal and non-fatal injuries. In comparison to early retirement of workers in the other industries, construction workers have the highest potential of retiring early due to health and musculoskeletal pain, thus losing valuable number of working days (ILO, 2017).

Minimising injury is difficult in an industry such as construction where the nature of work is labour intensive and work activities always changing. To adopt changes in the working environment, it involved wide range of changes in safety behaviour because of the nature of work, how it is conducted and the requirement to cater for potential imperative competition with customer demands and meeting the date line. This is further worse due to workers negative attitude and their behaviour towards safety (Choudhry & Fang, 2008).

Construction worker works in an environment that is changing, increasingly complex and challenging, thus the workers will be exposed to various occupational health and safety risks arising from the activities of uncertainty due to increased pressure received to meet work demand. According to Christoffel and Gallagher (2006), occupational accidents continue to become very significant global concern, as demonstrated by the high number of incidents in the workplace. With the advent of dynamic technology in today's social and economic context that demand of workers to perform more work within a short period of time (Lingard & Rowlinson, 2005). A construction project needed to be completed within a certain time frame as stated in the contract (Osman, Amminudin & Nawi, 2017). This is of course one of the causes of increased accident in the workplace. Although Occupational Safety and Health Act (OSHA) 1994 was introduced, there was still serious accidents recorded among construction workers.

Unsafe behaviours are antecedent to accidents that occur in the industry that became the main safety issues in the organisation (Dekker, 2002; Zohar, 2002; Zohar & Polachek, 2014). The organisation's safety procedures had close contact with workerss, equipment, tasks, and environmental operations. From a macro perspective, the safety climate was perceived as a perception of workers sharing of safety interests provided and is also a derivative of the organisational climate concept.

A good safety climate within an organisation must be characterised by strong support and commitment to safety from all workerss and employers. Workers were within positive safety climate environment when they have and demonstrate safe behaviour. This is because they assume that their efforts are very important. Most importantly, the management will be more committed and provide solid support to the safety aspects of the organisation. In other words, workers working in situations where the

management were less concerned with safety practices, might have different perceptions and attitudes towards safety. For example, they will focus more on ensuring that work be completed sooner by putting more emphasis on working speed and neglecting the work safety aspects. This is certainly inviting to unsafe behaviour (Zohar, 2002). Unsafe behaviours would also result to increase risk of injury, which may be due to lack of positive reinforcement, e.g. safety awareness from supervisors or co-workers, to promote safe behaviour at work (Zohar, 2002; Zohar & Polachek, 2014).

In the organisation context, work environment is something that has a deep negative impact on safety attitude and behaviour (Bjerkan, 2010). This aspect covers the safety and supportive work environment, as well as equipment and materials required by workerss to carry out their work (Bjerkan, 2010; Idris, Dollard & Yulita, 2014). In many cases, workers working under pressure, could diverge from safe directives that hinder improvement. They may also complete their work carelessly, which may lead to an increase in error, contributing to workplace accidents (Clarke & Cooper, 2004; Idris et al., 2014). Thus, with the presence of various limitations in the workplace, short-term benefits resulting from unsafe behaviour, such as completing work in a speedier effort and failing to comply with safety requirement were considered the best alternative (Idris et al., 2014). This will certainly cause more accidents at the workplace.

Another important factor associated with unsafe behaviours is safety communication. Stephens, Cole, Jenkin-Gibbs, Richle and Weare (2009) suggested, communication is a crucial determinant of safe behaviour and the overall success of an organisation. Along with dynamic changes in technology including internal and external pressures,

employers need to regularly monitor the effectiveness of impaired communications with their workerss (Stave, Pousette & Torner, 2008). It is important to see that the scope of safety communication contains a broad spectrum of work communications that begins from entry level to the board of directors. Therefore, different communication modes should be used in different working conditions (Hofmann & Morgeson, 1999; Orlikoff & Totten, 2009; Stephens et al., 2009). The effective form of communication with clear objectives will help safe behaviours practices, and this will inevitably make the workerss distanced themselves from engaging with unsafe behaviours (Alsamadani, Hallowell, Javennick-Will & Cabello, 2013; Bartram, Robertson & Callinan, 2002; Spencer & Spencer, 1993).

Not denying that construction industry contributes significantly to national economic development (Osman, Amminudin & Nawi, 2017). At the same time, the construction industry is a labour-oriented industry and involves large number of workerss. This large number of workers is highly vulnerable to various risks in carrying out work especially on construction sites. These risks include the risk of electric shock, exposure to moving objects, chemicals, dust, noise and limited space (Salim, 2012).

To mitigate the impact of accidents at the construction site, the Occupational Safety and Health Act (OSHA) 1994 was established to ensure the safety, health and welfare of workers are protected from high-risk activities (Samewoi, 2010). Although the country has occupational safety and health policies, it is not well enforced by the authorities (Osman et al., 2017).

The Department of Occupational Safety and Health issued the Occupational Accident Statistics by Sectors until end of 2017. Statistics are classified into three categories

namely fatal accidents, permanent disability accidents and non-permanent disability accidents. The construction industry recorded the highest number of fatal accidents from 2011 to 2017. There are 143 cases in construction from 249 cases recorded until end of 2017. Statistics of fatal accidents by sector for the year 2011 – 2017 is appended in Table 1.1.

Table 1.1
Fatal accidents by sector 2011 - 2017

SECTOR	2011	2012	2013	2014	2015	2016	2017
Construction	51	67	69	72	88	106	143
Manufacturing	45	40	58	45	46	72	46
Agriculture, Forestry. Logging and Fishing	41	38	33	42	31	25	18
Transport, Storage and Communication	11	22	0	15	22	13	9
Public Services and Statutory Bodies	7	0	0	5	46	0	4
Mining and Quarrying	7	32	0	15	9	0	7
Financial, Insurance, Real Estate and Business Services	6	0	0	0	14	16	7
Utility	5	0	0	0	0	0	8
Hotel and Restaurant	2	0	0	0	0	0	2
Wholesale and Retail Trade	1	0	0	1	0	0	5
Total	176	199	160	195	256	232	249

Source: Department of Safety and Health, 2018

Selangor recorded the highest casualties, with 41 deaths from a total of 207 casualties for fatal accidents at worksites in 2017. Statistics of fatal accidents worksites by state for the year 2011 – 2017 is appended in Table 1.2.

Table 1.2
Fatal accidents at worksites by states 2011 - 2017

STATES	2011	2012	2013	2014	2015	2016	2017
Perlis	2	0	1	5	1	2	2
Kedah	5	3	3	1	1	7	9
Penang	8	4	7	4	23	10	11
Perak	18	27	29	16	15	9	14
Selangor	35	33	29	30	13	42	41
Kuala Lumpur	14	20	9	13	28	23	17
Negeri Sembilan	13	6	9	3	8	12	7
Melaka	11	0	6	6	8	10	8

Table 1.2 (Continued)

STATES	2011	2012	2013	2014	2015	2016	2017
Johor	25	19	16	30	41	40	32
Pahang	2	5	6	12	9	17	15
Terengganu	5	7	16	10	4	2	3
Kelantan	4	4	2	7	4	9	8
Sabah	9	22	24	29	21	15	10
Sarawak	25	39	34	39	36	42	30
Total	176	189	191	205	212	240	207

Source: Department of Safety and Health, 2018

The summary of fatal accidents in construction industry from 2006 to 2017 is appended in Table 1.3.

Table 1.3

Summary of Fatal accidents in construction industry from 2006 to 2017

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No of accidents	4500	3931	3814	4527	4667	4330	4536	2815	2874	3345	3750	2430
Deaths	166	53	102	162	137	51	67	69	72	88	106	143

Source: Department of Safety and Health, 2018

In 2006 total number of accidents were 4500 with 166 deaths (3.69%), then the number of accidents in 2007 declined to 3931 cases and the number of deaths also declined to 53 cases (1.35%). The number of accidents continued to decline in 2008 with a total of 3814 accidents, anyway, the number deaths recorded within this period continue to rise with 102 cases (2.67%). In 2009 the number of accidents cases increased to 4527 cases and the number of death also increased to 162 cases (3.58%). In 2010, the number of accident cases continue to rise with a total of 4667 cases, anyway the number of death decreased to 137 cases (2.94%). In 2011 there were 4330 cases of accidents and the number of death also decreased tremendously to 51 cases (1.18%). In 2012, the number of accidents rose again to 4536 cases with 67 deaths (1.48%). The number of accidents in 2013 dropped to 2815 cases with 67 death cases (2.38%). In 2014 the accidents cases decreased to 2874 with 72 deaths (2.51%), then in 2015 and

2016 the accident cases continue to rise to 3345 and 3750 respectively and decreased to 2430 in 2017. Anyway, the number of death cases continue to rise that is 88 cases (2.63%) in 2015, 106 cases (2.83%) in 2016 and 143 cases (5.88%) in 2017. Though the number of accidents in the construction industry in 2017 was declining, the number of death was very alarming.

1.2 Problem Statement

Construction industry is one of the industries contributing to Malaysia's economic growth (BNM, 2017). In this country, construction industry is a labour-oriented and involved large number of workers. The high number of workers are exposed to various risks in performing works at construction work sites (Salim, 2012). According to researchers, the most dangerous trade worldwide is the construction industry (Jannadi & Bu-Khamsin, 2002). On top of that, researchers further suggest that the intensity of work conducted at each worksite makes the construction sites as the most dangerous place in a construction industry (Jannadi & Bu-Khamsin, 2002).

There are more than 2.3 million workers died every year because of accident at workplace or because of work-related illness (Buehler, Werna & Brown, 2017). It is also estimated about 100 million work-related accidents happening every year throughout the world (Chau et al., 2008). However, the number of research focusing on safety and health is still lacking where it is less than 1% organisational studies focusing on work issues and safety (Barling, Loughlin & Kelloway, 2002; Mullen, 2004). This statistic is evident that the research conducted is very low taking into account the significant social and economic cost factors due to accidents at work place, this is very critical for researchers to focus and understand all events preceding to

accidents occurring at workplace, and also factors related with individual safety behaviour at workplace (Mullen, 2004).

There are various factors that impacted workers from the construction industries especially related with work-related accidents. According to Abdul, Muhd and Bachan (2008) accident is an unplanned situation, unwanted, unpredictable and beyond control. Accidents is an occurance that is unpredictable or seen to happen (Alicia, 2009). Accidents that caused injuries and deaths received extensive attention (Hinze, Huang & Terry, 2005). It is estimated 80 out of every 100 accidents are due to human factors. In fact, unsafe behaviour contributes four times more accidents compared to other elements, e.g. unsafe work environment (Woods, 2009). The number of industrial accidents began to get attention from various agencies where they started to take action to prevent accidents. Anyway, most accidents at construction worksites happened because of human factors, example unsafe behaviour (Kim, McInerney and Alexander, 2002).

Studying the extent of unsafe behaviour among construction workers at worksites is vital given the nature risks in construction works. Though, Occupational Safety and Health Act (OSHA) 1994 has been enforced, serious accidents still happened among construction workers. The main problem related with safety issues and occupational health are unsafe behaviour of the construction workers themselves (Osman et al. 2017). Accidents at worksites due to unsafe behaviour is one of the main issues that is affecting the daily operation of the construction industry. The number of accidents due to unsafe behaviour is increasing every year that has impacted lives and property. If no preventive measure is taken by the industry, the situation can become worse and will impact the reputation of the industry. It is very worrying despite numerous

attempts, including spending large effort to reduce the incidence from recurring. However, there is lack of safety behaviour research in Malaysia focusing on high-risk industry that is, the construction industry (Ganesh & Krishnan, 2016). Johari, Tan and Adnan (2017) conducted a study on the roles of safety climate, safety communication, and work environment towards unsafe behaviour in a manufacturing industry suggested further research be conducted in a construction industry to determine unsafe behaviour in this setting.

In general, the cause of work-related accident is classified as unsafe condition and unsafe behaviour (Sadullah & Kanten, 2009). Anyway, for the purpose of this study, the research examined unsafe behavior as one of the factors. The aim of safe work environment is to prevent the occurrences of accidents due to unsafe behaviour of workers and the unsafe work environment. Hence, it will help generate state, ability, and norm that empower workers and the management to undertake work safely in a manner that avoid risks that trigger suffering (Garcia-Herrero, Mariscal, Garcia-Rodriguez & Ritzel, 2012).

Another important factor that has significant relationship with unsafe behaviour is safety climate (Hamid, Majid & Singh, 2008). More importantly, safety climate is a temporal state of safety at certain time (Huang, Chen & Grosh, 2013) and it acts as safety monitoring tools that provide indication the area to improve. Anyway, there is less emphasis in using safety climate as tool to measure safety (Bjerkan, 2010).

In the contexts of construction industry, some research on safety climate were conducted (Siu, Philips & Leung, 2004; Fang, Chen & Wong, 2006; Choudhry et al., 2009; Lingard, Cooke & Blismas, 2009). Relationship between safety climate and

safety behaviour is well established in safety research and the research findings identified safety outcome as very crucial indicators to improve safety at worksites (Newaz, Jefferies, Davis & Pillay, 2016). Analysis on safety climate shows that there is a predictive relationship between safety climate and safety performance at workplace (Cooper & Philips, 2004), nevertheless, there is lack of research to determine the relationship of safety climate on unsafe behaviours (Wirth & Sigurdsson, 2008).

Safety communication at workplace is another factor that plays an important role in reducing accidents due to human factors. Effective safety communication is an effective way believed that can reduce the risks of accidents because of human factors. In Malaysia, statistic has shown that this country has not reached a level as expected in reducing the number of accidents even after implementing various safety policies and preventive measures. Lately, emphasis towards individual factors that contribute to accident is enhanced. Hence, safety communication at work place become one of the most effective ways to reduce the number of accidents at workplace.

With the earlier explanation on safety communications in ensuring the safety atmosphere in construction work settings, there is a need to assess the role of this factor in relation to unsafe behaviours in order to enhance understanding and to improve safety among the construction workers. The job-related accident circumstances occur in different parts of the world and appear as a shocking trend in Malaysia. In a case study conducted overseas by European Agency for Safety and Health at work (EU-OSHA), found that most of the construction industries used traditional communication method to communicate daily at worksite, where safety is given less priority. Daily communication through feedback shows either the company put priority on production

or safety. Furthermore, safety communication is an effective way to change safety behaviour and safety climate and enhance safety at workplace. Basically, traditional communication methods were performed through simple oral messages for easy understanding of workers with or without formal education to understand (Olanrewaju & Farinde, 2014). Daily communication from supervisors related with unsafe behaviour are the actual main indicators between production and safety, especially while working during great pressure. The above researches were conducted in manufacturing, food processing, and military (Zohar, 2002; Zohar & Luria, 2003) but not in construction industry.

Tan Sri Lee Lam Thye, the chairman of National Institute of Safety and Health (NIOSH) urged all organisations and workers in the construction industry to improve workers safety and health and he also stressed that accidents at workplace be minimized. This is because unsafe work environment not only affect the workers but also their families. The organisation will also be affected directly or indirectly because of the costs involved especially for medical expenses, delayed works, unwanted management costs, and other related costs to cause an increase the total cost of the project as a whole. He further emphasised that human aspects be given more attention where workers behaviour at worksites be monitored to ensure safe and healthy working culture be practiced so that workers are aware of the safety aspects and health of their work at the worksites. Two-way communication between the management and workers about safety; and the workers are given autonomy when safety is at stake. All incidences and issues showed the level of safety at work site must be improved. Even though extensive research in this field had been conducted, other factors contributing to unsafe behaviour and accidents must be understood. However, there is lack of systematic effort to determine the relationship between various factors that determine

their relationship with unsafe behaviour that caused accidents at worksites because of unsafe work environment (Khosravi et al., 2014).

Based on the statistics, issues on safety at the construction work sites were not effectively overcome (Zaira, Hadikusumo, 2017). Hence it is important and the main aim of this study was to determine the influence of safety climate, safety communication, and work environment on unsafe behaviour among construction workers in Selangor as the state of Selangor has the highest number of construction projects in Malaysia (CIDB, 2018), and Selangor also has the highest number of work-related deaths during the period under study.

1.3 Research Questions

Based on the discussion of background information and research problem, this study attempts to answer the following research questions:

- Are there any significant relationship between safety climate, safety communication, and work environment on unsafe behaviour among the construction workers at workplace?

1.4 Research Objectives

In response to the research questions, this research seeks to determine the relationship of safety climate, safety communication, and work environment with unsafe behaviour among the construction workers at workplace.

1.5 Scope of the Study

The research was conducted among construction workers from construction industries in Selangor. These workers were selected as work-related accidents that have direct impact on them. When accident happens man-hours are wasted because of sick leaves and also suffering of the workers; due to injury and health care and financial implication as the workers have to pay for their medical bills and other expenses too. Only workers from construction industry from the state of Selangor is selected as respondents in this research where the death toll recorded involving construction workers is highest in Selangor as compared to death toll in other states in Malaysia.

1.6 Significance of the Study

The current study is significant in two aspects: theoretical development and practical implications. If the research objectives of this study are met, the findings of the research will be used to improve unsafe behavior of the construction workers. A practical ramification has validated the notion of safety climate and work environment are utmost important in preventing unsafe behaviour among workers (Johari et al., 2017). Therefore, it is utmost importance that studies on safety issues in construction industry that would perhaps yield interesting perspective in understanding the unsafe behaviour across different sectors.

It is also anticipated that the findings of the current study will be helpful to validate and strengthen the argument of unsafe behaviour to the management of the construction industry under study. It is also hoped that through the present study, the management of the respective construction organisation can implement ways to

improve the safe working environment at the workplace, so that a more conducive and safe working environment can be created.

1.7 Definition of Terms

In order, to better understand this research, it is important to familiarise with some of the main variables that were used in this research. Thus, the definition of terms are explained in this section.

1.7.1 Construction Industry

Sector of national economy in preparation of construction in constructing and repairs of building and other real property (Mohamed, 2002).

1.7.2 Unsafe Behaviour

Unsafe behaviour is treated as the dependent variable. Unsafe behaviour is the bold act of a person in risk taking, truancy, and trespassing with or without intention (Neal & Griffin, 2006).

1.7.3 Safety Climate

An extent workers' belief that safety is very important to the organisation (Vinodkumar & Bhasi, 2009).

1.7.4 Safety Communication

A situation where communication between supervisors and workers are exchanged related with safety at workplace (Havold & Nesset, 2008).

1.7.5 Work Environment

Physical location of workplace where people work together to accomplish team tasks (Warr 2002).

1.8 Outline of the Study

This chapter discussed and argued for the need to conduct a study relationship of safety climate, safety communication, and work environment with unsafe behaviours among workers in the construction industry. Specifically, it argued that such a study is imperative given the crucial nature of construction workers job to the country as a whole. A context of the present study was also highlighted. Since this study attempted to determine the influence of safety climate, safety communication, and work environment on unsafe behaviours among workers in the construction industry on this research setting, it is apt that a contextual discussion is offered to better enhanced understanding of the study. Specifically, this chapter presented some general function and background of a construction industry.

In chapter two a discussion on existing literatures on safety climate, safety communication, work environment, and unsafe behaviours were provided. This chapter also reviewed past studies on the topic of safety climate, safety communication, work environment, and unsafe behaviours. Such discussion was important towards formulation of the present research framework and hypotheses.

Chapter three discussed in detail how the present study was carried out. Specifically, it talked about how the research hypotheses were formulated, how the data were collected, how the subjects of the study were selected, and how the data were analysed. In chapter four, the research findings were presented. The final chapter, or chapter five,

was devoted to discuss the results presented in the earlier chapter in detail. In addition to this, the study's limitation, implications for future research and practices were also highlighted.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter, prior research on the effect of safety climate, safety communication, and work environment on unsafe behaviour were discussed and the chapter organised as follows: it started by defining the main concepts examined in this study. Then, the conceptual definition of previous research related with this topic were discussed. In addition, the theoretical framework was also formed, taking into consideration the dependent and independent variables in the topic of research, i.e. the influence of safety climate, safety communication, and work environment on unsafe behaviours among workers in the construction industry.

2.2 Conceptual Definition

Conceptual definition of the main variables used in this study will be provided in this section.

2.2.1 Unsafe Behaviour

In this study, unsafe behaviour is treated as the dependent variable. Unsafe behaviour is the bold act of a person in risk taking, truancy, and trespassing with or without intention (Neal & Griffin, 2006). The researchers further suggested that, safe behaviour is the opposite of unsafe behaviour, for example using safety equipment, complying with safety rules, and act very positively towards safety. Both behaviours either safe or unsafe are considered as independent or dependent concepts or a worker can have the same behaviours at the same time. Therefore, a worker who is involved

in either unsafe behaviour can also be involved in safe behaviour at the same time (Bradley, 1997). The researcher further suggested that the later concept is acceptable as a worker can show both behaviour at the same time. An organisation with stringent safety regulations may not experience this situation (Lund & Hovden, 2003). At the same time unsafe behaviour will increase the likelihood of a worker involvement in an accident can also happen with other accidents at the same time (Bradley, 1997; Mc Kenna, 1983).

Unsafe behaviour of workers, has been identified as one of the major risk factors that occur across construction projects (Berek, Suwandi, & Purnomo, 2017). Heinrich (1980) estimated 85% of accidents at worksites were caused by unsafe behaviour. Fleming and Lardner (2002) indicated that 90% of all work place accidents were attributed to the workers' unsafe behaviour. Berek, Suwandi, and Purnomo (2017) conducted a study among 200 construction workers in the construction project of new Provincial Governor Office of NTT where the research result showed unsafe behaviour has strong association on safety at worksites.

2.2.2 Safety Climate

The most refined description of safety climate was by Dedobbeleer and Beland (1991, p.97) who defined safety climate as *"molar perceptions people have on their work settings"*. This description reflected the state of early research knowledge of safety climate and suggested a great ambiguity where it was difficult to differentiate safety climate from other facet-specific safety.

Safety climate definition that was later develop was more specific towards safety. Sinclair, Martin, and Sears (2010, p.1478) defined safety climate as *"…workers'*

shared perceptions about their organisation's value for safety as expressed through the organisation's safety policies, practices, and procedures".

Guldenmund, (2000) defined safety climate as sharing of practice perceptions, beliefs, value, norms and organisational procedures. Griffin & Neal, (2000) like other researchers suggest that safety climate is an individual perception towards safety surrounding the worksite.

Specifically, safety climate is conceptualised as high level factor consisting of more focus factors. Safety climate is defined as an extent workers belief that safety is of utmost importance in an organisation. In general, the theory of safety climate is a term that is more focus towards behaviour of public perception in comparison to individual behaviour or workers (Vinodkumar & Bhasi, 2009).

An organisation practicing positive safety climate is very supportive towards their workers safe working behaviour and very committed towards safety (Zohar & Polachek, 2014). The safe value is fully accepted and rewarded. Therefore, it is not very true to assume that workers in such settings is prone to show safe behaviour (McGonagle, Betty, Joffe, 2014). Contributing models towards the relationship between safety climate accidents were tested in various empirical research, showing significant path between safety climate and safe behaviour (Bjerkan 2010).

2.2.3 Safety Communication

Havold and Nesset (2008) defined safety communication as a situation where an organisation exchanged effective information related with internal safety process. In order for a person to convey thoughts, express their feelings, exchanging of

information and knowledge among individual is through communication (Cigularov, Chen & Rosecrance, 2010). However, adding safety to communication will become a tool to help employers manage safety related issues, that is to ensure that members in an organisation will refrain themselves from potential hazards and accidents (Alsamadani et al. 2012). Safety communication is not focusing only on giving and receiving safety information at the workplace. It also help to influence workers' behaviour and attitude towards safety. In a top down communication, workers voice out their concern or report a near accident or an accident.

Geller (2005) suggested that safety status of an organisation is dependent of discussion and dissemination of information about safety. Safety communication is also a perception how a worker perceived, how a supervisor or security officer dessiminate information about safety and how they react towards complains from workers related with safety issues. This dimensions refers to previous research on communication dimension (Glendon & Litherland, 2001; Mearns, Flin, Fleming & Gordon, 1997; Varonen & Mattila, 2000; Wills, Biggs & Watson, 2005).

2.2.4 Work Environment

Work environment is defined as an organisation or workplace where one or more workers present to work or as work requirement (Warr, 2002). Work environment not only involving physical location but also involving equipment or material used by workers for their work (Omar & Sindi, 2015). According to Warr (2002) work environment is a situation where task is performed with regards to work demands and its completion to achieve specific goal at work place.

In normal circumstances, skilled workers able to perform their job effectively provided the work environment provided by the employer is very convenient and conducive. Therefore, it is imperative to take into consideration the environment where workers perform their work, this is one of the most important criteria that cannot be taken for granted to ensure workers performance at workplace (Park, Kim, Goh & Pedro, 2016).

Work environment is suggested to have significant relationship towards safety climate and the risk of safety (Omar & Sindi, 2015; Park et al. 2016). On many occasions, workers will experience strenuous pressure because of high demand from supervisors and management to achieve certain target at workplace. Anyway, if equipment and other facilities provided by the supervisors and management are not adequate and not in good working conditions, workers are more exposed to higher risk in a dangerous working environment. Hence, this will increase more errors and accidents will happen (Clarke & Cooper, 2004; Park et al. 2016).

2.3 Previous Literature Review

The following section addressed the factors under study from previous literatures.

Many scientific research had concluded that unsafe behaviour was the main cause of accidents at worksites (Wills, Watson, & Biggs, 2009). It was estimated 85% of the accidents at worksites were due to unsafe behavious (Hermann, Ibarra and Hopkins, 2010). According to Choudhry dan Fang (2008), by giving special focus towards unsafe behaviour would reduce accidents at construction worksites.

Wu, Liu, Zhang. Skibniewski, & Wang (2015) conducted a study on prospective safety performance validation on construction sites in 30 construction sites in south, central

and northeast China to front-line staff and leaderships. The findings of the research suggested workers' unsafe behaviour was a great treat to safety of workers at worksites.

2.3.1 Safety Climate and Unsafe Behaviour

Safety climate construct conceptualised as both individual and group level constructs. Safety climate at individual level (Shen, Koh, Rowlinson and Bridge, 2015).

Shen, Zhang, Koh, Rowlinson, and Leicht (2017) conducted a study on special effects of group safety climate on construction workers safety behaviour among 157 construction workers from an ongoing railway project in Hong Kong. The findings suggested that safety climate within group of construction workers would affect unsafe behaviours of other workers. Other researchers, Garica, Boix and Canosa (2004) conducted a study to explore the relationship between safety climate and worker's unsafe behaviour among 734 production workers of the pottery industry in Spain. The findings suggested that safety climate were strongly associated with unsafe behaviour.

Hoffmann and Stetzer (1996) and Beus, Payne, Bergman and Arthur (2010) found that safety climate was inversely associated with unsafe behaviour. Further studies have examined the linkage between unsafe behaviour and safety climate such as Bjerkan (2010) and Johari et al., (2017) provided empirical evidence that demonstrates inversed influence between safety climate and unsafe behaviour. Based on the empirical evidence and support, it is suggested that:

H_1: There is a significant relationship between safety climate and unsafe behaviour.

2.3.2 Safety Communication and Unsafe Behaviour

Yeong and Wahab (2016) conducted a study to examine the relationship of safety communication and unsafe behaviour at the workplace where they administered 300 sets of questionnaire to production workers from manufacturing industry in Negeri Sembilan. Their findings suggested that there was significant association between safety communication and unsafe behaviour.

Clarke (2006) suggested that safety communication is inversely associated with unsafe behaviour among manufacturing employees in the manufacturing industry. Over the past decades, researchers have identified poor safety communication is one of the primary causes of accidents at worksites (Ganguly, 2011). Another study in an aviation industry, revealed more than 70% safety problems were due to communications-related issues (Krivonos, 2007). Though the relationship between safety communication and unsafe behaviour had been well established Yeong and Wahab, 2017), however the direct effect of safety communication on unsafe behaviour is under researched (Yeong & Wahab, 2017).

Zohar (2002) asserted that supervisor who adopted open and informal safety communication reported lower accident rates compared to those who do not practice safety communication. This suggested that poor safety communication is the significant determinant of unsafe behaviour. Therefore, this research proposed that:

H_2: There is a significant relationship between safety communications and unsafe behaviour

2.3.3 Work Environment and Unsafe Behaviour

Researchers suggested unsafe behaviour of workers was the major cause of construction accidents that affecting safety work environment at the worksites (Chi, Han, Asche & Kim, 2013).

Many researchers (Bjerkan 2010; Goldenhar, Williams & Swanson, 2003) suggested significant relationship between unsafe work environment and involvement in accidents among workers across different tasks, for example construction workers. Clarke, (2006) also suggested that there is empirical evidence to support significant effect of unsafe work environment towards accidents. This research further suggested that hindrances at workplace would contribute towards increased number of accidents. Based on the above findings, this research hypothesized that:

H_3: There is a significant relationship between work environment and unsafe behaviour

2.4 Summary

This chapter had discussed the topics related to general background of theoretical aspects of unsafe behaviour from previous research. Even though the benefits of safety behaviour were in abundance, due to its complicated nature, various facets must be outlined in order to materialise the expected results (Noor, 2010). A model might work in a previous research but it might not be applicable in a different research. Therefore, it is important to determine the influence of safety climate, safety communication, and work environment on unsafe behaviour by the construction workers under research.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

In the preceding chapter, literatures associated with this study were discussed. This research was conducted to determine the relationship of safety climate, safety communication, and work environment on unsafe behaviour. In this chapter, a comprehensive exposition in what manner the present study was carried out would be elaborated. This chapter highlights how the research hypotheses were formulated, how the samples were selected, how the main variables under study were measured, and how the data were collected and analysed. But first, it was important to define the unit of analysis for the present study, i.e. construction workers.

3.2 Research Framework and Hypothesis

The research framework was a conceptual model on how ones theorized or planned logical relationship among issues that had existed and acknowledged as imperative towards research problem (Sekaran, 2005). The research framework also discussed relationships among variables that were part of the condition under study and developed such a research framework to suggest or hypotheses and check the positive or negative relationship to enhance understanding of the dynamic of the circumstances. Subsequently the research framework formulated, then tested on the hypotheses developed to study the validity of the formulated theory (Sekaran, 2005).

Subsequently special attention based on the literature and problem statements, the succeeding research framework as depicted in Figure 3.1 was proposed. The dependent

variable was unsafe behaviour. There were three independent variables which comprised of safety climate, safety communication, and work environment.

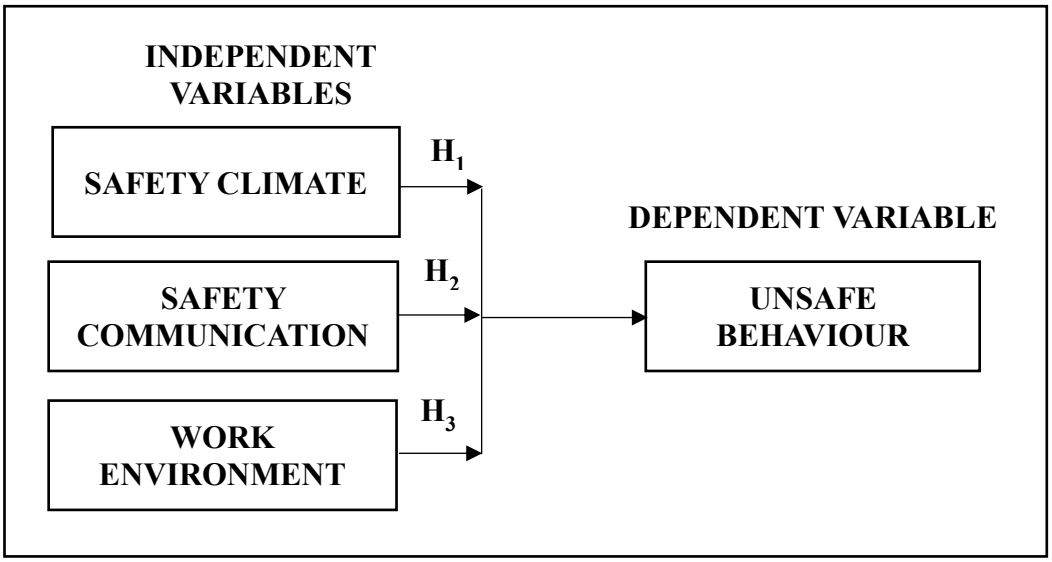

Figure 3.1
Research Framework

Based on the above research framework, the following hypotheses were derived:

i. H_1: There is a significant relationship between safety climate and unsafe behaviour.
ii. H_2: There is a significant relationship between safety communication and unsafe behaviour.
iii. H_3: There is a significant relationship between work environment and unsafe behaviour.

3.3 Research Design

Research design is the outline, guiding the researcher in data collection and data gathering imperative to the research questions. This research used quantitative methods because it could easily identify certain concepts or ideas and are more suitable

to make the decisions in hand (Anderson, Sweeney & Williams, 2002). Quantitative methods provided a good understanding of the relationship among the variables in a certain situation (Sekaran & Bougie, 2010). Furthermore, various factors must be considered so that the quantitative research is free from bias, confounding, essential variables and by means of statistical accuracy for testing hypotheses is imperative to make sure the study had worthy research design (Wiersma, 1993).

3.3.1 Unit of Analysis

The unit of analysis selected would be the individual whereby the data would be collected by means of survey process from the target respondents of all levels of construction workers. The construction workers were chosen because they were directly involved with the safety and ongoing construction projects.

3.4 Population and Sampling

The procedure of the sampling started by identifying the population. The population denoted the entire cluster of people or organisation that are of importance to the researcher (Sekaran, 2005). The target population are construction workers working in the construction industry in Selangor. The population frame is large and the list of companies are provided by the Senior General Manager of the CIDB.

The sample size is dependent on how accurate the requirement is, the heterogeneity of the sample, the total number of variables, appropriateness of statistical measuring instrument used in this research (Hussey & Hussey, 1997; Neuman, 1997). The research population of this study were 132 construction workers from construction industry from the state of Selangor. The state of Selangor is chosen as this state has the highest casualties in the construction industry and has the highest number of

construction companies in Malaysia (CIDB, 2018). From 132 sets of questionnaire distributed for data collection, 122 were returned where 112 were usable for data analysis.

3.5 Instrumentation

Numerous additional steps were correspondingly taken to stimulate attention amongst the respondents. First, the survey questions must be eye-catching, brief and professional looking to create interest for the respondents to respond. The questionnaire was developed taking into deliberation the objectives of the study and the fundamentals that might interest the respondents to respond.

3.5.1 Unsafe Behaviour

In this study, unsafe behaviour is operationalised as the bold act of a person in risk taking, truancy, and trespassing with or without intention (Neal & Griffin, 2006). The measurement of unsafe behaviour is a-9 items measuring instrument adapted from Mearns, Flin, Gordon, and Fleming (2001) used to assess the unsafe behaviour. Example of questionnaire used to measure the variables are ‘i ignore safety regulations to get the job done’, I carry out activities which are forbidden’, ‘I break work procedures.’ Each item is rated on a six-point Likert’s scale, while the respondents are asked to choose anyone of the scale, i.e. 1 = ‘strongly disagree’, 2 = ‘disagree’, 3 = ‘slightly disagree’, 4 = ‘slightly agree’, 5 = ‘agree’, and 6 = ‘strongly agree’.

3.5.2 Safety Climate

Safety climate is an extent workers belief that safety is of utmost importance in an organisation. In general, the theory of safety climate is a term that is more focus towards behaviour of public perception in comparison to individual behaviour or workers (Vinodkumar & Bhasi, 2009). Safety climate is operationalised as a distinct construct, which is different from safety attitudes, risk perception, and safety behaviour and the items that uses a six-point scale with 15 items measuring instrument adapted from Offshore Safety Questionnaire (OSQ) were used to measure safety climate is used in this research. Example of questionnaire used to measure the variables are 'the written safety rules and instructions are too complicated for workers to follow', if I didn't take a risk now and again, the job wouldn't get done', the standard of safety is very high at my place of work.' Each item is rated on a six-point Likert's scale, while the respondents are asked to choose anyone of the scale, i.e. 1 = 'strongly disagree', 2 = 'disagree', 3 = 'slightly disagree', 4 = 'slightly agree', 5 = 'agree', and 6 = 'strongly agree'.

3.5.3 Safety Communication

In the present study, safety communication is defined as workers' perceptions of the extent to which supervisors related safety information and how to respond to complaints with safety related issues. A total of 7 items measuring instrument adapted from Rundmo (1990) were used to assess safety communication level of the respondents. Example of questionnaire used to measure variables in this research are 'I am satisfied with the way I am kept informed about what takes place on', 'I am consulted before decisions are made', and there is good communication between construction workers changes'. Each item is rated on a six-point Likert's scale, while

the respondents are asked to choose anyone of the scale, i.e. 1 = 'strongly disagree', 2 = 'disagree', 3 = 'slightly disagree', 4 = 'slightly agree', 5 = 'agree', and 6 = 'strongly agree'.

3.5.4 Work Environment

Work environment is defined as an organisation or workplace where one or more workers were present to work or as work requirement (Warr, 2002). Work environment is operationalised as an establishment and other locations where one or more employees are working. A total of 10 items measuring instrument adapted from Moos and Insel (1974) were used to assess safety communication level of the respondents. Example of questionnaire used to measure variables in this research are 'I am satisfied with the way I am kept informed about what takes place on', 'I am consulted before decisions are made', and there is good communication between construction workers changes'. Each item is rated on a six-point Likert's scale, while the respondents are asked to choose anyone of the scale, i.e. 1 = 'strongly disagree', 2 = 'disagree', 3 = 'slightly disagree', 4 = 'slightly agree', 5 = 'agree', and 6 = 'strongly agree'.

3.5.5 Personal Information

There were three items to gather respondents' background information in this research, that is, year of birth, gender and their position. The respondents were asked to mark the answer representing the most appropriate responses with respect to the questionnaire.

In this research, four main variables were examined, namely unsafe behaviour, safety climate, safety communication, and work environment. The instruments used to measure the main variables were depicted in Table 3.1.

Table 3.1
Summary of Instruments to Measure Main Variables

No	Variable	Item	Source	Likert Scale
1.	Unsafe Behaviour	9	Mearns, Flin, Gordon, and Fleming (2001).	1= strongly disagree
2.	Safety Climate	15	Offshore Safety Questionnaire (OSQ).	2= disagree
2.	Safety Communication	7	Rundmo (1990).	3= slightly disagree 4= slightly agree 5= agree
3.	Work Environment	10	Moos and Insel (1974).	6= strongly agree

3.6 Back to Back Translation

In the process to eliminate errors, unclear and confusing questions, reverse translation processes were carried out. Firstly, the expert translated the English language questionnaire into Malay, then the same questions were translated back into English. After completion of the reversed translation processes, comparisons were performed to authenticate any error between the original and the new versions (Brislin, 1970). The linguistic used in the questionnaire would approximate the dept of understanding by respondents. The choice of wordings would be determined by the level of grammatical knowledge determined the understanding of the respondents.

3.7 Data Collection Method

Before conducting the study, the researcher approached Mr Megat Kamil Azmi Megat Rus Kamarani, the Senior General Manager of the Construction Industry Development Board (CIDB) Malaysia requesting his permission and assistance to conduct the survey among construction workers in the state of Selangor with the highest casualties and verbal permission was granted. Then, the respective contact persons from the respective companies provided by the Senior General Manager of the CIDB were

contacted through phone so that they are aware of the questionnaire and take the necessary action.

After the above steps were taken, the questionnaire was administered to the respondents through the respective contact person from the construction companies that would oversee the data collection.

This study used survey method as the main method to collect data for this research and this method is selected because it provides high reliability (Babbie, 1990). In this research, self-administered questionnaires are considered suitable because it could cover wide geographical area, has low costs, and are very convenient for the respondents. Besides, respondents are assured of anonymity and the measuring instruments are standardised throughout the study (Zikmund, 1994). The respondents were given one day to respond and return the questionnaire on the same day through their respective administration office.

3.8 Pilot Test

Before conducting a survey, pilot testing should be conducted first. Through this pilot test the disadvantages of the design aspect and the questionnaire can be traced. In addition, through this process, proxy data selection was created. The main purpose of the pilot test was to make all research questions had high level of reliability. Through this pilot test, researchers had the opportunity to assess the rate of actual research response. In addition, the researcher was able to assess the difficulty level of the respondent in answering the questionnaire used for the actual survey (Moore & Benbasat, 1991). In conducting the pilot tests people with similar background with the real respondents of the study were selected. This is to generate similar background

rules and provisions for data collection. For example, if the actual questionnaire was sent to the respondents by postal service, then the pilot test must also be sent via postage (Cooper & Schindler, 2006). The pilot test is a small study of the actual survey, however, pilot tests could also be used in different settings.

According to Ticehurst and Veal (2000), this preliminary study covered the following items:

a. Suitability of words used for research;
b. Arrangement of questions must be arranged in sequence;
c. The outlook of question must be interesting;
d. Test the questions with the level of knowledge of respondents;
e. Assess how much time it takes to answer the questions; and
f. To test suitability for analysis.

As there were no specific guidelines on the number of respondents for a pilot test (Hertzog, 2008), the researcher submitted 50 sets of questionnaire to the contact persons of the respective contractors provided by the Senior General Manager of CIDBfor them to distribute to selected respondents of the pilot test. Pilot test was very important to improve the actual survey questions (Newman, 1997).

The pilot test begun on January 22, 2018 and ended on January 28, 2018. Only 36 sets of questionnaires were returned to the researcher after the seven-day period, representing 72% feedback. The feedback received through this pilot test was the basis used for the actual study.

Reliability testing was conducted to measure the consistency of questionnaires used in this study. Through this pilot test, the assessment of uniformity, independence and the relationship of the respondents to the concept were roughly estimated (Sekaran, 2005). The result of the pilot study was shown in the table below.

Table 3.2
Cronbach's Alpha of the Pilot Study

Variables	Section	Total items	Alpha Coefficient
Unsafe behaviour	B	9	0.90
Safety climate	C	15	0.72
Safety communication	D	7	0.89
Work environment	E	10	0.83

The reliability resulting from the pilot test varied between 0.90 for unsafe behaviour and 0.72 for work environment. The required alpha value should be greater than 0.60 for pilot test and 0.70 for actual study (Sekaran, 2005; Straub, Boudreau & Gefen, 2004). The test result found alpha value met the required criteria, therefore the questionnaire was valid.

3.9 Data Analysis

Data obtained from this research are analysed using descriptive and inferential approaches. The IBM SPSS Statistics 21 was used.

Descriptive analysis is used to describe the data in frequencies and percentages. These analyses are appropriate for items measured on a nominal scale (Sekaran, 2005). On the other hand, inferential analyses were used to test the research hypotheses developed for the research. In the present study, Pearson correlation tests and regression analysis were used mainly to test the relationship between safety climate, safety communication, and work environment on unsafe behaviour. The use of this test

is appropriate given that all of these variables are measured using an interval scale (Sekaran, 2005).

3.10 Conclusion

This chapter has discussed in detail the overall research design. The research method, hypotheses, demography, research framework, the method and data analysis have been discussed in this chapter. This chapter is very important to ensure that the research is managed systematically to minimise problem that may occur and the process of data collection including its analysis to measure the research hypotheses. In the next chapter findings of this research shall be discussed based on the data that are collected.

CHAPTER FOUR
RESULTS

4.1 Introduction

This chapter presented the results of the research. It highlighted especially the research hypotheses set for the study are supported or otherwise. This chapter presents the preliminary analysis where demographic profiles of the respondents are provided; descriptive statistics for all variables, tests for violations of assumptions for multiple regression are presented. Thereafter the reliability of analysis, the results of the tests, revisiting of research hypotheses and finally the summary of chapter is provided.

4.2 Response Rate

In this research, the study targeted the construction workers. The sampling frame was taken from the list of contractors provided by the Senior General Manager of CIDB. The total number of questionnaire distributed was 132 set. Finally, the number of returned questionnaire was 122; this made the response rate 92.42%. Subsequently, after inspection for missing data, only 112 were valid for analysis creating effective response rate of 84.85%. Hence, the response rate was adequate, where a response rate of 40% was acceptable for the study (Salkind, 2006).

4.2.1 Background of Respondents

As mentioned earlier, 132 sets of questionnaires were distributed. However, only 112 were valid for analysis.

The background information selected for this research are as follows:

i. Year of birth

ii. Gender

iii. Position

Table 4.1 presents some background information of the respondents in this research. As can be seen from the table, most of the respondents were male (73.2%). In terms of year of birth, a slight majority of the respondents were born in 1997 and 1982, and most of them work as technician.

Generally speaking, the respondents are representative of the population of this research, i.e. the characteristics and the nature or works are similar throughout the construction workers.

Table 4.1
Background of Respondents (n=112)

		Frequency	Percentage (%)
Year of Birth	2000	1	0.9
	1999	2	1.8
	1998	3	2.7
	1997	9	8.0
	1996	4	3.6
	1995	4	3.6
	1994	8	7.1
	1993	5	4.5
	1992	4	3.6
	1991	4	3.6
	1990	4	3.6
	1989	5	4.5
	1988	6	5.4
	1987	7	6.3
	1986	3	2.7
	1985	7	6.3
	1984	2	1.8
	1983	3	2.7

Table 4.1 (Continued)

		Frequency	Percentage (%)
Year of Birth	1982	9	8.0
	1981	1	0.9
	1978	2	1.8
	1977	3	2.7
	1976	3	2.7
	1974	1	0.9
	1972	1	0.9
	1971	1	0.9
	1970	2	1.8
	1969	2	1.8
	1968	2	1.8
	1965	2	1.8
	1964	1	0.9
	1961	1	0.9
Gender			
	Male	82	73.2
	Female	30	26.8
Position			
	Admin	4	3.6
	Account executive	1	0.9
	Chargeman	4	3.6
	Chief operation	1	0.9
	Civil engineer	1	0.9
	Clerk	7	6.3
	Construction engineer	2	1.8
	Consultant management	1	0.9
	Designer	3	2.7
	Director	8	7.1
	Drafter	1	0.9
	Electrician	1	0.9
	Engineer	14	12.5
	Firm executive	1	0.9
	Foreman	1	0.9
	Hospital Engineer	1	0.9
	HR assistant	1	0.9
	Intern	2	1.8
	Labourer	8	7.1
	Lab assistant	1	0.9
	Manager	8	7.1
	Project architect	1	0.9
	Project director	1	0.9
	Project manager	5	4.5
	Purchasing	1	0.9

Table 4.1 (Continued)

	Frequency	Percentage (%)
Quantity surveyor	3	2.7
Site supervisor	5	4.5
Supervisor	4	3.6
Technician	21	18.8

Table 4.1 presents some background information of the respondents in this research. As can be seen from the table, most of the respondents were male (73.2%). In terms of age, 8.0 % of the respondents were of 36 and 52 years old respectively. In terms of the respondents' position, 18.8 % and 12.5% of the respondents were technicians and engineers respectively.

Generally speaking, the respondents are representative of the population of this research, i.e. the characteristics and the nature or works are similar throughout the construction workers.

The mean age of respondent was 31.30 with a standard deviation of 6.33. The result is shown in Table 4.2

Table 4.2
Mean value for age (n = 112)

Variable	Minimum	Maximum	Mean	Std Deviation
Age	18	57	31.30	6.33

4.3 Reliability of Variables

Reliability is a notion with practical extent of how reliable and unwavering a measurement instrument in used (Salkind, 2006). Reliability is measured by the value of Cronbach's Alpha. A value of 0.7 in Cronbach's Alpha reflecting satisfactory internal consistency of the questionnaire (Nunally, 1978). Flynn, Schroeder, and Sakakibara (1994) argue that Cronbach's Alpha 0.60 and above reflects the effective

reliability of the scale. The researcher proposes 1 that the variable reliability coefficient of less than 0.60 is considered poor, those exceeding 0.70 were acceptable. Measurement of good reliability were closed to 1. Anyway, the lowest acceptable Cronbach's Alpha decreased to 0.60 in exploratory research (Hair, Black, Babin & Anderson, 2010). Finally, the questionnaire had excellent internal consistency that could produce consistent results on the impact of individual unsafe behavior at the construction industry.

Before examining the results of the findings, the internal consistency reliability of the items in each instrument was tested in the research.

Table 4.3 presents the reliability coefficients for each instrument used in this study. As can be seen, the instruments of unsafe behaviour had Cronbach's Alpha value of 0.850, safety climate 0.786, safety communication 0.781, and work environment 0.843. Since the minimum Cronbach's Alpha value satisfy reliability coefficient of 0.7 (Nunally, 1978), it can be said that the instruments used to measure unsafe behaviour is reliable and shown in the table below.

Table 4.3
Reliability Coefficients of Research Variables

Variables	No of items	Cronbach's Alpha
Unsafe behaviour	9	0.850
Safety climate	15	0.750
Safety communication	7	0.834
Work environment	10	0.864

4.4 Descriptive Statistics

The descriptive statistics showed the least and extreme score, mean value and standard deviation of the main variables in the questionnaire using six Likert scale scales from

1 to 6 where 1 is strongly disagree and 6 strongly agree. Further explanation of data of all scales in this study were based on the score category breakdown interpretation where from 1 to 3 is 50% negative and 4 to 6 as 50% positive (Chomeya, 2010).

The descriptive statistics of mean and standard deviation values were depicted in Table 4.4. All variables were measured on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree). The mean value for unsafe behaviour as the dependent variable was 1.90. The mean value for the independent variables, which is safety climate was 3.56, safety communication was 4.46 and work environment was 4.60 respectively.

Table 4.4
Descriptive statistics of research variables (n = 112)

Variables	**Mean**	**SD**
Unsafe behaviour	1.90	0.69
Safety climate	3.56	0.67
Safety communication	4.46	0.73
Work environment	4.60	0.69

4.4.1 Unsafe Behaviour

Table 4.5 shows specific unsafe behaviour items that were asked in the research. the result of analysis is as depicted Table 4.5. In general, the level of unsafe behaviour mean value is between the range of 1.51 to 2.38 and SD from 0.67 to 1.48. The level of unsafe behaviour is reflected in specific dimensions, ignore the safety regulations to get the job done (mean = 1.57, SD = 0.79), carry out activities which are forbidden (mean = 1.51, SD = 0.67), break work procedures (mean = 1.58, SD = 0.68), take chances to get the job done (mean = 2.38, SD = 1.48), bend the rules to achieve a target (mean = 1.95, SD = 1.02), get the job done better by ignoring some rules (mean = 2.12, SD = 1.16), conditions at the workplace stop me working to the rules (mean = 2.05,

SD = 1.05), incentives encourage to break rules (mean = 1.77, SD = 0.93), and take shortcuts which involve little or no risk (mean = 2.17, SD = 1.10).

Table 4.5
Means of Unsafe Behaviour Items (n = 112)

Unsafe behaviour items	Mean	SD
I ignore safety regulations to get the job done	1.57	0.79
I carry out activities which are forbidden	1.51	0.67
I break work procedures	1.58	0.68
I take chances to get the job done	2.38	1.48
I bend the rules to achieve a target.	1.95	1.02
I get the job done better by ignoring some rules.	2.12	1.16
Conditions at the workplace stop me working to the rules.	2.05	1.05
Incentives encourage me to break rules	1.77	0.93
I take shortcuts which involve little or no risk.	2.17	1.10

4.4.2 Safety Climate

Table 4.6 shows specific safety climate items that were asked in the research. the result of analysis is shown in Table 4.6. The safety climate mean value is between 2.41 to 4.78 and SD from 1.15 to 1.56 The level of safety climate is reflected in specific dimension where the respondents are in the opinion that the written safety rules and instructions are too complicated for workers to follow (mean = 2.66, SD = 1.23), if don't take risk now and again, the job wouldn't get done (mean = 2.85, SD = 1.42), the standard of safety is very high at the work place (mean = 3.81, SD = 1.56), can get the job done quicker by ignoring rules (mean = 2.41, SD = 1.24), the rules do not always describe the safest way of working (mean = 2.96, SD = 1.43). There is sometimes pressure to put datelines before safety in the construction site (mean = 3.61, SD = 1.45), nowadays. Managers are more interested in safety than construction of project (mean = 3.61, SD 1.42), there is good attitude to safety in the construction site (mean = 4.45, SD = 1.15), rules and instructions relating to personal safety sometimes make it difficult to keep up with project dateline (mean = 2.87, SD = 1.28), workers

are reluctant to report accidents (mean = 2.99, SD = 1.40), safety is taken seriously in the construction site (mean = 4.74, SD = 1.22), management is genuinely concerned about workers' safety (mean = 4.78, SD = 1.17), sometimes it is necessary to ignore safety regulations to keep construction works going (mean = 2.69, SD 1.41), workers on this construction sites refuse to do work if they feel the task is unsafe (mean = 4.24, SD 1.37), and the management on this construction site is concerned about my general welfare (mean = 4.73, SD 1.17).

Table 4.6
Means of Safety Climate Items (n = 112)

Safety climate items	**Mean**	**SD**
The written safety rules and instructions are too complicated for workers to follow	2.66	1.23
If I didn't take a risk now and again, the job wouldn't get done	2.85	1.42
The standard of safety is very high at my place of work	3.81	1.56
I can get job done quicker by ignoring rules	2.41	1.24
The rules do not always describe the safest way of working	2.96	1.43
There is sometimes pressure to put datelines before safety in this construction site	3.61	1.45
Nowadays, managers are more interested in safety than construction of project	3.61	1.42
There is good attitude to safety in this construction site	4.45	1.15
Rules and instructions relating to personal safety sometimes make it difficult to keep up with project dateline	2.87	1.28
Workers are reluctant to report accidents	2.99	1.40
Safety is taken seriously in this construction site	4.74	1.22
Management is genuinely concerned about workers' safety	4.78	1.17
Sometimes it is necessary to ignore safety regulations to keep construction works going	2.69	1.41
Workers on this construction sites refuse to do work if they feel the task is unsafe	4.24	1.37
I feel that the management on this construction site is concerned about my general welfare	4.73	1.17

4.4.3 Safety Communication

Table 4.7 shows specific safety communication items that were asked in this research. The result of analysis is depicted in Table 4.7. The safety communication at workplace as reflected in; satisfied with the way I am kept informed about what takes place on

(mean = 4.77, SD = 0.85), good communication between management and construction workers (mean = 4.86, SD = 0.89), consulted before decisions are made (mean = 4.81, SD = 0.92), there is good communication between construction workers changes (mean = 4.75, SD = 0.90), supervisor gives clear instruction (mean = 4.87, SD = 0.90), have a fair opportunity of influencing the decision to be made by superiors (mean = 4.36, SD = 1.18), and know what I can expect from others (4.06, SD = 1.17).

Table 4.7
Means of Safety Communication Items (n = 112)

Safety communication items	**Mean**	**SD**
I am satisfied with the way I am kept informed about what takes place on.	4.77	0.85
I am consulted before decisions are made	4.81	0.92
There is good communication between construction workers changes.	4.75	0.90
My supervisor gives me clear instruction	4.87	0.90
I have a fair opportunity of influencing the decision to be made by my superiors	4.36	1.18
I know what I can expect from others	4.06	1.17

4.4.4 Work Environment

Table 4.8 shows specific work environment items asked in this research. The result of analysis is provided in Table 4.8. In general, the work environment mean value vary from 3.42 to 4.89. This is reflected in the following dimensions: there is constant pressure to keep working (mean = 3.42, SD = 1.39), things are sometimes disorganised (mean = 4.68, SD = 1.12), there always seems to be urgency about everything (mean = 4.05. SD 1.17), activities are well planned (mean 4.68, SD 1.12), workers cannot afford to relax (mean = 4.68, SD 1.12), rules and regulations are somewhat vague and ambiguous (mean = 4.68, SD 1.12), nobody works too hard (mean = 4.68, SD 1.12), the responsibilities of supervisors are clearly defined (mean = 4.89, SD = 0.94), there

is no time pressure (mean 4.04, SD = 1.29), and the details of assigned jobs are generally explained to workers (mean 4.77, SD = 0.92).

Table 4.8
Means of Work Environment Items (n = 112)

Work environment items	Mean	SD
There is constant pressure to keep working	3.42	1.39
Things are sometimes disorganised	4.68	1.12
There always seems to be urgency about everything	4.05	1.17
Activities are well planned	4.68	1.12
Workers cannot afford to relax	4.68	1.12
Rules and regulations are somewhat vague and ambiguous	4.68	1.12
Nobody works too hard	4.68	1.12
The responsibilities of supervisors are clearly defined	4.89	0.94
There is no time pressure	4.04	1.29
The details of assigned jobs are generally explained to workers	4.77	0.92

4.5 Hypotheses Testing

4.5.1 Correlation Matrix

Correlation matrix is required to view the interrelationship between variables under study. It is also known as Pearson correlation. Relationships among all variables under study are reported in Table 4.9.

Table 4.9
Correlation Matrix Among Variables Under Study (n = 112)

Variables		1	2	3	4
Unsafe behaviour (1)	Pearson Correlation	1	-	-	-
	Sig. (2-tailed)	-	-	-	-
Safety climate (2)	Pearson Correlation	.406(**)	1	-	-
	Sig. (2-tailed)	.000	-	-	-
Safety communication (3)	Pearson Correlation	-.274(**)	.181	1	-
	Sig. (2-tailed)	.003	.056	-	-
Work environment (4)	Pearson Correlation	-.188(*)	.181	.509 (**)	1
	Sig. (2-tailed)	.047	.057	.000	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen from Table 4.9, safety climate is significantly related to unsafe behaviour (r = 0.406, p= 0.000) where the analysis showed a positive relationship. This means that as construction workers with good safety climate environment will enhance workers safety behaviour, hence supporting the first hypothesis of this research, that is, there is significant relationship between safety climate and unsafe behaviour. The second hypothesis is also supported as there was significant relationship between safety communications unsafe behaviour (r = -0.274, p = 0.003) where the analysis showed a negative relationship. This means that as the construction workers were in the opinion that rules and regulations communicated through to the workers, affected his/her job, the better the communication, the safer the behaviour of construction workers, thus supporting the hypothesis. The third hypothesis was also supported (r = -0.188, p = 0.047) that is there is significant relationship between work environment and unsafe behavior where the analysis showed a negative relationship. A summary of the result of the research hypotheses is presented in Table 4.10.

Table 4.10
Summary of Hypotheses Results

	Research hypotheses	**Result**
H_1	There is a significant relationship between safety climate and unsafe behaviour	Accepted
H_2	There is a significant relationship between safety communications and unsafe behaviour	Accepted
H_3	There is a significant relationship between work environment and unsafe behaviour	Accepted

4.5.2 Regression Analysis

The purpose of performing regression analysis was to analyse distinctions related with variables and their extent of dependency or their influence on the independent variables. From the value of F, the results predicted the number of distinctions described by the model. In other words, if the value of F is not significant, there is no

necessity to continue with the analysis even if the value of R-squared has sufficient explanatory power to be assessed.

Beta might be compared through correlation coefficient, showing how strong the relationship between the independent and dependent variables and also the direction of either positive or negative. Normally, Beta values were between -1 and 1, and the most importantly was the Beta value significant (p=<0.005) or p-value was smaller than alpha value. The result of regression analysis as depicted in the table below.

Table 4.11
Results of the Regression Analysis

Variables	**Unstandardized Coefficient**		**Standardized Coefficient**	**t**	**Sig**
	B	**Std. Error**	**Beta**		
Safety climate	0.68	0.13	0.49	5.03	0.000
Safety communication	0.11	0.10	0.11	1.14	0.001
Work environment	-.05	0.09	-.05	-.51	0.003

*p=<0.005, F= 13.15, R^2 = 0.27

4.6 Summary

To summarise, the findings of this study were presented in this chapter. After descriptive tests were carried out, correlation test and regression assessments were conducted as response to hypotheses questions. Pearson correlation results were as expected and synchronised with preceding outcomes. The multiple regression outcomes showed the predictive factors of the independent variables contributed to construction industry. The findings were remarkable as it was pointy to numerous relationships between the variables. Further argument and conclusion would be provided in the succeeding chapter. In addition, the study's limitations and implications for future research and practice also be highlighted.

CHAPTER FIVE
DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter provides the outline of the findings discussed in the previous chapter. Firstly, this study re-visits the objective and purpose of the research. Then a section on general review of the findings were also described. Recommendations for future studies and contribution of the research were provided. Next, limitation of the study and finally suggestion for future research were also suggested, and finally the conclusion of the research was provided.

5.2 Overview of the Research Study

This research has explored the factors affecting the unsafe behaviour of construction workers in a construction industry in the state of Selangor. A total of 132 questionnaire were administered. The questionnaires were distributed through the respective companies provided by the Senior General Manager of CIDB. The number of returned questionnaire was 122 creating return percentage of 92.42%. Anyway, from 122 collected response, 112 were fit for use for analysis making a response rate of 84.85%.

5.3 Discussion of Findings

The following section addresses research question exploring the factors that determine the unsafe behaviour of construction workers. A cross tabulation test was conducted. The data was then analysed with multiple linear regression to investigate the relationship of uni-dimension variables.

The findings of this research can provide a foundation and the level of unsafe behaviour in construction industry among construction workers in construction industry. Furthermore, the goodness-fit statistical outcomes of the dimension models indicated that the model design may explain the construction workers behaviour with high probability.

The objective of this study was to determine the relationship between safety climate, safety communication, and work environment with unsafe behaviour. These were done through linear regression analysis assessments. Significant relationships existed between safety climate and unsafe behaviour, safety communication and unsafe behaviour, and also work environment and unsafe behaviour.

This study revealed the necessity of safety climate for construction industry, and this issue was previously covered in a very little detail in existing literature except of Osman et al., (2017). It is evident that the benefits and drawbacks of successful implementation of safety climate at workplace are critically influenced by all workers at the workplace. According to Okoro, Musondo, and Agumba. (2017), every employee played a vital role to ensure safety at workplace is always maintained as measures to improve productivities of employees.

Through the analysis, there is a significant empirical relationship between safety climate and unsafe behavior among construction workers. This suggests that if the management is highly committed to safety practices within the organization and ensuring that safety is given priority, then workers are less likely to perform unsafe behavior. Thus, Hypothesis H1 was supported in safety climate that determined unsafe behaviour at worksites. Safety climate had been shown to positively determine unsafe

behaviour (Choudhry & Fang, 2008; Johari et al., 2017; Kanten, 2013; Mohamed, 2002; Patel & Jha, 2015). The result of this study would help construction industries management and workers understand the factors to improve unsafe behaviour towards work and to inculcate safety awareness among workers of the industry. The ability to avoid unsafe behaviour would help construction industries better achieve the benefits of accident-free environment within the industry. Widespread workers awareness to shun unsafe behaviour would have material financial benefits.

Through the analysis, there is a significant empirical relationship between the safety communication and unsafe behavior among construction workers. Anyway, the safety communication has a negative relationship with the unsafe behaviors among the construction workers. Hypothesis 2 was also supported. All levels of construction workers supported good safety communication would increase productivity as the all workers were aware of any changes and development within the construction industry as two-way communication will enhance every workers awareness of the importance of safety communication. Besides, strong safety communication at worksites would more likely to reduce accidents. The finding was consistent with previous studies (Arfena, Jaswar & Kader, 2014; Reason, 2005; Wang, Faghih-Roohi, Hu & Xie, 2011; Yeong & Wahab, 2016). It is not surprising to find supervisors and management of the construction industry had gate keeping attribute of workers unsafe behaviour. While most of the supervisors and senior management in this research are responsible for implementing and disseminating rules and safety procedures to construction workers, this helped in allowing them to encourage safety behaviour among the construction workers.

The work environment is reported to have a significant relationship with unsafe behavior. In particular, the result of the analysis showed a negative relationship between work environment and unsafe behaviour. This is in line with the findings of the study by Varonen and Mattila (2000), Clarke and Cooper (2004), and Omar and Sindi (2015) where the work environment has an impact on the *unsafe behavior* of workplace construction workers. One reasonable reason to clarify this is that unsafe work environments will adversely affect construction workers in various aspects. From the aspect of safety, unsafe work environment will affect construction workers in discharging their duties and putting them at high risk *to complete* their task *when* they *are* engaged in unsafe behavior. On the other hand, if *the* construction workers are *working in a more conducive and uncomplicated environment, of course, they will likely not be involved in unsafe* behavior. Thus, Hypothesis 3 was also supported.

In addition, this research also attempted to empirically test conceptual models of best predictors of unsafe behaviour from research conducted by Johari et al. (2017). The statistical test results confirmed that the conceptual model can be applied to test unsafe behaviour of construction workers from the construction industry. Anyway, further tests on the predictor variables must be conducted.

5.4 Contribution

The contribution of this research can be divided into two, which is the theory contribution. The following subsections shall discuss this in detail.

5.4.1 Contribution to Theory

a) Validation of Conceptual Model

The first contribution was to empirically determine suitability of numerous factors and authenticate the conceptual model in the setting of unsafe behaviour among construction workers from the construction industry. This research empirically validates and confirms the conceptual model in this study.

b) Development and Validation of a Survey Instrument

The second academic support is the expansion and confirmation of instrument used in this research. In a condition where concept is advanced but previous instrumentation is not offered and confirmed, it is important to create and validate fresh methods. Such attempts are understated as a contribution to scientific practice in unsafe behaviour of workers in construction industry. Straub et al., (2004) recommended scholars who are capable to participate in the extra work to produce and confirm instrumentation to establish theoretic factors, are analysis the rigor of the factors and theoretic relations to technique/dimension modifications. This execution hence denotes major support to scientific practice of the sector (Straub et al. 2004).

Subsequently this investigation meets all the above criteria (Straub et al., 2004), it marks a significant support to the research methodology. This is attained by amending, generating and confirming methods that represent numerous issues involved in the conceptual model. The research instruments developed and certified in this investigation can be used to study numerous developing standards in the setting of unsafe behaviour of construction workers in the construction industry.

5.5 Limitation of the Study

This research has several limitations that must be noted and addressed in any future research. Several factors limit the generalisability of the researcher findings to a larger population. For example, although the subjects were selected from construction workers from the state of Selangor, 112 construction workers participated in this research. Hence, the findings of this research were limited to construction workers in the state of Selangor. However, the research could be replicated and extended to other construction industry from other states in Malaysia.

Secondly, the concepts and survey items applied in this study were generally gauged from past study printed in English. Even if the paraphrased study instruments were revised by numerous experts who were articulate in both languages either English or Malay, there could be some errors misleading the meaning of the word.

5.6 Suggestions for Future Research

Even though the results were firmed and fit the research framework, more research was required to validate this model or create another model which may be fit for a specific information. Even if clarifying excessive deal of the variance in issues illustrated in the research, the constraint of this research could be extended to gain new comprehensive representation of the unsafe behaviour of construction workers in future study.

This study intended to determine whether the obtained findings were specific to construction workers, and whether the results would be similar across a particular state with respect to construction workers unsafe behaviour in the future. This would need cross-sectional method when investigating construction workers unsafe behaviour.

The survey results were reinforced if supplemented with interviews. The results could also be reinforced if the study had been a longitudinal one. The statistics for this study had been collected within a short period and offer a snapshot. Nevertheless, it may perhaps be extended done over a longer period of time to facilitate longitudinal research.

Future study might perhaps remodel the model by considering the independent dimensions as moderators of the relationship of safety communication with unsafe behaviour. By taking the independent variables as moderators, one could enhance understanding the level effect that the predictors of respective unsafe behaviour had on behaviour of workers in the construction industry. It was hoped that this understanding would support in developing designs and interferences in attaining diverse sets of probable workers in future study.

Even though statistical outcomes of this study showed a good fit for this model, there were other issues that might affect unsafe behaviour of construction workers. In future research, researchers might also study other probable psychosocial or contextual variables that might affect unsafe behaviour of workers of the construction industry or other industries.

Lastly, future research should investigate a redesign model with moderators or intervening variables in either similar or other industry from other states in Malaysia.

5.7 Recommendations

This research has important findings for safety policy implementation, rules and procedures in the construction industry practices. Caution was needed when

conducting a study in the construction industry as the industry is labour intensive and the workers are to carryout work activities that are always changing especially that involve unsafe work behaviour. As the safety rules and regulation spread within the construction industry gradually, understanding the unsafe behaviour among the workers gave important advantage to the supervisors and management of the construction industry.

The empirical results of this research offered strategic direction to avoid workers unsafe behaviour while at work for a successful implementation of construction projects. This research had provided insight into factors affecting theoretical perspective for understanding unsafe behaviour research in the construction industry. Policy makers within the construction industry must be clear about the objectives of safety rules and procedures and they must be communicated effectively within the organization.

If adequate explanation and emphasis were provided to all the workers on how they could increase performance, this research asserted that they were more likely to shun unsafe behaviour at any time.

In order to achieve awareness of safety among all construction workers, it was recommended that the policy maker and management must focus on identifying all construction work activities according to priority.

5.8 Conclusion

This research had provided insight into factors that affected a theoretical perspective for successful unsafe behaviour research. Generally, the findings indicated that the

model fitted the data attain from construction workers from construction industry in the state of Selangor. Therefore, this survey was expected to fill the gap from the empirical and theoretical point of view in explaining the unsafe behaviour of workers in the construction industry.

REFERENCES

Abdul, R. A., Muhd, Z. A. M., and Bachan, S. (2008). Causes of accidents at construction sites. Malaysian Journal of Civil Engineering, 20(2), 242-259.

Alicia, C. C. (2009). An examination of the Human Factors Attitudes and Knowledge of Surface Warfare Officers. Master of Science in Human System Integration Naval Postgraduate School, Monterey, California.

Alsamadani, R., Hallowell, M. R., Javvennick-Will, A. and Cabello, J. (2013). Relationships among language proficiency, communication patterns, and safety performance in small work crews in the United States. Journal of Construction Engineering and Management, 13(9), 1125-1134.

Anderson, D. R., Sweeney, D. J., & William, T. A. (2002). *Statistics for business and economics* (8thed.). Cincinnati, OH: South-Western.

Arfena D. L., Jaswar, K., & Kader, A. S. A. (2014). Contribution of Human Factor to Shipping Safety. *Jurnal Teknologi*, 66(2), 113-119.

Babbie, E. (1990). *Survey research methods* (2nded.). Belmont, Calif.: Wadsworth.

Barling, J., Loughlin, C., Kelloway, E. K., (2002). Development and Test of a Model Linking Safety-Specific Transformational Leadership and occupational safety. *Journal of Applied Psychology*, 87(3), 488-496.

Bank Negara Malaysia (BNM) Annual Report 2017

Bartram, D., Robertson, I. T. & Callinan, M. (2002). Introduction: A framework for examining organizational effectiveness. In *Organizational Effectiveness: The Role of Psychology,* edited by I. T. Robertson, M. Callinan & D. Bartram. 1-10. Chichester, UK, Wiley.

Berek, N. C., Suwandi, T. & Purnomo, W. (2017). Internal factors that influence unsafe acts on construction employees. *International Journal of Researchers*, 2(3), 57-61.

Beus, J. M., Payne, S. C., Bergman, M. E. & Arthur, W. (2010). Safety climate and injuries: An examination of theoretical and empirical relationship. *Journal of Applied Psychology*, 95(4), 713-727.

Bjerkan, A. M., (2010). Health, environment, safety culture and climate-analyzing the relationships to occupational accidents. *Journal of Risk Research*, 13(4), 445-477.

Bradley, G. (1997). Safe people safe places: Psychological contributions to industrial accident prevention. *Journal of Applied Social Behaviour*, 2, 1-14.

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3) 185-216.

Buehler, M., Werna, E., & Brown, M. (2017). *World Economic Forum*. More than 2 million people die at work each year. Here's how to prevent it.

Chau, N., Bourgkard, E., Bhattacherjee, A., Ravaud, J. F., Choquet, M., and Mur, J. M. (2008). Associations of job, living conditions and lifestyle with occupational injury in working population-based study. *International Arch Occup Environ Health*, 81, 379-389.

Chi, S., Han, S., Asche, & Kim, D.Y. (2013). Relationship between unsafe working conditions and employees' behaviour and impact of working conditions on injury severity in U.S. construction industry. *Journal Construction Engineering Management,* 139, 826-838.

Chomeya, R. (2010). Quality of psychology test between likert scale 5 and 6 points. *Journal of Socila Sciences*, 6(3), 399-403.

Choudhry, R. M., & Fang, D. (2008). Why operatives engage in unsafe work behaviour: Investigating factors on construction sites. *Safety Science*, 46(4), 566-584.

Christoffel, & Gallagher, S. S. 2006), *Injury Prevention and Public Health: Practical Knowledge, Skills, and Strategies*. Jones & Bartlett Learning.

CIDB Malaysia: Main statistics on construction projects awarded as of March 2017. Retrieved March 15, 2018 from http://www.cidb.gov.my/images/content/pdf/statistik/Web-Mac.-2017.pdf.

Cigularov, K. P., Chen, P. Y. & Rosecrance, J. (2010). The effects of error management climate and safety communication on safety: a multi-level study. *Accident Analysis Preview*, 42(5), 1498-1506.

Clarke, S. (2006). Ther relationship between safety climate and safety performance: A meta-analytical review. *Journal of Occupational Health Psychology,* 11(4), 315-327.

Clarke, S. G., & Cooper, C. L. (2004). *Managing the Risk of Workplace Stress: Health and Safety Hazards.* New York City, NY: Routledge.

Cooper, D. R., & Schindler, P. S. (2006). *Business research methods* (9th ed.). New York: McGraw Hill, Salkind, N. J.

Cooper, M. D., & Philip, R. A. (2004). Exploratory analysis of the safety climate and safety behaviour relationship. *Journal of Safety Research*, 35(5), 497-512.

Dedobbeleer, N. & Beland, F. (1991). A safety climate measure for construction sites. *Journal of Safety Research*, 22(2), 97-103.

Dekker, S. W. A (2002). Reconstructing human contributions to accidents: the new view on error and performance. *Journal of Safety Research*, 33, 371-385

EU-OSHA: Improving construction site safety through safety communication of foremen. Retrieved March, 15, 2018, from https://osha.europa.eu/en/tools-and-publications/publications/improving-construction-site-safety-through-safety-communication-of-foremen.

Fang, D., Chen, Y., & Wong. (2006). Safety climate in construction industry: A case study in Hong Kong. *Journal of Construction Engineering and Management*, 132(6), 573-584.

Flynn, B. A., Schroeder, R. G. & Sakakibara, S. (1994). A framework for quality management research and an associated measurement instrument. *Journal of Operations Management*, 28(4), 339-366.

Ganesh, C. S. & Krishnan, R. (2016). A review of occupation injury research in Malaysia. *Medical Journal Malaysia*, 71, 100-104.

Ganguly, S. (2011). Human error vs. workplace management in modern organizations. *International Journal of Research in Management and Technology*, 1, 13-17.

Garcia, A. M., Boix, P., & Canosa, C. (2004). Why do employees behave unsafely at work? Determinants of safe work practices in industrial employees. *Journal of Occupational Environ Med*, 61, 239-246.

Garcia-Herrero, S., Mariscal, M. A., Garcia-Rodriguez, J. and Ritzel, D. O. (2012). Working conditions, psychological/physical symptoms and occupational accidents. Bayesian network models. *Safety Science*, 50, 1760-1774.

Geller, E. S. (2005). *People-Based Safety: The Source*. Virginia Beach. VA: Coastal Training Technologies Corporation.

Glendon, A. I. & Litherland, D. K. (2001). Safety climate factors, group differences and safety behaviour in road construction. *Safety Science*, 39(3), 157-188.

Goldenhar, L., Williams, L. & Swanson, N. (2003). Modelling the relationship between job stressors and injury and near-miss outcomes for construction labourers. *Work & Stress*, 17(3), 218-240.

Griffin, M. & Neal, A. (2000). Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. *Journal Occupational Health Psychology*, 5, 347-358.

Guldenmund, F. W. (2000). The nature of safety culture: a review of theory and research. *Safety Science*, 34(1-3), 215-257.

Hair, J., Black, W. C., Babin, B., Anderson, R. E. (2010). *Multivariate data analysis (7th ed.).* Uppers Saddle River, New Jersey: Pearson Education International.

Hamid, A. R. A., Majid, M. Z. A., and Singh. B. (2008). Causes of accidents at construction sites. *Malaysia Journal of Civil Engineering*, 20(2), 242-259.

Havold, J. I. & Nesset, E. (2008). From safety culture to safety orientation: Validation and simplification of a safety orientation scale using a sample of seafarers working for Norwegian ship owners. *Safety Science*, 24(7), 1-22.

Heinrich, H.W. (1980). *Industrial Accident Prevention*. Mc. Graw-Hill Book Company. New York.

Hermann, J. A., Ibarra, G. V. & Hopkins, B. I. (2010). A safety program that integrated behaviour-based safety and traditional safety methods and its effects on injury rates of manufacturing employees. *Journal of Organisational Behaviour Management*, 30(1), 6-25.

Hertzog, M. A. (2008). Considerations in determining sample size for pilot studies. *Research in Nursing and Health*, 31(2), 180-191.

Hinze, J., Huang, X., & Terry L., (2005). The nature of struck-by accidents. *Journal of Construction Engineering and Management*, 13(2), 262.

Hofmann, D. A. & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviours and accidents. *Personnel Psychology*, 49(2), 307-339.

Hofmann, D. A., & Morgeson, F. P. (1999). Safety-related behavior as a social exchange: The role of perceived organizational support and leader–member exchange. *Journal of Applied Psychology*, 84, 286–296.

Huang, Y. H., Chen, P. Y., Grosch, J. W. (2010). Safety climate: New developments in conceptualization, theory, and research. *Accident Analysis and Prevention*, 42, 1421-1422.

Hussey, J., & Hussey, R. (1997). *Business research: ractical guide for undergraduate and postgraduate students.* New York: Palgrave.

Idris, M. A., Dollard, M. E., & Yulita (2014). Psychosocial safety climate, emotional demands, burnout, and depression: a longitudinal multilevel study in the Malaysian private sector. *Journal Occupational and Health Psychology*, 19(3), 291-302.

ILO (2017). *World Economic Forum*. More than 2 million people die at work each year. Here's how to prevent it.

Jannadi, O. A., Bu-Khamsin, M. S., (2002). Safety factors considered by industrial contractors in Saudi Arabia. *Building and Environment Journal,* 37(5), 539-547.

Johari, J., Tan, F. Y. & Adnan, Z. (2017). Demystifying the empirical link between safety climate, safety communication, work environment, and unsafe behaviour at work. *Jurnal Pengurusan*, 50, 35-43.

Kanten, S. (2013). The relationship among working conditions, safety climate, safe behaviors and occupational accidents: An empirical research on the marble employees. The Macrotheme Review, *A multidisciplinary journal of global macrotrends.*

Khosravi, Y., Asilian-Mahabi, H., Hajizadeh, E., Hassanzadeh-Rangi, N., Bastani, H., and Behzan, A, H. (2014). Factors influencing unsafe behaviors and accidents on construction sites: A review. *International Journal of Occupational Safety and Ergonomics,* 20(1), 111-125.

Kim, C. W., McInerney, M. L., & Alexander, R. P. (2002). Job satisfaction as related to safe performance: A case for a manufacturing firm. *The Coastal Business Journal,* 1(1).

Krejcie, R. V., and Morgan, D. W. (1970). Setermining sample size for research activities. *Educational and Psychological Measurement*, 30(1), 607-610.

Krivonos, P. D. (2007). *Communication in Aviation in Safety: Lessons Learned and Lessons Required.* Paper presented at the Regional Seminar of the Australia and New Zealand Societies of Air Safety Investigations.

Lingard, H. C., Cooke, T., & Blismas. N (2009). Group-level safety climate in the Australian construction industry: within-group homogeneity and between-group differences in road construction and maintenance. *Construction Management and Economics,* 27, 419-432.

Lingard, H., & Rowlinson, S. M. (2005). Development of a safety performance index for construction projects in Egypt. *American Journal of Civil Engineering and Architecture*, 3(5), 182-192.

Lund, J. & Hovden, J. (2003). The influence of safety at work on safety at home and during leisure time. *Safety Science*, 41, 739-757.

McGonagle, A. K., Beatty, J. E. & Joffe, R. (2014). Coaching for employees with chronic illness: evaluating an intervention. *Journal of Occupational Health Psychology*, 19(3), 385-398.

McKenna, F. P. (1983). Accidents proneness: a conceptual analysis. *Accident Analysis and Prevention*, 15, 65-71.

Mearnes, K., Flin, R., Fleming, M. & Gordon, R. (1997). *Human and Organisational Factors in Offshore Safety (HSE Report OTH 543).* HM Stationary Office, Norwich, UK.

Mohamed, S. (2002). Safety climate in construction site environments. *Journal Constr. Eng. Manage*, 128, 375-384.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information System Research*, 2(2), 192-222.

Moos, R. H. & Insel, P. N. (1974). *Work Environment Scale Form*. Inc., Mountain View, CA: Consulting Psychologists Press.

Mullen, J. (2004). Investigating factors that influence individual safety behaviour at work. *Journal of Safety Research*, 35, 275-285.

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, *91*(4), 946-953.

Neuman, W. L. (1997). Social research methods. Qualitative and quantitative approaches (3rd ed.). MA: Allyn & Bacon.

Newaz, M. T., Jefferies, M., Davis, P., & Pillay, M. (2016). *Using the psychological contract to measure safety outcomes on construction sites.* Proceedings of the 32nd Annual ARCOM Conference, 5-7 September 2016, Manchester, UK, Association of Reseachers in Construction Management, 1, 487-496.

Noor, S, M. (2010). *The moderating effect of organizational structure and quality practices on absorptive capacity, technology compatibility and technology transfer relationship.* Unpublished doctoral dissertation, Universiti Utara Malaysia.

Nunally, J. C. (1978). *Psychometric Theory.* New York, NY: McGraw Hill.

Okoro, C, S., Musondo, I., & Agumba, J. (2017). Identifying determinants of construction employee performance on construction sites: A Literature Review. *International Journal of Innovation, Management and Technology*, 8(1), 60-63.

Olanrewaju, K. O., & Farinde, A. J. (2014). The potentials of traditional communication methods in information dissemination: A case study of farmers in Osun State, Nigeria. *South African Journal for Communication Theory and Research*, 40(4), 361-375.

Omar, Y., & Sindi, M. (2015). Impact of work pressure on the performance of Saudi Airlines staff: Case study on booking staff of Saudi Airlines in Jeddah. *International Journal of Academic Research*, 7(1), 229-235.

Orlikoff, J. E. & Totten, M. K. (2009). Eavluating the board chair creating a process for assessing leaders reinforces a commitment to governance accountability and continuous improvement. *Healthcare Executive*, 24(1), 60-72.

Osman, W. N., Amminudin, N. S., & Nawi, M. N. M. (2017). Kajian kes pengurusan keselamatan dan kesihatan pekerja di tapak bina: Persepektif kontraktor. *Journal of Advanced Research in Business and Management Studies*, 7(1), 51-59.

Park, C. S., Kim, H. T., Goh, J. H., Pedro, A. (2016). BIM-based idea bank managing value engineering ideas. *International Journal Project Management*, 35(4), 686-698.

Patel, D. A., & Jha, K. N. (2015). Neural network model for the prediction of safe work behaviour in construction projects. *Journal Constr. Eng. Management*, 141(1), 1-13.

Peter Warr (2001). Age and work behaviour: Physical attributes, cognitive abilities, knowledge, personality traits and motives. *International Review of Industrial and Organisational Psychology*, 16, 1-36.

Rahman, M. A. (2012). *Tahap Kesedaran Guru-Guru Tadika Terhadap Keselamatan dan Kesihatan Pekerjaan di Tempat Kerja: Kajian Kes di Negeri Melaka*. PhD diss., Universiti Utara Malaysia.

Reason, J. (2005). Safety in the Operating Theatre - Part 2: Human Error and Organisational Failure. *Quality Safety Health Care*, 14, 56-61.

Rundmo, T. (1990). *Risk and Perception of Safety*. Research Report Norwegian Petroleaum Directorate, Trondheim/Stavanger.

Sadullah, O. & Kanten, S. (2009). A research on the effect of organizational safety climate upon the safe behaviors. *Eng Academic Review*, 9(3), 923-932.

Salim, F. N. A. (2012). *Kajian keselamatan dan kesihatan di tapak bina sekitar kawasan bahagian pantai barat Sabah.* Thesis Sarjana Muda. Universiti Teknologi Malaysia.

Salkind, N. J. (2006). Exploring Research (6thed.). Pearson Education, Inc., Upper Saddle River, NJ

Samewoi, Z. (2010). *Tahap kesedaran kontraktor terhadap latihan keselamatan di tapak bina*. Fakulti Alam Bina: Universiti Teknologi Malaysia.

Sekaran, U. (2005). Research methods for business: A skill building approach (4thed.). Singapore: John Wiley & Sons, Inc.

Sekaran, U., & Bougie, R. (2010). *Research methods for business. A skill building approach* (5thed.). West Sussex, United Kingdom: John Wiley and Sons, Ltd, Publication.

Shen, Y., Koh, T. Y., Rowlinson, S., & Bridge, A. J. (2015). Empirical investigation of factors contributing to the psychological safety climate on construction sites. *Journal of Construction Engineering and Management*, 141(11), 15-38.

Shen, Y., Zhang, P., Koh, Y., Rowlinson, S., & Leicht, R. (2017). The effecta of group safety climate on construction personnel's safety behaviour: A cross-level investigation. *Proceedings of the 15th Engineering Project Organization Conference with 5th Megaprojects Workshop (EPOC-MW 2017).* Lake Tahoe California, U. S, 1-11.

Sinclair, R. R., Martin, J. E. & Sears, L. E. (2010). Labor unions and safety climate: Perceived union safety values and retail employee safety outcomes. *Accident Analysis and Prevention*, 42, 1477-1487.

Siu, O. L., Philips, D. R., & Leung. T. W. (2004). Safety climate and safety performance among construction employees in Hong Kong. *Accident Analysis and Prevention,* 36, 359-366.

Spencer, L. M. & Spencer, S. M. (1993). Competence at work. *Human Resouirce Development Quarterly,* 5, 391-395.

Stave, C., Pousette, A. & Torner, M. (2008). Risk and safety communication in small enterprises-how to support a lasting change towards work safety priority. *Journal of Risk Research,* 11 (1-2), 195-206.

Stephen, S. S. Cole, H. J., Jenkins-Gibbs, K., Richle, C. F. & Weare, W. H. (2009). Developing core leadership competencies for library profession. *Library Leadership and Managament,* 23(2), 118-126.

Straub, D., Boudreau, M., & Gefen, D. (2004). Validation guidelines for it positivist research. *Communication of the Association for Information System*, 13(24), 380-427.

Ticehurst, G. W., & Veal, A. J. (2000). *Business research methods: A managerial approach.* Pearson Educatrion Australia, NSW.

Varonen, U. & Mattila, M. (2000). The safety climate and its relationship to safety practices, safety of the work environment and occupational accidents in eight wood processing companies. *Accident Analysis and Prevention*, 32, 761-769.

Vinodkumar, M. & Bhasi, M. (2009). Safety management practices and safety behaviour: Assessing the mediating role of safety knowledge and motivation. *Accident Analysis & Prevention,* 42(6), 2082-2093.

Wang, Y. F., Faghih Roohi, S., Hu, X. M., & Xie, M. (2011). Investigations of Human and Organizational Factors in hazardous vapor accidents. *Journal of Hazardous Materials,* 191(1-3), 69-82.

Warr, P. (2002). *Psychology at Work*. London: Penguin Books.

Wiersma, W. (1993). *Research methods in education: An introduction* (5thed.). Boston: Allyn & Bacon.

Wills, A. R., Biggs, H. C. & Watson, B. (2005). An analysis of a safety climate measure for occupational drivers and implications for safer workplaces. *Australian Journal of Rehabilitation Counselling,* 11, 8-21.

Wills, A., Watson, B. & Biggs, H. (2009). An exploratory investigation into safety climate and work-related driving. Journal Safety Research, 32(1):81-94.

Wirth, O., and Sigurdsson, S. O. (2008). When workplace safety depends on behaviour change: topics for behavioural safety research. *Journal of Safety Research*, 39, 589-598.

Woods, T. F. (2009). *Avoid These Unsafe Behaviors to Prevent Workplace Accidents.* Thomas Ferner Woods Agency Inc, Columbus.

Wu, X., Liu, Q., Zhang, L., Skibniewski, M. J. & Wang, Y. (2015). Prospective safety performance evaluation on construction sites. *Accident Analysis and Prevention*, 78, 58-72.

Yeong, S. S. & Wahab, S. R. A. (2016). The Mediating Effect of Safety Culture on Safety Communication and Human Factor Accident at the Workplace. *Asian Social Science*, 12(12), 127-142

Zaira, M. M., and Hadikusumo, B. H. W. (2017). Structural equation model of integrated safety intervention practices affecting the safety behaviour of employees in the construction industry. *Safety Science*, 98, 124-135.

Zikmund, W. G. (1994). *Exploring marketing research* (5th ed.). TX: The Dryden Press.

Zohar, D. (2002). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. *Journal of Organizational Behaviour*, 23(1), 75-92.

Zohar, D., & Luria, G. (2003). A multilevel model of safety climate: Cross-level relationships between organization and group level climates. *Journal of Applied Psychology*, 90, 616-628.

Zohar, D., & Polachek, T. (2014) Discourse-based intervention for modifying supervisory communication as leverage for safety climate and performance improvement: a randomized field study. Journal Appl. Psychology, 99(1), 113-124.

APPENDIX A

Dear Sir/Madam,

First and foremost, I would like to congratulate you for being selected as respondent in this study. These questionnaires are made to obtain information about your experience and knowledge to determine the influence of safety climate, safety communication, and work environment on unsafe behaviour among workers. Your opinion is important in helping me understand the unsafe behavior. This study is a partial fulfillment of the requirements for the degree of Master of Occupational Safety and Health

For your information, your involvement in this research is voluntary. In addition to that, I assure you that confidentiality of the information provided and your identity is secured. All information provided will be used for research purpose only. Many thanks for your support in helping me to complete this questionnaire.

Should you require further explanation please do not hesitate to contact me. at: ghazali.bin.abdaziz@gmail.com or 019-3168696

Thank you.

Ghazali Bin Abd Aziz
Master of Science Occupational Safety and Health Management
School of Business
Univeriti Utara Malaysia

10.02.2018

QUESTIONNAIRES
(SOAL SELIDIK)

INSTRUCTION *(ARAHAN)*
Please complete the questionnaire by marking your chosen answer with an 'X' in the space provided.
(Sila jawab kesemua soalan yang dikemukakan dengan menandakan 'X' pada ruang yang disediakan)

SECTION A: BACKGROUND INFORMATION (MAKLUMAT LATAR BELAKANG)

1. Your year of birth (*Tahun anda dilahirkan*)? ☐☐☐☐
2. Are you (*Anda ialah*) ☐ Male (*Lelaki*) ☐ Female (*Perempuan*)
3. Your position (*Jawatan Anda*)? _____
   Specify (*Nyatakan*)

SECTION B: UNSAFE BEHAVIOUR (*TINGKAHLAKU TIDAK SELAMAT*)

Items *Perkara*	Strongly disagree *Sangat tidak setuju*	Disagree *Tidak setuju*	Slightly disagree *Sedikit tidak setuju*	Slightly Agree *Sedikit setuju*	Agree *Setuju*	Strongly agree *Sangat setuju*
1. I ignore safety regulations to get the job done. *Saya abaikan peraturan keselamatan untuk menyiapkan kerja.*						
2. I carry out activities which are forbidden. *Saya melakukan aktiviti yang dilarang.*						
3. I break work procedures. *Saya melanggar peraturan kerja.*						
4. I take chances to get the job done. *Saya ambil kesempatan untuk menyiapkan kerja.*						
5. I bend the rules to achieve a target. *Saya melanggar peraturan untuk mencapai sasaran.*						

6. I get the job done better by ignoring some rules. *Saya dapat melakukan kerja lebih baik dengan mengabaikan beberapa peraturan.*						
7. Conditions at the workplace stop me working to the rules. *Keadaan di tempat kerja menghalang saya bekerja mengikut peraturan*.						
8. Incentives encourage me to break rules. *Insentif menggalakkan saya melanggar peraturan.*						
9. I take shortcuts which involve little or no risk. *Saya mengambil jalan pintas yang melibatkan sedikit atau tanpa risiko.*						

SECTION C: SAFETY CLIMATE (*IKLIM KESELAMATAN*)

Items *Perkara*	Strongly disagree *Sangat tidak setuju*	Disagree *Tidak setuju*	Slightly disagree *Sedikit tidak setuju*	Slightly Agree *Sedikit setuju*	Agree *Setuju*	Strongly agree *Sangat setuju*
1. The written safety rules and instructions are too complicated for workers to follow. *Peraturan dan arahan keselamatan bertulis sangat rumit untuk diikuti pekerja*.						
2. If I didn't take a risk now and again, the job wouldn't get done. *Jika saya tidak mengambil risiko sekarang dan seterusnya, kerja tidak dapat dilakukan.*						
3. The standard of safety is very high at my place of work. *Standard keselamatan sangat tinggi ditempat kerja saya.*						

4. I can get job done quicker by ignoring rules. *Saya boleh melaksanakan kerja lebih cepat dengan mengabaikan peraturan.*						
5. The rules do not always describe the safest way of working. *Peraturan tidak selalunya menerangkan cara kerja yang paling selamat.*						
6. There is sometimes pressure to put datelines before safety in this construction site. *Kadang-kala terdapat tekanan terhadap keutamaan menyiapkan projek daripada keselamatan di tapak pembinaan ini.*						
7. Nowadays, managers are more interested in safety than construction of project. *Pada masa kini, pengurus lebih berminat terhadap keselamatan berbanding projek pembinaan.*						
8. There is a good attitude to safety in this construction site. *Terdapat tingkahlaku yang baik terhadap keselamatan di kawasan pembinaan ini.*						
9. Rules and instructions relating to personal safety sometimes make it difficult to keep up with project dateline. *Peraturan dan arahan yang berkait dengan keselamatan peribadi selalunya menyukarkan menyiapkan projek mengikut sasaran.*						
10. Workers are reluctant to report accidents. *Pekerja agak keberatan melaporkan kemalangan.*						
11. Safety is taken seriously in this construction site. *Keselamatan diambil serius di kawasan pembinaan ini.*						

12. Management is genuinely concerned about workers' safety. *Pengurusan benar-benar prihatin tentang keselamatan pekerja.*						
13. Sometimes it is necessary to ignore safety regulations to keep construction works going. *Kadang-kala adalah perlu untuk mengabaikan peraturan keselamatan untuk memastikan kerja-kerja pembinaan berjalan lancar.*						
14. Workers on this construction site refuse to do work if they feel the task is unsafe. *Pekerja di tapak pembinaan ini enggan melakukan kerja jika mereka merasa tugasan adalah tidak selamat.*						
15. I feel that the management on this construction site is concerned about my general welfare. *Saya rasa pengurusan di kawasan tapak pembinaan ini mengambil berat terhadap kebajikan am saya.*						

SECTION D: SAFETY COMMUNICATION (*HUBUNGAN KESELAMATAN*)

Items *Perkara*	Strongly disagree *Sangat tidak setuju*	Disagree *Tidak setuju*	Slightly disagree *Sedikit tidak setuju*	Slightly Agree *Sedikit setuju*	Agree *Setuju*	Strongly agree *Sangat setuju*
1. I am satisfied with the way I am kept informed about what takes place on. *Saya berpuas hati dengan cara saya diberi maklumat tentang apa yang berlaku.*						
2. There is good communication between management and construction workers. *Terdapat komunikasi yang baik di antara pengurusan dan pekerja binaan.*						

3. I am consulted before decisions are made. *Saya dirujuk sebelum sebarang keputusan dibuat.*						
4. There is good communication between construction workers changes. *Terdapat komunikasi yang baik semasa pertukaran pekerja binaan.*						
5. My supervisor gives me clear instructions. *Penyelia saya memberi arahan yang jelas*						
6. I have a fair opportunity of influencing the decisions to be made by my superiors. *Saya mempunyai peluang mempengaruhi keputusan yang akan dibuat oleh penyelia saya*						
7. I know what I can expect from others. *Saya tahu apa yang boleh saya jangkakan daripada orang lain.*						

SECTION E: WORK ENVIRONMENT (*PERSEKITARAN KERJA*)

Items *Perkara*	Strongly disagree *Sangat tidak setuju*	Disagree *Tidak setuju*	Slightly disagree *Sedikit tidak setuju*	Slightly Agree *Sedikit setuju*	Agree *Setuju*	Strongly agree *Sangat setuju*
1. There is constant pressure to keep working. *Terdapat tekanan berterusan untuk terus bekerja.*						
2. Things are sometimes disorganized. *Keadaan kadang-kala tidak teratur.*						
3. There always seems to be urgency about everything. *Kerap kali terdapat keutamaan tentang segala-galanya.*						
4. Activities are well planned. *Aktiviti dirancang dengan baik.*						

5. Workers cannot afford to relax. *Pekerja tidak mampu untuk berehat.*						
6. Rules and regulations are somewhat vague and ambiguous. *Peraturan dan undang-undang agak kabur dan samar-samar.*						
7. Nobody works too hard. *Tiada sesiapa yang bekerja lebih kuat.*						
8. The responsibilities of supervisors are clearly defined. *Tanggungjawab penyelia ditakrifkan dengan jelas.*						
9. There is no time pressure. *Tiada tekanan tentang masa.*						
10. The details of assigned jobs are generally explained to workers. *Perincian tugas lazimnya dijelaskan kepada pekerja.*						

☺ Thank you for filling in the questionnaire. ☺

☺Terima kasih kepada anda kerana sudi menjawab borang soal selidik kajian☺