

STUDY THE SAFETY BEHAVIOR IN SCAFFOLDING
INDUSTRY

KOVALAN SUBRAMANIAM

MASTER OF SCIENCE (OCCUPATIONAL SAFETY AND
HEALTH MANAGMENT)
UNIVERSITI UTARA MALAYSIA
April 2013

STUDY THE SAFETY BEHAVIOR IN SCAFFOLDING INDUSTRY

By
KOVALAN SUBRAMANIAM

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

DECLARATION

I declare that all the thesis work described in this dissertation is my own work (unless otherwise acknowledged in the text) and that none of the thesis work has been previously submitted for any academic Master programs. All sources of quoted information have been acknowledged through references

Date:

Student Signature : _____

PERMISSION TO USE

In presenting this thesis as partial requirement for the Master of Science(Occupational Safety and Health) in University Utara Malaysia, I agree that the University may make it freely available for any inspection of the findings in the course of work and express their discretion. I further agree that the permission for copying of this thesis in any manner i.e. in whole or part here in, for scholarly purposes, may be granted by my supervisor, or in his absence, by the Dean of College of Business. It is understood by law that any copy or publication of this thesis in full or parts thereof meant for the use and purpose of 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 University Utara Malaysia, should any material from the thesis be made for scholarly use and further research.

Request for permission to copy or make use of the materials in this thesis either in whole or in part shall be addressed to

Dean of Othman Yeop Abdullah Graduate school of Business
Universiti Utara Malaysia
06010 UUM Sintok
Kedah DarulAman

ABSTRACT

Occupational safety is often related with productivity, reputation and profit. Many factors that are attributed to workplace accidents and safety behaviour have received little attention in occupational safety studies instead unsafe behaviour of the employees at workplace is deemed to be the major cause for almost all accident cases in the industrial scope. More attention has been focused on the workers safety behaviour in compliance with the workplace safety than determining actual hazardous scope of work and finding effective measures to reduce fatality at workplace. We are astounded by the fact that, limited studies have been focused on scaffolding industry although this scope of work contributes quite high accidents in the construction industry. It is reported by the Social Security Organization of Malaysia that the most prevailing accidents in the construction field is the slip and fall type. This study will identified factors that affect employee's safety behaviour in scaffolding industry. Among the factors that will be discussed and analysed are safety policies, rules and procedures; safety communication and feedback, and finally safety training and PPE use training. The measurement tools that were adopted are from published work of previous researchers. The target respondents were the scaffold work related employees, currently working with the Shell Refinery at Port Dickson. A total of 120 respondents, choose at random had been distributed to the sample for the study consisting of four variables. Quantitative method using availability sampling used was applied in this research. The data gathered from the survey were analyzed using Statistical Package for Social Science (SPSS) version 11.0.1. The response to the survey were rated according to the Likert scale type with "1" indicated strongly disagree and "6" indicated strongly agree. The factors analysis indicated the numbers of factors extracted from this study was the same as those extracted from previous studies. This study showed that safety policies, rules and procedures; safety communication and feedback, and finally safety training and PPE use training was co-related to safety behavior in scaffolding industry.

Keywords: Safety behavior, Safety policy, Safety communication, Safety training, Scaffold

ABSTRAK

Keselamatan pekerjaan sentiasa berkait rapat dengan produktiviti, reputasi dan keuntungan. Banyak factory yang menyumbang kepada kemalangan di tempat kerja dan tingkah laku keselamatan tidak menerima perhatian yang sewajarnya mengikut kajian keselamatan yang dilakukan sungguhpun tingkah laku yang tidak selamat menjadi penyumbang terbesar kepada kes-kes kemalangan yang berlaku dalam bidang industri. Malahan, lebih banyak perhatian telah ditumpukan kepada tingkah laku keselamatan pekerja dalam memastikan keselamatan di tempat kerja. Walaupun laporan Organisasi Keselamatan Sosial Malaysia menyatakan bahawa kerja-kerja memasang perancah menjadi penyumbang kemalangan yang agak tinggi dalam industri pembinaan khususnya kemalangan akibat tergelincir dan jatuh dari perancah, namun, tumpuan dan perhatian yang diberikan terhadap kajian industri perancah adalah terlalu rendah dan masih mempunyai ruang untuk penambahbaikan urusan tingkah laku keselamatan. Kajian ini dituju untuk mengenal pasti faktor-faktor yang menjejaskan kelakuan keselamatan pekerja dalam industri perancah. Antara faktor yang dibincang dan dianalisis adalah berkenaan keselamatan dasar, peraturan dan prosedur; komunikasi keselamatan dan maklum balas, dan latihan keselamatan dan latihan penggunaan PPE sebagai penyudah. Alat pengukur yang diguna dalam kajian ini adalah sama dengan alat pengukuran yang telah diterima pakai oleh kajian-kajian yang diterbitkan penyelidik sebelum ini. Sasaran responden terdiri daripada pekerja-pekerja yang secara tidak langsung terlibat dengan kerja-kerja pembinaan perancah di Shell Penapisan di Port Dickson. Seramai 120 orang responden dipilih secara rawak untuk sampel kajian yang merangkumi empat pemboleh ubah. Kaedah kuantitatif dan kaedah persampelan telah digunakan dalam kajian ini untuk memperolehi butiran yang lebih terperinci. Data yang dikumpul daripada kajian, dianalisis dengan menggunakan Pakej Statistik Untuk Sains Sosial (SPSS) versi 11.0.1. Respon atau reaksi kaji selidik dinilai mengikut jenis skala Likert dengan angka "1" menunjukkan amat tidak setuju manakala angka "6" menunjukkan sangat setuju. Analisis faktor menunjukkan bilangan faktor yang diekstrak daripada kajian ini adalah sama seperti yang diekstrak daripada kajian sebelumnya. Kajian ini menunjukkan keselamatan dasar, peraturan dan prosedur; komunikasi keselamatan dan maklum balas, dan latihan keselamatan dan latihan penggunaan PPE berkaitan dengan tingkah laku keselamatan dalam industri perancah.

Kata kunci : Keselamatan tingkah laku, dasar Keselamatan, komunikasi Keselamatan, latihan Keselamatan, Perancah

DEDICATION

This thesis is dedicated to my parents Mr.Subramaniam and Mrs Mariammal who have supported me all the way since the beginning of my studies.

Also, this thesis is dedicated to my wife Mrs.Rajeswary, my cute daughters Arsvini and Komathy who has been a great source of motivation and inspiration.

This thesis also dedicated to my brothers, sisters, and also to my all family members who have supported me all the way since the beginning of my studies.

Finally, this thesis is dedicated to all those who believe in the richness of learning.

ACKNOWLEDGEMENT

Many people have provided valuable inputs into this dissertation the list is endless. However, I would like to note down and thank the following wonderful persons:

First and foremost, I would like praise and thank God for giving me the strength, patience, courage and ability to complete this thesis without any distraction.

Next, I would like to extend my special thanks and gratitude to my supervisor, Mr.Lukman for his comprehensive guidance, insight and encouragement in the writing and completion of this thesis. His support and patience throughout the journey is immeasurable and the appreciation is extended from the bottom of my heart.

To my boss at RM Leopad Sdn Bhd, Mr.Sivaji Rajah who was very supportive and such an understanding person. At times, he granted my leave when my presence in the department was most needed and i am really grateful for his understanding.

To my colleagues at RM Leopad who provided inputs and shared their expertise in management best practices especially Mr.Gunalan. Also, to my classmate in this program, Mr.Sathia segaran, for sharing his thoughts and comments during this master studies. I would also like to extend my appreciation to them for their continuous support and co-operation. They deserve a lot more than mere words and I wish to thank them for supporting my initiative from the beginning and for having offered me their valuable time and efforts in making this thesis writing possible.

Finally, I wish to record a million thanks to my parents Mr.Subramaniam and Mrs.Mariamammal, my ever loving wife Rajeswary, both my daughters (Arsvini and komathy) and such lovely family members who have been insistent in me pursuing my studies. Thank you for all the support, guidance, love, care and most of all for the trust, confidence and belief you all had in me throughout the years.

TABLE OF CONTENTS

	Page
TITLE	I
Declaration	ii
Certification of project paper.	iii
Permission to use.	iv
Abstract	V
Abstrak	vi
Dedication.	vii
Acknowledgements	viii
Table of Contents	ix
List of Appendices	X
List of Tables ..	Xi
List of Figures	
CHAPTER ONE	
INTRODUCTION	
1.1 Introduction.	1
1.1 Company's Information	3
1.2 Background of the Study and the Research Problem.	4
1.3 Problem statement.	10
1.4 Objective of study	14
1.5 Significance of study.	15
1.6 The scope of study.	16
1.7 Limitation of study.	16
1.8 Conclusion.	16
CHAPTER TWO	
LITERATURE REVIEW	
2.0 Introduction.	18
2.1 Studies on employees safety behaviour.	24
2.2 Definitions of variables constructs of study.	26
2.2.1 Safety behaviour	26
2.2.2 Safety policy, rules and procedures.	26
2.2.3 Safety communication and feedback.	27
2.2.4 Safety and PPE use training.	27
2.3 Theories on Safety Behaviour Attributes; Safety Policy, Rules and Procedures; Safety Communication and Feedback; and Safety and PPE use Training	28

2.4	Review of Previous Research Studies	29
2.4.1	Safety behavior.	29
2.4.2	Safety policy, rules and procedures.	31
2.4.3	Safety communication and feedback	33
2.4.4	Safety training and PPE use training.	36
2.3	Conclusion	38
CHAPTER THREE		
RESEARCH METHODOLOGY		
3.0	Introduction	40
3.1	The Research Framework and the Hypotheses of the Study	41
3.2	Statement of Hypothesis	42
3.3	Instruments scales.	42
3.3.1	The selection of survey instrument	43
3.4	Population and sampling size	46
3.4.1	Population	47
3.4.2	Sample	46
3.5	Data collection method.	47
3.6	Questionnaires Reliability.	48
3.7	Data analysis techniques.	49
3.7.1	The reliability analysis.	49
3.7.2	The Descriptive analysis	50
3.7.3	Pearson correlation analysis.	50
3.8	Conclusion	50
CHAPTER 4: RESULTS		
4.0	Introduction	51
4.1	Summary of Data Collection	51
4.1.1	Number of Return	51
4.1.2	Normality Test	52
4.2	The Demography of Respondents	56
4.3	Pilot Test and the Reliability of the instrument	59
4.5	Descriptive Statistics of variables	61
4.6	Test Results for Research Hypotheses	62
4.6.1	Hypothesis 1, 2, and 3 using Correlation analysis.	63
4.7	Conclusion.	65
CHAPTER 5: DISCUSSION AND CONCLUSION		
5.0	Introduction	66
5.1	Hypotheses Testing Results.	66
5.1.1	Safety behavior is associated with safety policy, rules and Procedures.	66

5.1.2	Safety behavior is associated with safety Communication and Feedback	
5.1.3	Safety Behavior associate with Safety training and PPE use training.....	68
		70
5.2	Research Contributions.....	71
	5.2.1 Theoretical Implications.....	71
	5.2.2 Practical Implications.....	72
5.3	Limitations and Future Research Directions.....	72
5.4	Conclusion.....	73
	REFERENCE.....	74
	APPENDICES	
	Appendix A	
	Information sheet.....	80
	Appendix B	
	Questionnaires' Set.....	81

LIST OF TABLES

Table	Title	Page
Table 1.1	Worst major industrial accidents in the world since the last 100 years	5
Table 1.2	Total accidents and industrial accidents in the Malaysia from the 2006 until 2011	6
Table 1.3	Industrial accidents by sector from 2008 until 2011	7
Table 2.1	Fatal accidents in Hong Kong due to problematic scaffoldings (all types)	22
Table 2.2	Total number of accidents reported in various business sectors In Malaysia.	23
Table 3.1	Safety Behavior Scale	44
Table 3.2	Safety policy, rules and procedures scale	44
Table 3.3	Safety communication and feedback scale	45
Table 3.4	Safety and PPE use training scale	46
Table 4.1	Summary of Survey Distribution and Response	52
Table 4.2	Details of the data normality assessment for safety behavior	52
Table 4.3	Details of the data normality assessment for Safety Policy, Rules and Procedures	53
Table 4.4	Details of the Data Normality Assessment for Safety communication and Feedback	54
Table 4.5	Details of the Data Normality Assessment for Safety Training and PPE use Training.	55
Table 4.6	Profile of Respondents by Gender	57
Table 4.7	Profile of Respondents by Age	58
Table 4.8	Profile of Respondents by Ethnic	58
Table 4.9	Profile of Respondents by Working Experience	58
Table 4.10	Profile of Respondents by Education Level	59
Table 4.11	Reliability Coefficients for each Variable	60
Table 4.12	Questionnaires instruments	61
Table 4.13	Mean and standard deviation for variables	62
Table 4.14	Pearson Correlation 'r' Score Interpretation	63
Table 4.15	Correlation Matrix among Variables	64
Table 4.16	Results of the analysis	65

LIST OF FIGURES

Table	Title	Page
Figure 3.1	Constructs of the Safety behaviour	41

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter focus specifically on the safety behaviour in multi level employees involved in the scaffolding industries especially in the oil and gas field. The factors and challenges faced by the scaffold industry in safety behaviour are explained in this chapter. This chapter provides accurate information about the objectives, pertinence of research and benefits which will be useful to the management of the organization to identify accidents that occurs due to the cause of safety behaviour. This chapter would also justify the main factors attributed to cause for unsafe behaviour among workers and management staff. The study of this research is certain to benefit all scaffolding organizations in their operational management as per their vision and mission.

Scaffolding is a temporary structure and temporary working platform used to support people and material in the construction or repair of buildings and other large structures. There are a few types of scaffold structure such as independent tower, bracket tower, scaffold tower supported by building, suspended scaffold and trestle scaffold (Factory and Machinery Act 1967-Building operation and works of engineering construction safety regulations). In Malaysia, scaffold used in almost all construction area such as high rise building, petrochemical industries and also in offshore works. All scaffolding erections

should be in compliance with scaffold inspections (Factory and Machinery Act 1967- Building operation and works of engineering construction safety regulations 85 part X)

The main key elements of a scaffold are standards, ledgers, bracings and transoms. The standards are vertical tubes that transfer the entire mass of the structure to the ground where the rest is placed on a square base plate to spread the load. The base plate has a shank in its centre to hold the tube and is sometimes pinned to a sole board. Ledgers are horizontal tubes which connect between the standards. Transom on the other hand rests upon the ledgers at right angles and the main transoms are placed next to the standards. Transom holds the standards in place and provide support for boards. Intermediate transoms are those transoms placed between the main transoms to provide additional support for boards. Bracings are placed diagonally from ledger to ledger, next to the standards to which they are fitted. During join ledgers, transoms and bracings to standards fittings such as fix clamps, swivel clamps, sleeve coupler and putlog are used with proper installing procedures. For instance, fix couplers are used to join standard and ledger whereas swivel clamps are used to join bracing and standard. In order to ensure usage of fittings in the corrective way, every employee should gained product knowledge in scaffolding works. When it involves scaffolding erection, all employees should implement and adhere to the safety rules and requirements that are related to the scaffolding works. It is prevalent that during scaffolding erection and dismantle, implementation of safety procedures and standards which are related with safety behavior is carried out. This will ensure the employees to practice good safety behavior when selecting scaffold materials, erection and during the dismantle process.

1.1 Company Information

This study is conducted at RM Leopad which was established over 17 years ago. Leopad is one of the oldest and most respected names in the Scaffolding Industry .The Head Office of the company is located at WISMA LEOPAD, 2nd Floor, NO. 5, Jalan Tun Sambanthan, Kuala Lumpur and has other branches located at Kedah, Perak, Pahang, Terengganu, Johor, Negeri Sembilan, Labuan and has successfully expended internationally to Dubai and Nigeria. Leopad is a full-service scaffolding company with a high reputation in the field of industrial scaffolding. Leopad is a reputable scaffold company in Malaysia operate in the Oil and Gas, Chemical/Petrochemical, Power Plant, Fertilizer, and the Refineries sector. The company is certified to ISO9001:2008, quality management system, ISO 14001:2004 environmental management system and OHSAS 18001. Other than becoming a service provider in scaffolding industry Leopad Group is also involved insulation works, painting, blasting and trading. Leopad has always been using the maximum strength and durability materials that comply with stringent British and European Standards such as modular and tubular scaffold system. All scaffolds are designed and manufactured for the maximum safety and efficiency. The scaffolds are strong, rugged, heavyweight working platforms in a variety of sizes and heights. This organization also provides engineering design, estimating, planning and consulting services for scaffolding works. Leopad management always accredited as a organization that emphasizes and ensures that all activities are carried out safely in compliance with the OSHA Act 1994 and MS 1722.

1.2 Background Of The Study And The Research Problem

The issue related to occupational safety had gained attention from public, academicians and occupational safety and health practitioner. This is due to the occurrence of several major industrial accidents such as nuclear disaster in Chernobyl (1986), the Three Mile Island (2009) and the release of Methyl Isocyanate in Bhopal (1984). It has significant emotional and economic impact on business, families and society. These major industrial accidents increased public's awareness of the potential threat of industrial accidents to public and employees safety. The history has recorded some of the worst major industrial accidents in the world since the last 100 years. As shown in Table 1.1.

Many of these industrial accidents occurred in the chemical industries .In the first quarter of the century, the Germans mourned the death of 561 people due to the explosion of Ammonium Nitrate in Oppau, Germany (Kliesh, 1987). After 25 years others industrial accidents occurred in America and Germany claiming the life of 576 and 245 people. The most worst accident in chemical industry was the accidental release of Methyl Isocyanate (MIC) from Bhopal manufacturing facility in 1984 killing 2000 people and injuring 200,000 more. Recently on September 2012 at Karachi, Pakistan, 289 people died in a fire at the Ali Enterprises garment factory, which made ready-to-wear clothing for Western export. While On November 2012 a seven story factory fire outside of Dhaka, the capital of Bangladesh, killed at least 112 people, 12 from jumping out of windows to

escape the blaze. Although all of these were the process safety related accidents, it could be implied that the occupational safety accidents would have resulted in similar losses only in the smaller scale.

Table 1.1
Worst major industrial accidents in the world since the last 100 years

Year	Description	Location	Injuries	Fatalities
1921	Explosion Ammonium Nitrate storage	Oppau Germany	1900	561
1947	Explosion of Ammonium Nitrate storage	Texas City USA	>3000	576
1948	Explosion of Di-Methyl Ether	Ludwigshafen Germany	>3800	245
1972	Release toxic Gases	Yokhaidi, japan	978	76
1974	Explosion of Cyclo-Hexane	Flixborough, UK	78	28
1980	Explosion of Propane gas	Ortuella, Spain	Not recorded	51
1984	Release of MIC	Bhopal India	200,000	2000

Source: Kliesh, 1987

Table 1.2

Total accidents and industrial accidents in the Malaysia from the 2006 until 2011

YEAR	TOTAL ACCIDENTS	INDUSTRIAL ACCIDENTS
2006	58,321	40,617
2007	56,339	38,367
2008	54,133	35,092
2009	55,186	34,376
2010	57,639	35,603
2011	59,897	24,809

Source: Social Security Organization (SOCSO), Malaysia

As shown in Table 1.2, showed the number of reported industrial cases in Malaysia by year 2006 reduced from 40,617 cases to 38,367 cases in 2007. In year 2008 industrial accidents reduced to 35,092cases, while on year 2009, 34,376 cases reported as industrial accidents. In year 2010, industrial accidents increased to 35,603 cases and on 2011 industrial accident cases reduced to 35,088 cases. As a conclusion, more than 50% of number of accidents recorded related with industrial accidents.

Table 1.3 showed industrial accidents by sector from 2008 until 2011. Sector industrial divided into ten sections and consists of public services; Finance, insurance, real estates and business centres; hotel and restaurants; whole sale and retail trade; transport, storage and communication; utilities; agriculture, forestry, logging and fishing; construction; mining and quarrying; and manufacturing. Scaffolding industry is accounted under the construction industry according to the reported statistics by SOCSO of Malaysia. Construction sector had recorded 120 reported cases in 2010, which contributed to 4.7 percent of the total reported cases. There was a decrease of 1 percent (3.78%) of the

reported cases on construction industry compared to the previous year. As referred to table 1.1, there were 66 fatalities reported in the year 2010, and these fatality cases had decrease to 24cases in the year 2011. Even though the fatality cases may have decreased up to 63% in the year 2011 compared to the year 2010, every single organization still needs to implement stringent safety practices in order to achieve zero fatality cases.

Table 1.3
Industrial accidents by sector from 2008 until 2011

Occupational accidents by sector for 2008 to 2011												
Sector	2008			2009			2010			2011		
	NPD	PD	D	NPD	PD	D	NPD	PD	D	NPD	PD	D
Public services	3	2	2	0	0	1	40	2	3	30	1	1
Financial, insurance, real estate and business centres	2	1	4	0	0	1	30	1	1	18	0	5
Hotels and restaurants	13	1	1	1	18	0	0	0	0	1	0	0
Wholesale and retail trade	2	0	0	0	0		0	0	0	1	0	0
Trnsaport , storage and communication	18	1	8	18	0	8	16	1	14	17	5	3
Utilities	82	32	19	85	3	18	34	3	11	26	1	2
Agriculture, forestry, logging and fishing	365	7	42	363	8	40	467	38	30	200	7	37
Construction	55	2	72	34	6	62	50	4	66	23	2	24
Mining and quarrying	4	0	6	2	3	2	2	1	1	7	0	2
Manufacturing	1565	134	76	1186	79	53	1493	162	59	808	78	27
NPD : Non permanent disability PD : Permanent disability D : Death												
Source : News Straits Times , 23rd February 2012												

In maintain work Place safety, safety behavior become one of the major factor. In scaffolding industry this concept has always become the main priority in order to create safe work environment. In the study of construction industry, the United States found that 21.4% of non fatal work-related falls were from scaffolds (Cattlege, Greenwood, Hendricks, Schneiderman, & Stanevich,1996). Fatality and serious injury incidents and accidents have been a major focus in all industries in Malaysia and worldwide. 18.6% of the fatal occupational fall recorded in the United States from the period of 1980 to 1989, were from scaffolds related issues (Cattledge, et al.,1996). In an organization with a good

safety behavior, safety has to be everyone's primary goal and safety behaviors of the employees are influenced by certain organizational and cultural factors. Set up of safety procedures alone are not enough in the implementation of safe work place. Everyone must be made to understand why these procedures are necessary and everyone must use these procedures when erecting and dismantling the scaffolds. It should also be understood that a good safety behavior in work place will not only improve safety features but also contribute to meeting business goals. Behavior is define as everything a person does that are observable and measureable (Vijayakumar, 2007). Safety behavior describes the behavior that support safety practices and activities such as providing safety training and safety compliance that explains the core activities that is needed to be carried out by employees according to occupational safety and health requirements to prevent workplace accidents (Mahmood,2010). Safety behavior can be dividing into two categories compliance and participation (Borman, & Motowidlo's, 1993). Safety compliance refers to the core activities that individuals need to carry out to maintain workplace safety without any incident and accident. These behaviors include complying with the standard work procedures and wearing personal protective equipments. Safety participation describes behaviors that do not directly contribute to an individual's personal safety but that which helps to develop and create an environment that supports safety. These behaviors can be implemented with activities such as participating in voluntary safety activities, helping co-workers with safety-related issues, and attending safety meetings.

Hazards in scaffolding industry have been identified as one of the elements which could cause accidents and incidents such as fall from heights and this has become the leading

cause of death in construction work (Center To Protect Workers' Rights, 2002; National Institute For Occupational Safety And Health [NIOSH], 2000). Fall hazards occurred in scaffolding works due to missing mid-rails and top guardrails, improper access, platforms not fully planked, substandard planks, falling objects or missing toe boards and slippery platforms. While scaffold collapse occurred due to structural flaws such as missing or improperly supported base plates, scaffold not tied properly to building, platform slope exceeds legs not plumb, braces/runners/cross-bracing not secure, missing braces/runners and cross-bracing, some planks overextended/under extended, severe overloading, and broken pins on frames. Individuals exposed to scaffolding hazards include scaffold erectors and dismantlers, personnel working on/under scaffolds, other employees and the general public near scaffolding. Scaffold erectors and dismantlers are at particular risk, since they are directly exposed to scaffold work and come into contact with ladders, guardrails, platform and planks which are completely installed. Scaffold-related falls by collapse or falls from scaffold towers during erection and dismantle become the second leading cause or reason of falls. It has a record of 52 deaths per year (18% of all falls). 9,500 workers are injured and approximately 80 being killed annually in the United States, for scaffold mishaps (U.S. Bureau of Labor Statistics, 1996). In the year 2002, 12% (734 of 5,915) of fatal occupational injuries were from falls, 12% (85) involved scaffolds erection. Other than scaffold collapse and fall from scaffold, other common hazards are Structural Flaws.

Organizational climate that supports and encourages employees to exhibit safety behavior, either individually or collectively, are among other factors needed, in order to promote

safety and health function in a more productive and effective manner. The other important factor to exhibit the safety behavior is the safety procedures. This required behavior generally comprises of established safety procedures, standards and usage of personal protective equipment (Griffin & Neal, 2006). Research points out that, occupational accidents are the result of random combination of many factors found at the workplace. Generally the causes of occupational accidents are classified as unsafe conditions and unsafe behaviors. Some studies revealed that organizational and social factors are not to be overlooked because these factors influence safety behaviors (Choudhry & Fang, 2008). Recent research findings, tie the majority of the workplace accidents and injuries to unsafe behavior of the employees rather than unsafe work environment (Mullen, 2004). Empirical research was focused on the implication of organizational safety climate upon the safety behavior of the employees (Glendon & Litherland, 2001; Johnson, 2007; Mohamed, 2009; Neal & Griffin, 2006; Zhou, 2008).

These studies have endorsed and accepted that the safety policies, rules and procedures; safety communication and feedback, and finally safety and PPE use training of the organization affects the safety behavior of the employees in the workplace. The purpose of this study therefore is, as determined in this context to investigate the factors of the organizational safety behavior of the employees.

1.3 Problem Statement

This study had chosen one of a scaffolding company in Malaysia called RM. Leopad, to be the subject of investigation. This company is a service provider in scaffolding industry

for main companies such as PETRONAS, SHELL and other multinational companies. A number of previous studies have tried to identify the safety behavior that improve safety and reduce occupational accidents in organizations. But still not clear what contributes to the occurrence of accidents or injuries (Lu & Tsai, 2010). In scaffolding industry is accounted under the construction industry according to the reported statistics by SOCSO of Malaysia. The existing bodies in occupational safety and health found unsafe behavior and human error were the two major contributors for workplace accident (Geller, 2001; Dekker 2002; Cooper, 2009). However despite serious implication of this findings occupational and safety department, safety behavior studies have received little attention from researchers, particularly involving high risk and hazardous working environment (Reason, Parker & Lawton, 1998). Therefore, this study filled up this gap by focusing on safety behavior of the employees working in the scaffolding industry.

The research on safety behavior issues is nothing new and had been around for almost 80 years. However, the solutions remain scarce and need more focus. Heinrich discovered that 88 percent of workplace accidents were caused by unsafe behavior (Goetsch, 2008). Since then organizations established various measures to reduce and overcome accidents at workplace. Due to variability nature of human behavior, these goals had been very challenging (Reason et al., 1998 ; Zohar, 2002). In resolve safety behavior issue in scaffolding industry is more challenging like other industry which involves hazardous materials. Any mishaps such as slip and fall without proper personal protective equipment may result in fatality, destruction of property and other severe negative consequences. Dekker (2002) sees human error and unsafe behavior as symptoms to accidents and not

direct causes. He viewed unsafe behavior as symptoms of something deeper involving individual's personality and safety system practiced in organizations. Dekker (2002) also thinks that safety behavior can be systematically connected to features of people, tools, tasks and operating environment. Therefore, there is need to understand more of notion and its effect on safety behavior.

Studies have also identified that individual traits or characteristics help to promote compliance behavior and it is importance to measure employee's safety behavior in an attempt to improve the company safety record (Reason et al, 1998). Positive and negative behavior was believed to be relevant to safety management. Negative behavior was found to harm organization safety compliance, while positive behaviors facilitate process of safety compliance. In addition, Geller (2001) stated that workplace safety behavior is the most crucial and effective measures to reduce occupational injuries and prevent accidents. Limited research has been conducted examining the factors affects employees regarding safety behavior in scaffolding industry. Therefore there is need to investigate the factors affects employees regarding safety behavior in scaffolding industry using new sample population of employees working in scaffold industry.

Previous studies had shown that Safety policy, rules and procedures establishes a safety system that can correct workers' safety behaviors (Lu & Yang 2010; Barling, 2002; Fernandez-Muniz et al., 2007; Lu & Tsai, 2008; Lu & Yang, 2010; Mullen, 2004). Clear and meaningful safety policy, rules and procedures will ensure organization to reflect a perfect organization's safety management, including the ultimate goal of 'zero' accidents

and achieve safety objectives (Beard & Santos-Reyes, 2002). No study was conducted in the scaffolding industry and therefore it is imperative to test this relationship again in another working environments with different safety requirements.

Another important factor associated safety behavior is safety communication and feedback. Safety communication should ensure the leader and members to freely converse about routine and non-routine problems and also engage in problem solving process which will benefit the behavior of workers (Fairhurst, 1993; Fairhurst & Chandler, 1989; Fairhurst, Rogers, & Sarr, 1987; Hofmann, 2003). In view of importance to ensure safety communication and feedback, there is need to examine the relationship with safety behavior in scaffolding industry.

Previous research suggested that safety training and PPE use training is factor associated safety behavior. Wong (2000) suggested that trainings and educational programs change behavior of employees. At the same time trainings also can recognize hazards and hazardous action and understand the consequences (Vredenburg, 2002). When employees understand the consequences there is improve in attitudes towards safety and safe behaviors are likely to follow (Ajzen 1991).

Therefore, it is a clear signal that further research is required and needed to enhance occupational safety. Even though, the company may itself had recorded zero fatality continuously every year, this research is pertinent for maintaining zero fatality in future work for every single work process and the task should be observed accordingly.

Although the fatality cases involved is zero yet, since the organization is also accountable to the non permanent disability accidents that occurs to the subcontractors employees due consideration must be given to this scope of safety. The OSH Act 1994 has clearly stated that the safety accountability to any person who works with the main company, lies on the main company itself (OSHA,1994). By identifying the elements of safety behavior at the workplace, it is essential to investigate those that occurred and considering the appropriate preventative measures in reducing the risk of them happening again.

1.4 Objective Of Study

Objective

The primary goal of this research is to examine the relationship between safety behavior and Safety Policy, Rules, Procedures, Safety Communication Feedback, Safety Training and PPE use Training .This goal is to be realized through the following sub-objectives:

- a) To examine the relationship between Safety policy, rules and procedures and safety behavior.
- b) To examine the relationship between Safety Communication Feedback and Safety Behavior
- c) To examine the relationship between Safety training and PPE use training and Safety Behavior

1.2 Research Questions

The following research questions will ensure factors that are involved in safety behavior among the employees in the scaffolding industry.

- a) What is the relationship between safety behavior and safety policy, rules and procedures?
- b) What is the relationship between safety behavior and safety communication and feedback?
- c) What is the relationship between safety behavior and safety training and PPE use training?

1.5 Significance of Study

The outcome of this analysis can be use as a model to restructure the workplace safety implementation in order to improve safety compliance towards safety behavior. This survey also becomes fundamental in upgrading the safety awareness program in future and sets a very firm foundation for further researches in future. At the same time, this survey will assist the organization in their analysis of the root cause of their weakness in safety management programs toward reaching Zero Non Compliances Report. This study will surely provide useful guide to improve safety practices through suitable equipments, trainings, right PPE use training and other relevant requisites. It is significant to note that this work will also help create a workplace environment that is more concerned of the

employee's safety, good safety behavior and provide useful information pertaining to occupational safety. Analysis in safety behavior not only contributes to minimize work related accidents but also contribute to reduce the operational cost of the organization at large.

1.6 The Scope of Study

This study was carried out at one of the Leopad Group branches in Port Dickson. This branch is directly involved in scaffolding works for Hijau Project Shell. The scope of study has been directed to identify the system and process related variables which would influence the safety behaviour among the Leopad employees who are involved in this survey. The total number of work force selected for this study stands at 120 personnel; from project site (90 workers), admin (20 workers) and safety (10 workers). The location of the study is at Batu 1 Jalan Pantai Port Dickson, 71000 Port Dickson, Negeri Sembilan, Malaysia.

1.7 Limitation of Study

This study was carryout at only one scaffolding organization and the questionnaire prepared for this study was only distributed among R.M Leopad employees.

1.8 Conclusion

This dissertation is divided into five chapters. Chapter one contains statement of the problems to be studied, the research questions, the objective of study and significance of study. Chapter two provides a review of the literature, which is includes the historical

view of safety and health behaviour, and past studies and theories, which are of primary interest to this study. It also presents a theoretical model which depicts the relationship between independent and dependent variables, and the mediating effect of these relationships. Specific hypotheses about the relationships are proposed in this chapter and the operational definitions for independent and dependent variables will be specified. Chapter three presents the methodology utilized in this study and it includes research type and design, a description of the population and sample, research instrumentation, the procedures for data collection and analysis. Chapter four provides the data, results of hypotheses testing, analysis and discussion. Finally, chapter five concludes the study with a summary of findings, conclusions and recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Literature review provides justification of the reason for research describes and supports the use of variables such as safety policy, rules and procedures, safety communication and feedback and safety training and PPE use training and its effects on safe work behaviour among workers. In this chapter, all related variables are thoroughly analysed and presented with relevant details. This would indirectly allow in establishing the theoretical framework and methodological focus of this study. There have been several factors which had been identified by organizations to reduce accidents and incidents at the workplace. Safety behaviour is co-related with accident rates at statistically significant levels (Brown, 2000; Donald & young; Eiff, 1999). Proactive behavior and attitudes in safety implementation and participation will result in better risk management, reduction in injuries, illness and material damage.

Various type work systems and practices have been identified in minimizing workplace accidents and incidents. A safe system of work is a method of working designed to eliminate, if possible, or otherwise reduce risks to health and safety. Systematic occupational health and safety management has become the main International Strategy to improve health at work (Frick, 2000). The similar regulations exist in many other countries (Dalrymple, 1998). Such as Malaysia, OHSAS 18001:2007 and MS1722 are a comprehensive Occupational Health and Safety (OH&S) Management System specified,

and designed to enable organization to control Occupational Health and safety risks and improve their performance while carrying out their tasks. OHSAS 18001:2007 and MS1722 system in Malaysia mainly attached with Occupational Safety and Health Act 1994 (Act 514) (OSHA), Factories & Machineries Act 1967 (Act 139) (FAMA) and Construction Industry Development Act 1994 (Act 520) (CIDB). Safety and health management system generated with standards, procedures and monitoring arrangement aimed at promoting the health and safety of people at work and to protect the public from accident (Osborne & Zairi 1997). This kind of safety works system will improve and educate the employees of the safety practices in organization and would improve safety behaviour element in workplace.

Total number of accidents in various sector in Malaysia reported that there was a reduction in construction work sectors occupational accidents in the year 2010 compared to the year 2011, (refer to table 2.2). If we compare the construction sector with the manufacturing sector in the year 2010, we can conclude that the numbers of accidents are high in the manufacturing sector compare than the construction sector, but the number fatalities in construction sector accident stands higher compared to the manufacturing sectors. In shaping a work environment free of accidents involving fatalities, safety behavior can be the key to reducing the injuries at the workplace and indirectly influence the outcomes of the event before the injuries or accidents occurred (Johnson 2003).

Base on ABC model of behavior by Frederick (1982) it can be explained that behavior is influenced by two distinct factors i.e. activators and consequences (Abang Abdullah,

2005). First, activators inform people of what they should do for example during scaffold erection, the scaffold workmen should hook their harness and if other scaffold workmen influence their team members to take shortcut such as erect scaffold without hook the harness then, we are faced with competing activators. The scaffold workmen will perform certain behavior, which comes to the consequences where the scaffold workmen expect to gain or avoid the requirements. Hence, the enforcement on safety behavior factors plays a crucial part to encourage safety compliance before the consequences occur.

Numerous researchers have found that the reason of occupational accidents occurred is because of unsafe conditions and unsafe behaviors. Some studies or researches go on to show that organizational and social factors are not to be overlooked because these factors also influence the safety behaviors (Choudhry, R.M. & Fang, D., 2008). Recent research also found that the majority of the workplace accidents and injuries happened because of unsafe behavior of the employees rather than unsafe work environment (Mullen, 2004). Presence and adherence to good safety behavior does reflect good safety compliance in workplace. Safety issue cannot be tackled effectively without the contribution of employees with the implementation of a particular pattern of behaviors during carry out tasks. Contribution from employer comes in the form of their ability to adapt more holistic tactics and approaches which focuses not only in improving physical working environment but also on shaping up the employee's behaviors and attitudes that can collaborate with related jobs. "Employer" can be defined as principal employer or the main contractor of construction organization as stipulated in OSHA 1994. Employer may consist of the owner of the companies, the CEO or directors and any senior managers at

top management level who has an empowerment to rules safety and health department. Employers roles in safety and health is stipulated in Section 17 (Duties of employers and self employed to their employees) of OSHA 1994. Ignorant behavior and attitude of the employers and the employees have contributed to rise of issues on behavioral safety and noncompliance of safety procedures at work place (Jamal Khan, 2006).

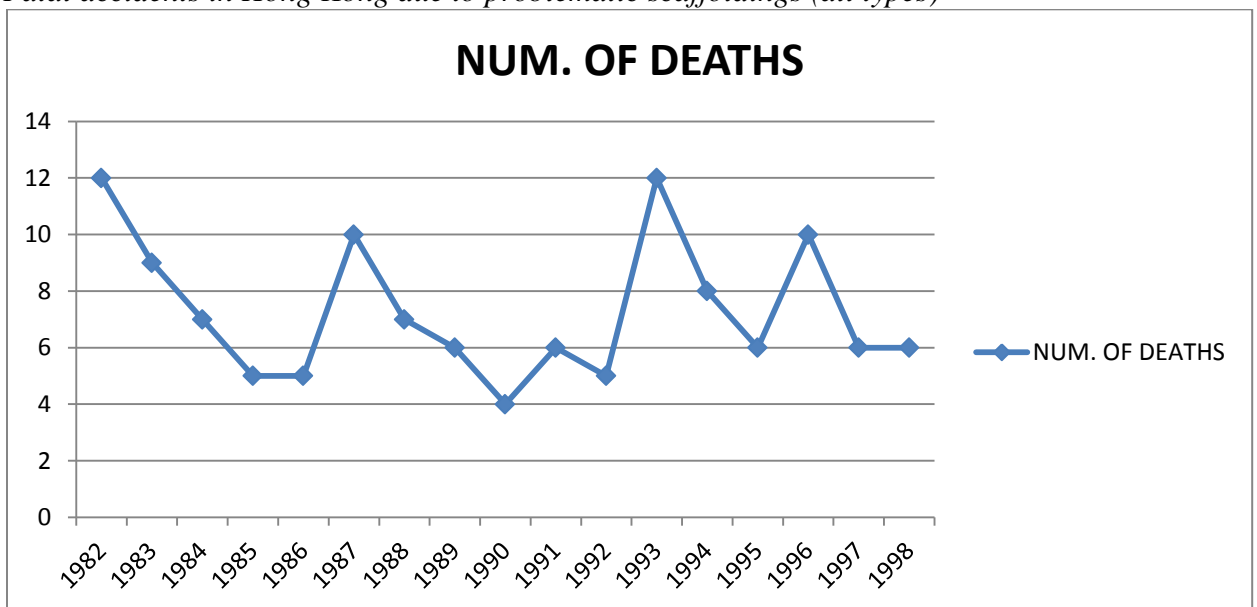
Many researchers supported that majority of accidents are caused by unsafe work behavior or human errors. (Freeman, 1972; Hale & Glendon, 1987; Krause, 1995; Lutness, 1987; Petersen, 1988; Salminen & Tallberg, 1996; Shuckburgh, 1975; Surry, 1971; Williamson & Feyer, 1990). Research and examination on fatal occupational accidents in Finland during the period between 1985 and 1990 reported serious occupational accidents in 1988 and 1989; found that 84–94% of all the examined accidents were caused mainly by human errors (Salminen & Tallberg 1996). While all occupational fatalities that occurred in Australia for the years 1982–1984, reported that 91% of the occupational fatalities involved behavioral factors (Feyer & Williamson 1990). Finally, Lutness (1987) also supported this by reporting that more than 95% of all accidents involved human errors. Hence, majority of researchers have undoubtedly concluded that safe work behavioral factor is always related to occupational accidents.

In addition, scaffolds in oil and gas industries should be built from a set of standardized components according to the relevant technical guidelines. These standardized guidelines are set by the British Standard BS1139 currently applies to access and working scaffolds, and scaffold structures in steel (British Standards Institute, 1993). While scaffolds vary in

complexity, size, and type, they require a number of essential features for structural stability. All erection of scaffold should be with proper connections such as fittings and tubes. These are inspected by respective person called as scaffold inspector. All towers should be erect by following the standard scaffold procedures underlined such as with PE drawings.

Unpublished study by the Bureau of Labor Statistics shows that 801 incidents are related with scaffold structures. In 27% of the cases, the event was “person fell and the outcome is nothing happened to scaffold.” Other types of incidents are “plank slipped” (16%), “wooden plank broke” (8%), “support, poles tilted or tipped over” (7%), “wheels on bottom of the scaffold rolled” (6%), “cross-bracing gave way” (6%), and “anchoring into structure gave way” (5%). The remaining cases has been categorized as “slipped on work material” (5%), “wood or metal support poles broke” (5%), “scaffold tilted on unlevel ground” (4%), “scaffold base slipped.”

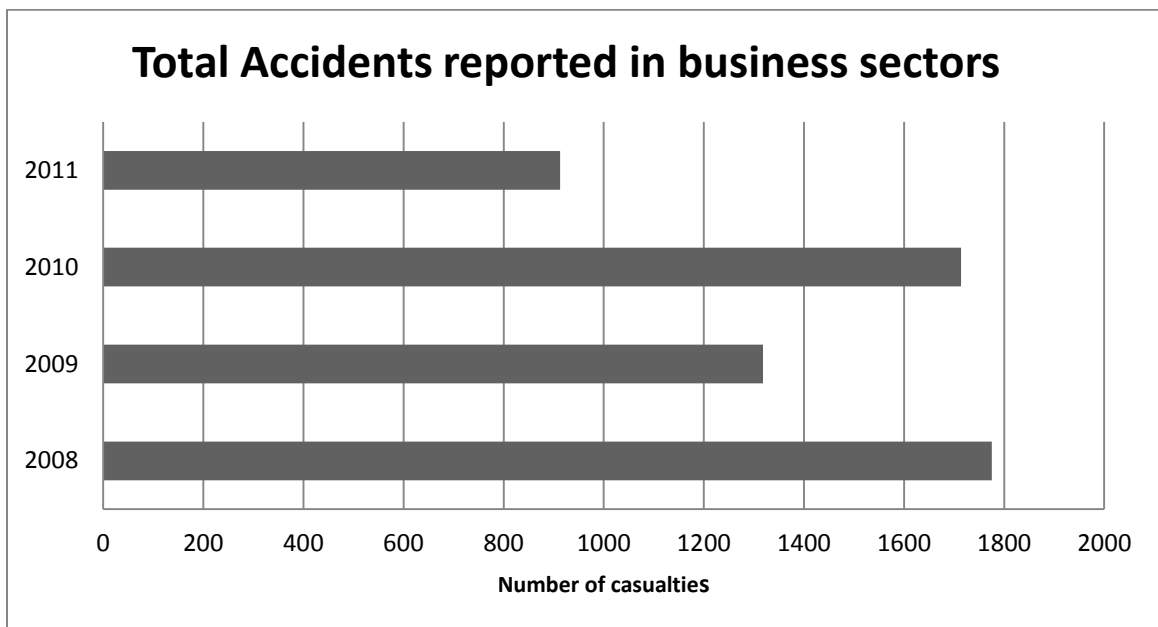
Table 2.1
Fatal accidents in Hong Kong due to problematic scaffoldings (all types)



Even though the accident rates shown in Table 2.1 depicted a mix decline and increase in the number of fatal accidents in Hong Kong due to problematic scaffoldings, there has not been much improvement in the statistics. Every organization that is involved in scaffolding industry should comply with stringent British and European standards and all scaffold towers should be designed and erect as client requirements.(e.g., light duties works, heavy duties works and finally super heavy duties works)

Table 2.2

Total number of accidents reported in various business sectors in Malaysia



Fatality and serious injury incidents and accidents have been a major focus of industries and other business sectors in Malaysia. Scaffolding works can be classified as high risk job and organization that involved must always ensure that all employees are save from fatality and serious injuries .There were almost 5,703 fatal and 3.9 million non-fatal

workplace injuries in the United States in the year 2006 (BLS, 2007). Scaffolding works always related to slip and falls hazards due to falls from height. In UK across the year 1996 to the year 2001, falls from height accounted between 44% and 60% of all fatal accidents in the construction industry (HSC, 2001). In Kuwait on the other hand, falls from height, including from scaffolds, roofs, and ladders, accounted for 48.5% of all work-related accidents and this is just over 50% of all fatal work-related accidents (Bouz & Kartam1998).

A fully safety and health management system should be composed with standards, procedures and monitoring arrangements, aimed at promoting the health and safety of people at work and to protect the public from accident (Osborne & Zairi 1997) As such, several variables have been categorized and identified as system based or person based.

2.1 Studies On Employees' Safety Behaviour

Heinrich (1931) Domino Theory become most widely quoted accident causation model. Heinrich explained that any injury (5th domino) is necessarily caused by an accident (4th domino) and that the accident occurred caused by unsafe acts of a person and/or unsafe conditions at workplace (3rd domino) that are preceded by fault of person (2nd domino) and ancestry and social environment (1st domino). In this model, Heinrich suggested that removal of the 3rd domino is the easiest and most effective way to overcome the sequence leading to an injury.

Heinrich (1931) reported that from case studies of 75,000 accident records, 88% of all industrial accidents involved are caused by unsafe acts of persons; 10% by unsafe conditions; and 2% by acts of God.

DuPont (1991) study found unsafe act causing or contributing to nearly all injuries. Similarly earlier finding by Heinrich (1959, cited in Cooper, 1998) suggested that for every 330 unsafe acts, 229 will lead to a serious injury and one in a major incident. Thus, the absence of any injuries for those who consistently engage in unsafe behaviors is reinforcing that behavior which may eventually result in a serious injury.

DuPont (1995) has a training manual that instructs observers that both of the safe and unsafe acts are always done by people, not machines. Thus it is highly essential to concentrate on people and their actions to see whether they are working safely.

Recent research by Mullen (2004) reported that majority of the workplace accidents and injuries are due to unsafe behavior of the employees rather than unsafe work environment. These studies accepted that the safety climate of the organization that affects the safe/unsafe behavior of the employees in the workplace. Safety climate can be described as the employees shared perceptions of the importance and the priority of the safety together with the safety policies, practices and applications in the workplace (Vinodkumar et al., 2009). The research studies are too determined and investigate the affects of the organizational safety climate upon the safety behavior of the employees.

2.2 Definitions of Variables Constructs of Study

The definition of the various variables which has been selected for this study is explained as follows:

2.2.1 Safety behaviour

Behavior is define as whatever a person does that can be observable and measureable (Vijayakumar, 2007). Safety behavior describes the behavior that contributes safety practices and activities such as that which explains the core activities that are needed to be carried out by employees during safety training and safety compliance based on occupational, safety and health requirements in preventing workplace accidents (Mahmood, 2010). Safety behavior becomes a main alternative in reducing the injuries at the workplace and indirectly influencing the outcomes of the event before the injuries or accidents occurred (Johnson, 2003).

2.2.2 Safety Policy, Rules and Procedures

Safety policy refer to clear mission, responsibilities and goals in order to set suitable standards of behavior for employees, and establishes a safety system that can correct workers' safety behaviors (Lu & Yang 2010). Safety policy will contribute to create and significantly influence workers' safety behaviors (Barling, 2002; Fernandez-Muniz et al., 2007; Lu & Tsai, 2008; Lu & Yang, 2010; Mullen, 2004). Clear and meaningful safety policy statement will ensure organization to reflect a perfect organization's safety management, including the ultimate goal of 'zero' accidents and achieve safety objectives (Beard & Santos-Reyes, 2002).

2.2.3 Safety Communication and Feedback

Effective communications becomes the essential consideration to safe and efficient workplace. In order for organizations to foster a climate where employees are beware of hazards, they must provide and communicate risk and safety information (Pidgeon., 1991; Fernandez-Muniz., et al., 2007). Information that is received will be assisting the employees during exposure to hazards.

2.2.4 Safety and PPE use Training

Protective personal equipment should be provided to the workers, especially for those who work in construction sites or to those who are exposed to critical hazards. Personal protective equipment will reduce the death of the worker if they are exposed to hazardous working environment. Employer should ensure employees always follow rules when use safety tools and this should always be the priority when performing jobs at construction sites (Frank Harris & Ronald Mc Caffer 1982). Safety training is the attempt by companies to inform employees on how to prevent and respond to work-related illness and injury. Workers face different risks from one workplace to another workplace, and differences in training are necessary. Scaffold workmen, for example, need training on confined space works if they are involved with confine space erection. Suitable safety training will inform employees of potential danger on the job and will teach and encourage them of the safe behavior at work.

2.3 Theories on Safety Behaviour Attributes; Safety Policy, Rules and Procedures; Safety Communication and Feedback; and Safety and PPE use Training

Research by Fernando (2008) on identifying workers characteristics and factors of safety compliance at the processing area in petrochemical industry, Malaysia has been found that management commitment, employee involvement, safety communication, effective safety training and effective safety feedback are the factors that influence workers characteristics in workplace.

A book written by Henrich on “Prevention of Industrial Accidents” also stated that 88% of accidents estimated occurred because of human errors. According to Bahr(1997), also conclude that 80%-90% of accidents occurred due to human errors. Research by Reynard and Billings identified that human’s unsafe acts contributes for 70%–90% of the accidents.

Presentation by Abdel Hamid and Everett (2000) on Accident Root Cause Tracing (ARCTM) highlighted that unsafe acts of workers and co-workers become one of the reason for unsafe conditions. Studies of the workplace accidents and injuries are attributed to unsafe work practices rather than unsafe working conditions (Garavan & O’Brien, 2001; Hoyos, 1995).

2.4 Review of Previous Research Study

2.4.1 Safety Behavior

Human safety behavior becomes major contributor in construction accidents. Good safety behavior will reflect better safety compliance in workplace. Researchers have always been debating that workplace accidents and injuries always related with unsafe work practices of employees rather than unsafe working conditions (Garavan et al.). Normally workers behaviors were measured using two scales safe behaviors(Griffin& Neal, 2004) and unsafe behaviors (Rundmo, 1998). Research on the Twentieth Century Theory selection shows that work accident experiences influences workers cognitions and behaviors. Results on the completed study conclude that safe and unsafe behavior is influenced by certain organizational and cultural factors (Brown et al., 2000; Mullen, 2004; Oliver et al., 2002; Tomas et al., 1999).Among the factors safety culture represents the individuals shared belief values, attitudes and behaviors about safety in the workplace. On the other hand, safety climate becomes an indicator of the underlying safety culture of a work group, plant or organization. Among this two concepts, safety climate plays an important role when it involves psychometric measurement (Seo,2005). Understanding the cultural behaviour of workers in workplace is important too because worker's behaviour can reflect safety culture which could originate from their religion such as use of drugs and alcohol. The importance of workers cultural interactions have been a subject of research (Khader, 2004). It is also important to examine the regular activities for the simple worker during a normal working day. Safe work behaviour is an essential element and defined as

the frequency of personal behaviour intended to reduce risk and elevate safe work environment in the workplace (Mc Lain & Jarrell, 2007).

When accidents occur in workplace, investigation will be conducted by safety personnel to determine the root cause of accidents. Most of investigator will cast blame on individual or person rather than completely investigating the incident and the underlying the factors that may have contributed to the situation (Hofmann & Stetzer, 1998). When accidents occur in the workplace, investigations are conducted to determine the underlying causes. Most of investigators seem to focus on attributing blame to an individual most proximal to the accident, rather than completely investigating the incident and the underlying factors that may have contributed to the situation (Hofmann & Stetzer, 1998). On the other hand, compliance of safety behavior is associated with supervisor injunctive safety norms and perceived control over safety (Fugas, 2012). When responsibilities and certain degree of authorities are delegated to workforce this would will produce positive impact in the safety norms of the organization. Supervisors who communicate with their co-workers will create safe work behaviour among workers. Increasing visibility of supervisor's intervention between supervisors and workers were able to reinforce safe work behaviour among employees (Luria, 2008).

Scaffolding scope can be categorised as service provider and in order to reach their clients requirements all related erection will be compressive, accurate and also as per safety requirements. In this regard, behaviour on safety becomes important aspect when erecting the scaffold. Other than that, during scaffold erection workers always need to implement

safety compliance and safety rules to ensure that all related works are carried out with procedures. Materials that are meant for used should be safe to use and as per standard requirements. Defect materials should always be eliminated from the work site immediately. Usage of defect materials such as using a broken or defective ladder can cause major accidents such as falling from heights (Kartam & Bouz, 1998).

2.4.2 Safety Policy, Rules and Procedures

Safety behavior in workplace also related with organization safety policy. Safety policy refers to the extent to which a firm creates a clear mission, responsibilities and goals in order to set standards of behavior for employees, and establishes a safety system to correct workers' safety behaviors (Lu & Yang, 2010). In an effort to promote the development of safety and healthy workplace, the safety policy, rules and procedures important as it is one of the important functions for the organization and workers to conduct their daily operation and task safely and correctly. Establish clear and meaningful statement of its safety policy, will reflect the organization's safety management, and will refine workers' safety behavior changes and also takes on new form. Workers that have high level of positive safety behavior are able to conduct their work effectively and efficiently, where it probably might prevent accidents from occurred at the workplace. Establishment of safety policy also will lead to build organization commitment, objective, principles, strategies and guidelines on safety that can educate workers safety behavior in workplace (Fernandez-Muniz et al.,2007). Safety Policy that is created by organization should reflect well organized safety management, zero accidents target, and achieve safety objective that

is required by the authorities (Beard & Santos-Reyes, 2002). In order to develop safety compliance, most of the organization often implements safety policy and safety rules in their workplace. Such as in the maritime area, Safety Management Code (ISM Code) is used as the instrument to provide international standards in safe operations of ships (Akselsson & Ek, 2005). Safety policy will ensure safe work environment that will monitor employee's health and safety aspects on their ongoing tasks and implement control measures to avoid unwanted occurrences. Contribution from employees becomes major importance in the implementation of Safety policy, rules and procedures in workplace. Every employee should follow all common safety work practices to protect them and their fellow employees from work related injuries and illness. The legal requirement for the employers to create safety policy is established by OSHAS Act 514-1994 mainly in section 16 (duties to formulate health and safety policy). This legal enactment requires written safety policy statements to be created by all employers, except for smaller organization (those with fewer than five employees). Safety policies and procedures that are well designed will create managerial commitment in the implementation of safety practices (Chao, 2008). Safety policies will positively impact the organizational culture, safety climate, work attitudes, organizational commitment and job satisfaction (Michael et al., 2005). Health and safety policies and procedures also become an indication to create well-being of employees (Michael et al., 2005; DeJoy et al., 2010).

Safety rules and procedures have always been categorized as risk control system in many publications. Procedure can be defined as activity or process to carry out task in a particular or specified way, directing and controlling the work environment. Safety

procedures are often prepared base on OSHAS 18001:2008 guidance to 18001 Standard for Occupational Health and Safety Management Systems (British Standards Institution, 2008).In Malaysia during writing procedures, organization used to implement OSHAS 18001:2008 and MS-1722(Malaysian Standards). Procedures become essential parts (Energy Institute, 2008) when the task becomes too complex for the employee to handle such as in an emergency situation. During this situation, the transparency of behavior required to monitor the tasks as per standards and work process flow. Study by Dutch (Labour Inspectorate, 1989), during incident containment loss in chemical process industry found that 50% is contributed by related procedures, of this 10% are related with no or unclear procedures, 12% is caused of wrong procedures and 28% shows correct procedure was not implemented accordingly. Another study among offshore installations, managers in British North Sea show that ‘failure to follow rules’ becomes the third most factor that caused accidents after ‘not thinking the job through’ and ‘carelessness’ reasons (O’Dea & Flin 2001).In line with this view, safety policy, rules and procedures become major part to educate employees in work process flow and will eliminate and control unsafe behavior in workplace.

2.4.3 Safety Communication and Feedback

Safety communication can provide information on risk identification and safety information to employees and this will ensure safety issues being quickly responded. Safety communication will significantly influence accident attributions and at same time safety communication will be positively related to workers safety behavior in terms of safety compliance. In order to create effective safety communication, organization should

choose right communication methods so that it can eliminate and control the hazards such as communicate risk and safety information (Fernandez-Muniz, 2007 & Pidgeon, 1991). Regular feedback on safety performance through posted charts and a review of behavioral data at safety meetings (Roughton, 1993). In scaffolding industry, safety communication, also become essential in carrying out erection and dismantle works so that it is in compliance with the safety requirements. For example, during the erection in confine space, organization should provide suitable communication channels such as information on risk and safety information. This type of communication will educate the workers to identify the risk, hazards and also to take necessary action during emergency. There are many examples of technical strategies to implement effective safety communication. The common method used during internal communication include presentation to senior management, staff and HSE committees, team meetings, email, videos, newsletters, poster display and signage. Method of external communication includes annual report, publications and telephone enquiries. All information should be presented to the recipients in manner that the recipients can understand (Griffiths & Vecchio-sadus, 2004).

One of the main safety communications in workplace is ‘communication between leader and subordinate. At the organization level, regular and direct communications establishes valuable characteristics and also promotes safety performance (Vredenburgh, 2002). In previous research, poor communications become reason for poor safety performance (Hofmann & Morgeson, 1999), low productivity and morale (Alexander, Helms, & Wilkins, 1989). All types of communication should ensure the leader and members to freely converse about routine and non-routine problems and also engage in problem

solving process which will benefit the behavior of workers (Fairhurst, 1993; Fairhurst & Chandler, 1989; Fairhurst, Rogers, & Sarr, 1987; Hofmann, 2003). Fostering subordinates on positive safety attitudes and effective safety related information will create effective communication atmosphere in workplace. In order to influence safety practices, feedback should be provided to employees who are capable to utilize it. Information exchange on safety between the supervisor and their subordinates will display the intention of the supervisor on the well being of their subordinates. Employees with positive intention will always contribute to enhance communication of safety related issues such as safety equipment handling, safety operating procedures and guidelines, outcome of safety behavior and emergency procedures with their leaders. Researchers used multiple approaches to clarify the relationship between communication and safety related issues. They also found that communication between employee and supervisor can induce employees to raise in their safety concerns (Hofmann & Morgeson, 1999). Recent research on communication of safety rules and regulations in mining environment shows that employees are willing to raise safety issues (Laurence, 2005).

Non-compliance to safety requirements become reason for many construction accident. Effective communications can be the system used to create safe and efficient workplace. Leaders for employees should deliver vision and values through interaction and communication (Ismail, 2007) and effective communication leads to understand the goals to achieve. Study between line workers and supervisors working in the maintenance of heavy duty equipment found that improved communication channel will reduce micro accidents and increased use in Personal Protective Equipment (Zohar, 2002). Effective

communication can be achieved in three ways; firstly, through visible behavior. This means that once the employer communicates the importance of safety and health, the employees soon recognize what employer regards as important. Then the employees will adopt their own behavior accordingly. Secondly, effective communication is done through written communication of the health and safety policy statements, health and safety roles and responsibilities, performance standards and findings from risk assessments. Finally, this is achieved through face to face discussions between the employer and employee. This will enable the employees to make a personal contribution and helps them to feel involved in the safety and health of the organization.

The communication network in occupational safety and health becomes a supportive framework in which people and system of work can interact purposively and cooperatively. Clean and constructive safety communication provides knowledge that can improve to prevent risk behavior.

2.4.4 Safety Training and PPE use Training

Safety training is always related to safety behavior because safety training can be used to educate workers in safe behavior, provide practice time, and also motivate workers to perform their task safely. Safety training is required to educate employees on the potential of accidents, potential of hazards and suitable techniques to prevent accidents. Hence, training and educational programs contribute to improve safety awareness which is an important criteria to improve safety in construction (Ghani, 2010) and change behavior of

employees (Wong, 2000). Study in 18 construction sites in Ireland, shows that the safety training organized without systematic schedule which only covers them and protects the organization, would influence the knowledge and behavior of employees in the case of unwanted incidents that occurs with little expectation (McDonald, 2003). Safety training that is considered as insufficient can be one of the root causes in the workplace accidents. This is because insufficient training will be unable to provide knowledge, education and necessary `skills to recognize potential hazards in workplace (Toole, 2002). In another study on vehicles maintenance, the employees have identified that safety training always have a strong link or relationship between employees and safety behavior improvement (Heinzman, Komaki & Wyld, 1980). Other than reducing unwanted occurrence in workplace such as accidents, safety training also reduces costs and save human lives too (Hopton, 1969). The overall conclusion is that, training is one of the key elements to prepare workers to avoid accidents (Wilson, 1989).

Personal protective equipment (PPE) is safety equipments that are designed to reduce employees' exposure to hazards when engineering and administrative arm is not effective in reducing the exposure. Suitable personal protective equipment (PPE) can reduce injuries and illness in workplace (Breish, 1989; LaBar, 1990). A survey by the United States Occupational Safety and Health Administration (OSHA) on 1986 -1988 shows that proper implementation on PPE could have prevented up to 37.6% of the occupational injuries and illness (LaBar, 1990). OSHA statistics about 12%-14% of occupational injuries related with disabling occurred because workers do not wear the suitable PPE (Breisch,1989). In order to maintain PPE compliance in workplace, employer has to

monitor their employee from time to time to ensure that the rules and requirements to wear safety tools are always observed and made to become a priority while performing jobs at workplace (Frank Harris & Ronald McCaffer 1982). All related protective personal equipments to workers should be provided by the employer especially to those who work in hazardous to human environment such as chemical handling, working on height and confine space entry. Study in construction industry in the United Kingdom found that non-compliance in using PPE varies from 21% to 65% (Duff, 1993). Other than the United Kingdom study, Hong Kong study has also concluded that 49% to 69% is due to non-compliance in using PPE. Among other factors, the non-compliance percentage of Personal Protective Equipment (PPE) shows the highest rank.

2.3 Conclusion

This paper has argued the need for safety behavior where high employers impetus towards factors identified is agreed by many researchers to help the organization continuously to improve safety compliance and safety performance in the scaffold industry. Employers and employees with good safety behavior in particular play a significant role in the achievement of safety compliance towards occupational, safety and health improvement in the scaffold industry. Studies have shown that an improvement need to be done where employers' behavioral safety compliance factors are highly recommended and to be provided and reinforced by employers to the employees in order to achieve organization goals and eliminate scaffold accidents. Active involvement of behavioral safety compliance identified will resulted in greater influence among employees and improves

safety behavior. The significant roles of employers' behavioral safety compliance factors can give value and benefit construction where it can elevate safety concerns and cultivates a vision for the future. Studies have shown that Occupational, Safety and Health Act (OSHA) 1994 had been identified as an effective approach providing legislative framework to enforce human behavior towards safety compliance. The Occupational Safety and Health Act (OSHA) 1994 were enacted on a self regulatory basis to promote safety culture (Faridah,2010). Exercising these elements would encourage employers and employees to change their behavior towards occupational, safety and health improvement and hence, protect employees from occupational accidents, injuries and illnesses. It will discipline the employees as one strong team to give full support towards achievement of organization safety goal and help Construction Industry Master Plan (CIMP) 2006-2015 initiated by Construction Industry Development Board (CIDB) achieve its aim and objectives. Last but not least, there is enough room for improvement due to understanding that good behavior can be sharpen towards behavioral safety compliance to occupational, safety and health improvement in the construction industry. Hence, this initial finding may lead to the establishment of the on-going research areas currently undertaken by the researcher and that needed to be addressed for employers' behavioral safety compliance towards occupational, safety and health improvement in the construction industry. The next chapter would identify research methodology and procedure that will be implemented in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

In the previous chapter, we have discussed the workplace safety behavior. This chapter will cover and identify research methodology and procedure that will be implemented in this study. This includes the description of participants, research instruments, research design, procedure and finally data collection methods.

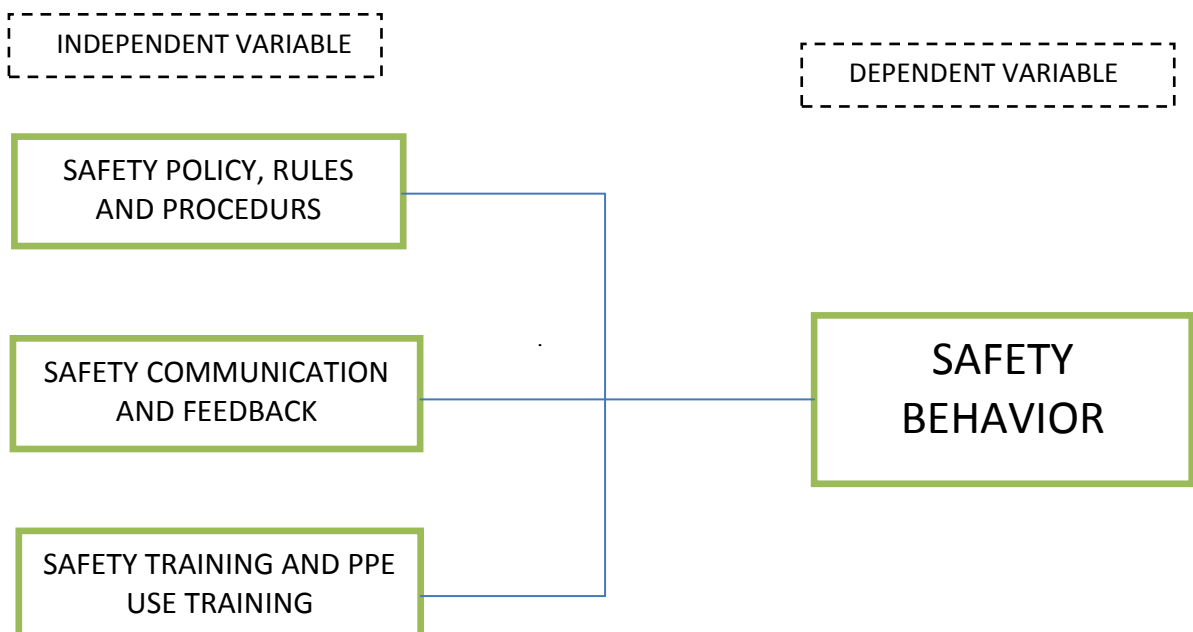
The study was carried out in a scaffolding scope in Shell refinery employing over 120 staffs. There will be a range of safety issues concerning the safety behavior. All 120 employees will undergo the survey and the estimated response rate is 100%. In this survey, selecting who will participate in our study is a very important step in the research process, and it requires careful thought. It is easy to create an excellent research proposal, and then find that it is not possible to recruit the type of participants that the study requires. Firstly, the selection of participant is based on his ability to understand the purposes of our study in this scaffolding work and so that this will allow readers to argue with our definition. This is called an operational definition. In this survey, we have also included participants based on target population, meaning a population that has certain characteristics required by the researcher such as from the list of manager, supervisor, project coordinator, scaffold workmen, competent scaffold workmen and other employees. When choosing the right participant, research can be carried out with effective outcomes.

3.1 Research framework and the hypotheses of the study

The theoretical framework is the major foundation on which the entire research project is based on. Theoretical framework is developed, described and the elaborate network and relationship among the variables deemed relevant to the problem situation is identified through the process of observations and literature review. This study was conducted to investigate the safety behaviour in scaffold industry. The framework of this study consists of three independent variables (a) Safety rules and procedures, (b) Safety communication and feedback, (c) Safety training and PPE use training.

All these independent variables will be later measured on the workplace safety compliance, of which the safety behaviour being the determinants (dependant variable). Based on extensive literature review, structural relationships between these variables related to safety behaviour were hypothesized; as seen in figure 3.1.

Figure 3.1
Constructs of the safety behaviour



3.2 Statement of hypothesis

HYPOTHESIS 1

There is relationship between safety training and PPE use training and safety behavior.

HYPOTHESIS 2

There is relationship between safety behavior and safety communication and feedback

HYPOTHESIS 3

There is relationship between safety behavior and safety policy, rules and procedures

3.3 Instruments scales

This study applied quantitative approach in data collection process. The survey questionnaire used in this study was adopted from previous studies and represents a compilation of survey items already tested for reliability and used in the earlier empirical studies by other researcher in the field. The survey questions utilize the closed-ended question formats that would give uniform frame of reference for respondents to decide their answer (Bowen & Weisberg, 1977). The hallmark of survey questionnaire are clarity, simplicity, and attractiveness (Folz,1995). Clear and logical questions will ensure all respondents to able to see easily the relationship between questions asked and the stated objectives of the research (Casley & Kumar, 1998).

This survey questionnaire was developed with specific questions to answer the research intention and to test the hypotheses. All items were measured on a 6-point rating scale

ranging i.e. from 1 (*strongly disagree*) to 6(*strongly agree*), and the items are reported in the Appendix A. This method was developed by Likert and is widely used to measure attitudes because of its simplicity and administered criterion (Zikmund, 2003). This survey questionnaire was divided into four sections. Section A, measures safety behavior (6 questions); section B measures safety policy, rules and procedures (7 questions) ;section C measures employees' safety communication and feedback (7 questions) and section D measures safety training personal protective equipment training (9 questions). Demographic questions were also included. This was in order to provide a profile of respondents.

3.3.1 Selection of survey instruments

Selection of the variables is the development of specific research procedures that will result in empirical observations representing those concepts in the real world (Babbie,1992). Four variables were measured in this study, namely; safety behaviour, safety policy, rules and procedures, safety communication and feedback and also safety training and PPE use training. The sources of variables are as described below:

Safety Behaviour

Six items that measure employee safety behaviour are adapted from Chin-Shan Lu and Chung-Shan Yang (2011). All of the items were measured using 6-point Likert scale, and were coded on scale 1(*strongly disagree*) to 6(*strongly agree*). These scale items are as listed in table 3.1 below:

Table 3.1
Safety Behavior Scale

- 1) I maintain safety awareness at work.
- 2) I comply with safety rules and standard operational procedures.
- 3) I do not neglect safety, even when in a rush.
- 4) I wear personal protective equipment at work.
- 5) I participate in setting safety goals.
- 6) I actively participate in safety meetings.

Safety policy, rules and procedurs

Seven items that measure safety policy, rules and procedures are adopted from the research which was conducted by Chin-Shan Lu and Chung-Shan Yang (2011). All of the items were measured using 6-point Likert scale, and were coded on scale 1(strongly disagree) to 6(strongly agree). These scale items are as listed in table 3.2 below:

Table 3.2
SAFETY POLICY, RULES AND PROCEDURS Scale

- 1) My company has written safety policies.
- 2) My company has established a safety responsibility system.
- 3) My company has set up a work safety rule.
- 4) The safety rules and procedures followed in my company are sufficient to prevent incidents occurring.
- 5) My supervisors and managers always try to enforce safe working procedures.
- 6) Safety inspections are carried out regularly.
- 7) The safety procedures and practices in this organization are useful and effective.

Safety communication and feed back

Seven items that measure safety communication and feedback were taken from previous questionnaires research conducted by Chin-Shan Lu and Chung-Shan Yang (2011). All of the items were measured using 6-point Likert scale, and were coded on scale 1 (strongly disagree) to 6 (strongly agree). These scale items are as listed in table 3.3 below:

Table 3.3

SAFETY COMMUNICATION AND FEED BACK

- 1) My company provides workers with safety related information.
- 2) My company informs workers about risks that are associated with their work.
- 3) My company responds quickly to safety related problems.
- 4) My company holds regular job safety meetings.
- 5) We always implement open discussion of problems between supervisor and workers.
- 6) Management always consults with the employees regarding changes about work arrangements.
- 7) The target and goals for safety performance in my organization are clear to the workers.

Safety and PPE use training

Nine items that measure safety training and PPE use training is based on questionnaires that were adopted from the research which was conducted by Chin-Shan Lu and Chung-Shan Yang (2011). All of the items were measured using 6-point Likert

scale, and were coded on scale 1 (strongly disagree) to 6 (strongly agree). These scale items are as listed in table 3.4 below:

Table 3.4

SAFETY TRAINING AND PPE USE TRAINING

- 1) My company provides sufficient safety education.
- 2) The design of safety training programs is good.
- 3) Safety training programs have been adopted in my workplace.
- 4) Explanation of the changes in the work environment is effectively communicated.
- 5) Training is provided on the use of PPEs during emergencies.
- 6) Encouragement to use PPE is always given.
- 7) Defining probable risks and dangers during training.
- 8) Training covers the skills that are required during emergencies.
- 9) Newly recruits are trained adequately to learn safety rules and procedures.

3.4 Population and Sampling Size

3.4.1 Population

The population in this study involves 120 employees working in various positions such as higher level managers, executives, project coordinator, administrative and finance staffs and the highest population consist of skillful worker such as competent scaffold workmen, material controller and supervisors. Most of them are males and are involved in

the coordination to erect and dismantle scaffolding towers in Shell Refinery Port Dickson at Negeri Sembilan. By OSHA definition, an employee includes a person who is directly employed by the principal employer, leased or contracted for the service (Occupational Safety and Health Act 1994 and Regulations 2007). Those who are attached to the operation of the plant would be exposed to material and occupational hazards and therefore they are the most suitable candidates for this study.

3.4.2 Sample

The sample is drawn from the hourly workforce area in Shell Refinery. The locations include a total base of approximately 120 hourly workers. Questionnaires were administered to all of them during progress meeting. Ages of the respondents range from 20 to 60 years old. The sample involve contains about 15.8% female respondents and 84.2% male respondents, and the race / ethnic composition of the sample estimates about 45% Malays, 5% Chinese, and 50% Indians.

3.5 Data Collection Method

Data collection is an important aspect of any type of research study. A major weakness of the questionnaire is non-response bias, which may lead to a poor sample and affect both reliability of the research and the types of data analysis (Emercy & Cooper,1991; Davis & Cosenza, 1993; Neuman, 1994). Inaccurate data collection can impact the results of the study and ultimately lead to invalid results. The quantitative data collection method relies

on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories. They produce results that are easy to summarize, compare, and generalize. Typical quantitative data gathering strategies for this research is the Questionnaires.

Questionnaires will be sent to scaffold industries employees and this saves the time and cost. Employees will respond to the questionnaires regarding controversial issues in particular due to the fact that their responses are anonymous. This device helps to simplify and quantify employee's safety behaviors. Using a checklist will list down safety behaviors, characteristics, or other entities that are needed for this research. A rating scale will be use when a safety behavior needs to be evaluated on a continuum. This is also known as the Likert scales (Leedy & Ormrod, 2001). All questionnaires are delivered to the respondents during safety and coordination meeting. All questionnaires answered by respondents after the meeting and returned before they leave the office.

3.6 Questionnaires Reliability

Pilot testing involves conducting a preliminary test on the data collection tools and procedures to identify and eliminate problems, allowing programs to make corrective changes or adjustments before actually collecting data from the target population.

Pilot test will be carried out at initial state of the study to confirm on the reliability consistency and stability of research process. Approximately 30 individuals are selected to participate in this pilot study. According to Zikmund (2003), pilot study can become a

guide for larger study and it will collect data from definitive subjects of the research project in a small scale probing. This is a form of sampling technique without exact standards. Reliability describes the degree to which the measurement instrument accurately and repeatedly measures the intended construct (Churchill,1979).All variables should be reliable as the results all items (cronbach alfa) must be above 0.7 to 0.95 (Mohsen Tavakol, & Reg Dennick, 2011). The co-efficient of reliability measures how well each item in a scale, correlates with the sum of the remaining items. It measures consistency among items in a scale. This technique is the widely used as internal consistency coefficient.

3.7 Data Analysis Techniques

This study will use Statistical Package for the Social Sciences (SPSS) to perform and carryout the statistical analysis. Types of analysis that will be implemented are reliability analysis, descriptive analysis and correlation analysis.

3.7.1 The reliability analysis

The reliability analysis will be used when we have multiple questions in survey/question that form a scale and determine if the scale is reliable. Cronbach's alpha is used in measurement of internal consistency ("reliability"). In this research, there will be twenty-nine questions in the questionnaire which is used to measure how safety behavior affects the scaffold industries. Each question will be with a 6-point Likert item from "strongly disagree" to "strongly agree". In order to understand whether the questions in this questionnaire are all reliably measured, the same latent variable (safety behavior affects

the scaffold industries) (so a Likert scale could be constructed), a Cronbach's alpha will be run on a sample size of 30 workers.

3.7.2 The Descriptive analysis

Descriptive analysis for this study will be used to describe the characteristics of the sample including the demographic sample. In this research, working experience and age are continuous variables, the mean, standard deviation of the maximum and minimum values will be used to describe this particular demographic sample. Variables for job title, gender, race and educational background we will use frequency analysis.

3.7.3 Pearson correlation analysis

The Pearson's correlation is used to find a correlation between at least two continuous variables. Pearson correlation two tail statistical analyses will identify the correlation significant between all independent variables and the dependent variables. Here strength among the variables can be computed and investigated.

3.8 Conclusion

This chapter will explain to us all of the methodological factors that is involved when carry out the study. This chapter will explain the research frame work, conceptual and operational definition of framework, the instruments used, details about population and samples involved, pilot study and finally the method used to analyze all the data that will be collected in future research. The next chapter is set to explain the data analysis during this study.

CHAPTER 4

RESULTS

4.0 Introduction

This chapter will report the analysis of the data collected by using reliability test, descriptive frequencies and Pearson correlations. The descriptive frequencies involve the demographics on age, work experience, race, and education level. The results of the current study is explained and discussed throughout this chapter.

4.1 Summary of Data Collection

4.1.1 Number of Returns

About 120 respondents participated in this study and 120 set of questionnaires had been distributed to respondents. The sampling was retrieved from a utility company under categories which consists of management level and supervisory level. The questionnaires were collected for analysis within 17 days. However, the late responses were still accepted. Starting from 2nd June 2012 to 27th June 2012, a total of 120 survey questionnaires were handed over to the key contact persons for distribution. The collection of questionnaires from the contact person began on the 10th June 2012 and all is collected before 27th June 2012.

Table 4.1
Summary of Survey Distribution and Response

Description	N	%
Total questionnaires distributed to key contacts		
English version	120	100
Progress of questionnaires distribution:		
1 st week	50	41.7
2 nd week	70	58.3
Total questionnaires collected from the key contact Person	120	100

4.1.2 Normality Test

In this analysis, normality was assessed by determining the value of kurtosis and skewness statistic. The skewness value provides an indication of the symmetry of the distribution whereas the kurtosis provides information on the peakedness of the distribution. Table 4.2, 4.3, 4.4, 4.5 shows details of the data for normality assessment.

Table 4.2
Shows details of the data normality assessment for safety behavior

Safety Behavior		Statistic	Std. Error
Mean		4.90	.052
95% Confidence Interval for Mean	Lower Bound	4.80	
	Upper Bound	5.01	
5% Trimmed Mean		4.91	
Median		5.00	
Variance		.325	
Std. Deviation		.570	
Minimum		4	
Maximum		6	
Range		2	
Inter-quartile Range		1	
Skewness		-.308	.221
Kurtosis		-.213	.438

The statistics above shows that the skewness is -0.308 which indicates a negative skew and negative value of kurtosis is -0.213 which indicates a distribution that is flatter (platykurtic). Since the value of skewness and kurtosis less than 1, it indicates that there is a normal distribution.

Table 4.3
Shows details of the data normality assessment for Safety Policy, Rules and Procedures

Descriptive Table			
Safety Policy, Rules and Procedures		Statistic	Std. Error
Mean		5.11	.047
95% Confidence Interval for Mean	Lower Bound	5.02	
	Upper Bound	5.20	
5% Trimmed Mean		5.14	
Median		5.14	
Variance		.264	
Std. Deviation		.513	
Minimum		3	
Maximum		6	
Range		3	
Inter-quartile Range		1	
Skewness		-.783	.221
Kurtosis		.853	.438

The statistics above shows that the skewness is -0.783, which indicates a negative skew and negative value of kurtosis is 0.853 which indicates a distribution that is flatter (platykurtic). Since the value of skewness and kurtosis is less than 1, it indicates that there is a normal distribution.

Table 4.4
Shows details of the Data Normality Assessment for Safety Communication and Feedback

Descriptive Table			
Safety Communication and Feedback		Statistic	Std. Error
WI	Mean	5.04	.063
	95% Confidence Interval for Mean		
	Lower Bound	4.92	
	Upper Bound	5.17	
	5% Trimmed Mean	5.06	
	Median	5.00	
	Variance	.474	
	Std. Deviation	.688	
	Minimum	4	
	Maximum	6	
	Range	2	
	Inter-quartile Range	1	
	Skewness	-.163	.221
	Kurtosis	-.826	.438

The statistics above shows that the skewness is -0.163 which indicates a negative skew and negative value of kurtosis is 0.826 which indicates a distribution that is flatter (platykurtic). Since the value of skewness and kurtosis is less than 1, it indicates that there is a normal distribution.

Table 4.5

Shows details of the Data Normality Assessment for Safety Training and PPE use Training.

Descriptive Table

Safety Training and PPE use Training.		Statistic	Std. Error
FI	Mean	4.96	.055
	95% Confidence Interval for Mean		
	Lower Bound	4.85	
	Upper Bound	5.07	
	5% Trimmed Mean	4.98	
	Median	5.00	
	Variance	.369	
	Std. Deviation	.608	
	Minimum	4	
	Maximum	6	
	Range	2	
	Inter-quartile Range	1	
	Skewness	-.158	.221
	Kurtosis	-.309	.438

The statistics above shows that the skewness is -0.158 which indicates a negative skew and negative value of kurtosis is -0.309 which indicates a distribution that is flatter (platykurtic). Since the value of skewness and kurtosis is less than 1, it indicates that there is a normal distribution.

4.2 The Demography of Respondents

A total of 120 respondents were selected from a project management team such as managers, supervisors, safety supervisors, team leaders, project coordinator, admin staff and material controller.

From the total of 120 respondents, 101 or 84.2%(percent) are males and 19 or 15.8% (percent) are females. Besides that, there are also other demographic factor such as ethnic, level of education, age and working experience. Based on the demographic data table 4.1, the majority respondents are Indians with 60 respondents or 50% (percent) of the total respondents taken into account. From total respondents, 54 respondents or 45% (percent) of them are Malays and finally followed by 6 Chinese respondents or the balance 5%(percent).

Ages of respondents are from the age range of 20yearsto 35years and above. Out of the total of 120 respondents, 33 respondents or 27.5% (percent) are from the age range of 20years-25years.This is followed by 45 respondents or 37.5% of total respondents from the age range of 26years-30 years. 25 or 20.8% of the total respondents are from the age range of 31years-35 years and finally 17or 20.8% of the respondents are from the age range of 35years and above.

When we refer to level of education, most of them are actually graduates at diploma level. They contribute to almost 60 respondents or 50% (percent). This is followed by degree

holders comprising 34 respondents or 28.3% (percent) and at secondary level 25 respondents or 20.8% (percent). Among all the respondents, only one respondent or 0.8% (percent) is master degree holder.

Finally, respondents that involved in this study are from various age groups. The youngest can be as young as 20 years old and the oldest can be at the maximum retirement age of 55 years. According to the data table 4.1, 53 respondents or 44.2% (percent) of them have working experience of one to five years. This followed by 26 respondents or 21.2% (percent) having experience of six to ten years. Those who have working experience from ten to fifteen years consist of 27 respondents or 22.5% (percent). Finally fourteen respondents have experience of more than fifteen year or 11.7% (percent). Respondent population distribution percentage and frequency profile is as explained in Table 4.6, Table 4.7 and Table 4.8, Table 4.9, and Table 4.10.

Table 4.6
Profile of Respondents by Gender

	Frequency	Percentage
Male	101	84.2
Female	19	15.8
Total	120	100.0

Table 4.7
Profile of Respondents by Age

	Frequency	Percentage
20 – 25 years	33	27.5
26 – 30 years	45	37.5
31- 35years	25	20.8
35 years above	17	14.2
Total	120	100.0

Table 4.8
Profile of Respondents by Ethnic

	Frequency	Percentage
Malays	54	45
Chinese	6	5
Indians	60	50
Total	120	100.0

Table 4.9
Profile of Respondents by Working Experience

	Frequency	Percentage
1 to 5 years	53	44.2
6 to10 years	26	21.2
10 to 15 years	27	22.5
Above 15 years	14	11.7
Total	120	100.0

Table 4.10
Profile of Respondents by Education Level

	Frequency	Percentage
Secondary	25	20.8
Diploma	60	50
Degree	34	28.3
Master	1	0.8
Total	120	100.0

4.3 Pilot Test and the Reliability of the Instrument

In this study, the reliability measurement was done through Cronbach's alpha approach to identify the internal consistency for each factor. Cronbach's alpha is the most popular test (Cavana et al., 2001; Sekaran 2000) and is widely accepted (Bryman& Cramer, 1990). It was suggested that the reliability of a basic research must be at least 0.7 or above (Nunally, 1978). The measurement and the corresponding alphas of the current study were: Safety behavior attributes ($\alpha=0.855$), safety policy and procedures ($\alpha=0.811$), safety communication and feed back ($\alpha=0.806$) and finally safety PPE use training ($\alpha= 0.862$). The presentation of Cronbach's alpha for each variable is presented in table 4.11 as below.

Table 4.11
Reliability Coefficients for each Variable

Measurement	Cronbach's Alpha
Safety behavior	0.855
Safety policy, rules and procedures	0.811
Safety communication and feed back	0.806
Safety training and PPE use training	0.862

A pilot study was conducted to ensure the questions were understood, reliable, and usable to collect data from a large scale population. A total of 30 completed questionnaires were returned and the respondents consisted of 25 males and 5 females. The total of Malay respondents was 13, followed by Indians 16 respondents and the Chinese 1 respondent. In terms of education level 8 respondents (26.7%) were from secondary level, 15 respondents (50%) were from diploma level and followed by degree holder consisting 7 respondents (23.3%). In terms of working experience, 16 respondents (53.3%) had 1 to 5 years of experience, 7 respondents (23.3%) had 6 to 10 years of experience, 4 respondents (13.3%) had 10 to 15 years of experience and finally 3 respondents (10%) had working experience for above 15 years. All items in the questionnaires were adopted from previous studies and is as shown in the table below:-

Table 4.12
Questionnaires instruments

QUESTIONNAIRES	INSTRUMENTS
Safety behaviour	Adopted from the research that was conducted by Chin-Shan Lu and Chung-Shan Yang (2011).
Safety policies, rules and procedures	Adopted from the research that was conducted by Chin-Shan Lu and Chung-Shan Yang (2011).
Safety communication and feed back	Questionnaires for were taken from previous questionnaires research conducted by Chin-Shan Lu and Chung-Shan Yang (2011).
Safety training and PPE use training	Questionnaires were adopted from the research that was conducted by Chin-Shan Lu and Chung-Shan Yang (2011).

4.5 Descriptive Statistic of Variables

The descriptive of frequencies in this study (table 4.13), shows that the mean, standard deviation and variance for the factors used (Safety behavior attributes, Safety policy, rules and procedures, Safety communication and feedback, Safety and PPE use training) is shown as in table 4.13. From the total mean score, Safety policy, rules and procedures has the highest mean score (mean=5.11, SD=0.513) .This is followed by Safety communication and feedback (mean=5.04, SD=0.688), safety behavior attributes

(mean=4.9, SD=0.570) and Safety and PPE use training (mean=4.96, SD=0.608). On the average, the indication from the above analysis shows that respondents have experience increased in Safety policy, rules and procedures. Table below shows Mean and standard deviation for variables.

Table 4.13
Mean and standard deviation for variables Frequencies of Variables(N=120)

Variables	Mean	Standard Deviation	Minimum	Maximum
Safety behavior attributes	4.9	0.570	4	6
Safety policy, rules and procedures	5.11	0.513	3	6
Safety communication and feed back	5.04	0.688	4	6
Safety and PPE use training	4.96	0.608	4	6

Note: All items used a 6-point Likert scale with 1= strongly disagree and 6= strongly agree

4.6 Test Results for Research Hypotheses

In this section, results are reviewed based on hypotheses that were developed in Chapter 1. There are three hypotheses that were studied and the results of each are shown with using correlations.

4.6.1) Hypothesis 1, Hypothesis 2 and Hypothesis 3 using Correlation analysis

Hypothesis 1

H₁ – There is relationship between safety behavior and safety policy, rules and procedures

Hypothesis 2

H₁ – There is relationship between safety behavior and safety communication and feedback

Hypothesis 3

H₁ -There is relationship between safety behavior and safety training and PPE use training.

Pearson correlation assumes that two variables are measured on at the least interval scales and this value determines the correlation strength to which the values of the two variables are "proportional" to each other. There are medium correlations among the entire scale.

Interpretations of the correlation are based on Pearson correlation score is as shown in

Table 4.14.

Table 4.14

Pearson Correlation 'r' Score Interpretation

r value	Interpretation
> 0.70	Very strong correlation
0.50 till 0.69	Strong correlation
0.30 till 0.49	Medium correlation
0.10 till 0.29	Low correlation
0.00 till 0.09	Correlation that can be avoided

The results of behavior attributes, safety policy, rules and procedures, safety communication and feedback, safety and PPE use training are as shown in Table 4.15.

Table 4.15
Correlation Matrix among Variables

	Safety behavior	Safety policy, rules and procedures	Safety communication and feedback	Safety training and PPE use training
Safety behavior	1	.440(**)	.397(**)	.328**
Safety policy, rules and procedures	.440(**)	1	.498(**)	.328(**)
Safety communication and feedback	.397(**)	.498(**)	1	.677(**)
Safety training and PPE use training	.328(**)	.328(**)	.677(**)	1

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

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

The overall correlation analysis indicated that the scores of the four variables range from 0.328 to 0.440, which means that variables are medium correlation between dependent variable and independent variables. Correlation result between the safety behavior and the safety policy, rules and procedures indicates medium correlation($r = 0.440$). Both variables have positive relationship and existed between these two variables. Results of correlation indicates that the safety communication and feedback is associated with safety behavior($r = .397, <.05$). Relationship between the safety behavior and the safety communication and feedback indicates medium positive correlation which is evident from the score, $r = 0.397(<0.05)$. Finally, score was between the safety behavior and the safety

training and PPE use training indicates medium correlation ($r = 0.328$). Both variables have positive relationship and existed between these two variables.

4.7) Conclusion

The result indicates and explains the safety behavior in the scaffold industry. The study was conducted among 120 respondents and yielded a 100% (percent) response rate. The major findings of the study found that safety behavior attribute, safety policy and rules, safety communication and feedback and finally safety and PPE use training influences the safety behavior. The Table below indicates the results of the analysis. The discussion of the obtained results will be further discussed in the following chapter.

Table 4.22 :
Results of the analysis

Hypothesis	Results
Hypothesis 1 There is positive relationship between safety behavior and safety policy, rules and procedures	safety behavior is associated with safety policy, rules and procedures
Hypothesis 2 There is positive relationship between safety behavior and safety communication and feedback	safety behavior is associated with Safety communication and feedback
Hypothesis 3 There is positive relationship between safety behavior and safety training and PPE use training.	safety behavior is associated with safety training and PPE use training.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter will discuss the key finding and conclude the present study by examining the relationship between the perceptions of safety behavior in scaffold industry. The results of this study were crucial because the nature of activities carry out at high risk industries which may cause potential human exposure to hazardous substance and other hazardous that can cause fatality. In addition, implications will suggest the best solutions and more practical approaches to enhance safety behavior among the scaffold workmen in scaffolding industries.

The result of correlation analysis supported all proposed hypotheses therefore fulfilled the objective of the study. Safety policies, rules and procedures; safety communication and feedback, and finally safety training and PPE use training were all have positive relationship with safety behavior. The outcomes of this study could assist the management to improve its safety behavior while at the same time this study set a sound platform for future valuable work in this area.

5.1 Hypotheses testing results

5.1.1) Safety behavior is associated with safety policy, rules and procedures

The results of correlation analysis indicated that there is a positive relationship between safety behavior and safety policy, rules and procedures. Between Safety policy, rules and

procedures showed medium relationship with Safety behavior using correlation analysis. There is a positive relationship that exist between Safety policy, rules and procedures with Safety behavior attributes P value is < 0.05 .

Unsafe behavior should be closely monitored. Management should analyze what is important clearly through goal setting, establishing policies and procedures, and even rewarding certain job behaviors (Schneider and Rentsch, 1988; Dedobbeleer & Beland, 1991). According by Fuller (2005) safety rules, regulations, standards and specified criteria in system always committed with safety behavior. Existence of well-designed safety policies and procedures and their effective implementation in practice become direct proof of managerial commitment to safety. For example, organizational health and safety policy which shows concern towards wellness of employees, has also positive impact on their organizational commitment (Michael et al., 2005; DeJoy et al., 2010). Due to positive impact, establish positive work attitudes may influence the motivation of employees for better safety behavior (Christian, M., Bradley, J., Wallace, J.C., Burke, M., 2009). This result is consistent with previous findings are supported by a 1991 study, commissioned by the NSW Department of Mineral Resources, which found that 83% of fatal accidents from strata movements in underground coal mines in the period 1972-1990 were associated with breaches of rules (Roylett, Russell, Ramon, & Blyth, 1991). Human error was simultaneously present with breaches of rules in over half the fatal accidents analyzed. It was concluded that fatalities would continue to occur unless management focused on strategies to focus on the development of better support rules, compliance with rules, and improvements in technology to counter against human error. This statement also

consistent with study suggests that knowledge of adequate behavioral responses may already improve subsequent behavior during tunnel accidents (Kinatedr, Muller, Muhlberger, & Pauli, 2012).

As a conclusion, relationship with safety behavior and safety policy, rules and procedures will improve workers safety behavior in continuous improvement. The rules and regulations should be seriously obeyed by all workers especially when performing high risk task. Furthermore, by monitoring and updating the rule and regulatory subsystem at scaffold work such as guidelines, codes and rules enable the scaffold industry to keep up clients expectations. By reducing the occurrence of unsafe behavior, it will directly reduce number of accidents and injuries that occur in the workplace.

5.1.2) Safety Communication and Feedback associate with Safety Behavior

The results of correlation analysis indicated that there is a positive relationship between safety communication feedback and safety behavior. Between Safety communication and feedback showed medium relationship with Safety behavior using correlation analysis. There is a positive relationship that exist between Safety communication and feedback with Safety behavior attributes P value is < 0.05 .

Communication about safety and the transmission of information to workers will ensure all related procedures are followed and have direct, positive effect on safety behavior. The results are also consistent with (Williams & Geller, 2008) related communication and

feedback and it is important to remind workers of their unsafe behaviors. Consequently, open communication and frequent interactions between employees and management will encourage safety behavior.

This result is consistent with previous research findings like more knowledge is gained by workers, they will use better safety mechanisms which has positive repercussions on safety compliance (Cheyne, A., Tomas,J.M., Cox,S.,Oliver, A., 1999; Griffin& Neal,2000). Implementation of open communication makes employees feel less nervous about raising and discussing safety issues with their supervisors (Ciguralov, K.P., Chen, P.Y., Rosecrance,J., 2010). Open communication with a focus on the problem-solving and learning, the more the workers become involved in safety management. Moreover, they could offer more suggestions on potential improvement to their jobs. This would imply a perfect level of safety participation (Griffin et al., 2000). Communicate safety issues on sites to upper management during the safety meetings and discussions may find possible solutions on how to improve safety behavior of workers. Safety related communication and feedback is important to remind workers of their safety behavior. In some cases, workers are not conscious about their mistake and thus, feedback to workers will help to remind them that safety is paramount. This indicates that, when more safety communication feedback is given to workers about their safety behavior; safety management outcome becomes better and comprehensive. The results are consistent with Williams and Geller (2008) who found that safety-related communication and feedback is effective in improving the safety performance of the workers.

As a conclusion, ensuring that positive safety behavior exists and that communication channels are open and working as well. This was confirmed in this survey when there is relationship with safety behavior and safety communication and feedback. This will consequently improve workers safety behavior in managing their jobs and targets effectively.

5.1.3) Safety Behavior associate with Safety training and PPE use training.

The results of correlation analysis indicated that there is positive relationship between safety behavior with safety training and PPE use training. Safety behavior showed medium correlation with safety training and PPE use training. Safety training is an effective HR tool in mitigating construction site accidents (Tam et al., 2001). Safety training and PPE use training helps improve workers skills and abilities to identify hazards. Improvement in skills and abilities may change employees behavior in manage their task according work scope requirements. The sufficient skills and knowledge that developed during safety and PPE training will improve employees safety related information, ability to communicate, share knowledge, and correct mistakes. These training elements give workers a better understanding of their work nature and use of protective equipment (Duff, A., Robertson, R., Phillips, R., Cooper, M., 1994).

Through PPE usage training, employee learn the importance of protective equipment such as major personal protective equipment items and other additional Personal Protective Equipment such as full body harness, respirator, and chemical suits.

According by Komaki, Heinzman, and Wyld (1980) found that safety training have strong linkage in vehicles maintenance employees and contribute to employees safety behavior improvement. There is evidence suggesting that through trainings and education programs play a important role in enhancement of safety in construction industry and contribute in increase safety awareness (Ghani et al.,2010) and change behavior of employees (Wong et al., 2000). Recent meta-analysis demonstrated that safety behavior can be more effectively trained through highly engaging measures such as behavioral trainings (Burke et al., 2011; Sitzmann, 2011). Active training approaches are known to have a variety of positive outcomes on learning and transfer of knowledge (Bell & Kozlowski, 2008). Due to this study, scaffolding related training improves safety behavior with emphasis on related safety training and safety PPE use training.

5.2 Research Contribution

In this section, the implications resulting from the outcome of study will discussed.

5.2.1 Theoretical Implication

This study was done to investigate the safety behavior in the scaffolding industry. There are similar studies on safety behavior such as in the construction industry, railway industry, shipping industry, hospitality industry and even in government agencies. This study was conducted in a local scaffolding company where it creates new opportunity for researches to prove on the safety behavior. Apart from that, this study would be able to contribute value to the academic world because it was done in a high risk and hazards industry.

5.2.2 Practical Implication

The study on safety behavior is not only an essence to the academic world but also to the operations of the company. It is compulsory for every industry to follow and implement safe working environment without any dispute in order to increase quality of productivity and profitability of the industry. This study will also contribute in the investigation status of company into the safety behavior among its employees. When conducting more research or study on safety behavior the management is able to identify the flaws and factors lacking in the enforcement to improve the quality and create a safe working environment to employees. Besides that, perfect safety communications will enhance safety awareness and it helps safety regulations to be fully implemented at workplace. Thus, important role undertaken by management should be more effective such as delegation of correct information during emergency. The information that is shared among employees should be cultivating safety behavior at workplace.

5.3 Limitations and Future Research Directions

Several limitations of study were noted. This study was conducted within a small sample size of 120 respondents only. It should involve larger sample group in order to gain results more precisely. The findings would be helpful in providing stability of study. Besides that, respondents consists of employees and contractors working in the oil and gas industry and their safety behavior reflects the hazards and risks inherent in the oil and gas working environment. The behavior that showed might be difference in other work setting because

of the difference in hazards and risks. For example, the safety behavior in scaffold industry might be different from the safety behavior in a semiconductor industry.

This study is conducted with self-administered questionnaires as a tool to collect data from the respondents. This measurement tools can be viewed as limitation because self-administered questionnaires may raise the tendency of single source bias. The majority of the respondents like to show their good safety behavior in the surveys. This may cause and lead to wrong conclusion because the study is based on the assumption that the response represented to be the true picture of their safety behavior at the workplace.

5.4 Conclusion

This research provides significant contributions to the practitioners of safety behavior management. Findings in this research can be used to enhance management's understanding of their employees' safety behavior and how it can be influenced. This research is hoped to set a precedent and may become the foundation for future research expansion on the safety behavior especially in scaffold industries. Human capital is of one of the important asset for any organization. Therefore, employers should have clear understanding of the subject matter and identify the best strategy to engage and commit to promote total safety. The strategies in this study had been intended to educate, and enforce regular performance review so as to asses and create prompt corrective actions when required.

REFERENCE

- Arezes, P.M., A.S. Miguel, A.S.(2008). Risk perception and safety behaviour: *A study in an occupational environment* . 900-907.
- 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 science Psychology*, 87(3), 488-496
- Blanch, A., Torrelles, B., Aluja,A., Antonio, J. S. (2009). Age and lost working days as a result of an occupational accident: *A study in a shift work rotation system* 47, 1359–1363.
- British Standards Institute [BSI] (1993). Code of practice for access and working scaffolds and special scaffolds in steel. London: Author.*
- Bureau of Labor Statistics (2001).Fatal workplace injuries in 2000: *A collection of data and analysis. Washington, DC: U.S. Government Printing Office.*
- Cattledge, G. H., Hendricks, S., Stanevich, R. (1996). Fatal occupational falls in the US construction industry, 1980– 1989. *Accident Analysis and Prevention*, 28, 647–654.
- Chao, C.J., Wang, H.M., Cheng, F.Y. (2008). A study for safety and health management problem of semiconductor industry in Taiwan. *Industrial Health* ,4, 575–581.
- Cherrie, J.Z., Di, F., Clissold, G. (2010). Occupational safety in China: *Safety climate and its influence on safety-related behavior*. 27 – 59.
- Cheyne, A., Tomas, J.M., Cox, S., Oliver, A.(1999). Modelling employee attitudes to safety: a comparison across sectors. *European Psychologist*, 1, 4–10.
- Chin, S.L., Chung, S.Y. (2011). Safety climate and safety behavior in the passenger ferry context . *Accident Analysis and Prevention*, 43, 329–341
- Christian, M., Bradley, J., Wallace, J.C., Burke, M. (2009). Workplace safety: a Meta analysis of the roles of person and situation factors. *Journal of Applied Psychology*, 94 (5), 1103–1127.
- Churchill. G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of marketing*, 16, 64-73.

- Ciguralov, 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 and Prevention* 42, 1498–1506.
- Cooper, M.D., Phillip, R.A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of Safety Research*, 497- 512.
- David, L. (2005). Safety rules and regulations on mine sites – The problem and a solution. *Journal of Safety Research*, 36, 39– 50.
- De dobbeleer, N., Beland, F. (1991). A safety climate measure for construction sites. *Journal of Safety Research*, 22, 97 – 103.
- Diana., Lai, N.C., Min Liu., Florence, Y.Y. L. (2011). A comparative study on adopting human resource practices for safety management on construction projects in the United States and Singapore. *Safety science* 29, 1018–1032.
- Farhang, A., Ruben D. R., Michael S.B. (1995). Comfort of personal protective equipment. *Safety science*, 195-198.
- Fernandez-Muniz, B., Montes-Peon, J.M., Vazquez-Ordas, C.J. (2007). Safety management system: development and validation of a multidimensional scale. *Journal of Loss prevention in the process industries*. 20, 52–68.
- Fernandez-Muniz, B., Jose Manuel, J.M., Camilo Jose. C., Vazquez-Ordas. (2012) Safety climate in OHSAS 18001-certified organisations: *Antecedents and consequences of safety behavior*. 745- 758.
- Garavan, T.N., O'brien, F. (2001). An investigation into the relationship between safety climate and safety behaviors in Irish organizations. *Irish Journal of Management* 22 (1), 141–170.
- Griffin, M.A., Neal, A. (2000). Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology*. 5, 347–358.
- Hetherington, C., Rhona Flin, R., Mearns, K. (2006). Safety in shipping: The human element, *Safety science* 37, 401–411.
- Helen, C. L., Tracy, C., Nick, B. (2010). Safety climate in conditions of construction subcontracting : a multi-level analysis. 813 – 825.
- Heinrich, H. W. (1931). *Industrial Accident Prevention – A Scientific Approach* (New York: McGraw-Hill).

- Heinrich, H.W., D. Petersen., N. Ross. (1980) . Industrial Accident Prevention, 5th Edition, McGraw-Hill, New York.
- Jane M. (2004). Investigating factors that influence individual safety behavior at work *Safety science*, 275 – 285.
- Jeremy M. B., Stephanie C. P., Mindy E. B., Winfred A. J. (2010). Safety Climate and Injuries: *An Examination of Theoretical and Empirical Relationships*. 713 – 727.
- Judd H., Michael., Zhen G. G., Janice K. W., Charles D. R.(2006). Production supervisor impacts on subordinates' safety outcomes: *An investigation of leader-member exchange and safety communication*. 37, 469–477.
- Kaj Frick. (2011). Worker influence on voluntary OHS management systems – A review of its ends and means *Safety science*. 974- 987.
- Kartam, N. A., Bouz, R. G. (1998). Fatalities and injuries in the Kuwait construction industry. *Accident analysis and prevention*, 30, 805– 814
- Kathryn, M., Rhona, F., Rachael, G., Mark F. (2001). Human and Organizational factors in offshore safety. *Safety science*, 144-160.
- Konstantin, P., Cigularov, P. Y. C., John R. (2010). The effects of error management climate and safety communication on safety :*A multi-level study*, 42, 1498–1506.
- Kopl, M.H., Michael, M. (2004) An evaluation of scaffold safety at construction sites. *safety science*, 141- 150.
- Komaki, J., Heinzmann, A, T., Lawson, L. (1980). Effect of training and feedback: Component analysis of a behavioral safety program. *Journal of applied psychology*, 65(3), 261-270.
- K. Praveen, P., Edward, A.K. (2008). Ethical Climates and Workplace Safety Behaviors: *An Empirical Investigation*. 515 – 529.
- Kuo, C. S., Chin, S. L. (2009). Effects of Safety Climate on Perceptions of Safety Performance in Container Terminal Operations. *Journal of Safety Research*, 1- 19.
- Li, J., Guangtao, Y. L., Feng, L. (2010). Perceived colleagues' safety knowledge/behavior and safety performance: *Safety climate as a moderator in a multilevel study*. 1468-1476.

- Lu, C.S., Tsai, C.L. (2010). The effect of safety climate on seafarer's safety behaviors in container shipping. *Accident Analysis and Prevention*, 42, 1999–2006.
- Luria, G., Zohar, D & Erev, I. (2008). The effect of workers Visibility on Efectiveness of Intervention Programs: Supervisory –Based Safety Interventions. *Journal of Safety Researc*, 39,273- 280.
- Lutness, J. (1987) Measuring up: assessing safety with climate surveys, Occupational Health and Safety. *Journal of Safety Research*, 56, 20–26
- Mullen, J, (2004). Investigating factors that influence individual safety behavior at work. *Journal of Safety Research*, 35, 275-285.
- Michael, J., Demetrice, E., Jansen, K., Haight, J., 2005. Management commitment to safety as organizational support: relationships with non-safety outcomes in wood manufacturing employees. *Journal of Safety Research*, 36,171–179.
- M. M. ABU-KHADER.(2004). Impact of Human behavior on process safety management in developing countries. *Journal of Safety Research*, 431- 437.
- Mohamed, M., Ali, T.H.,Tam., W.Y.V. (2009). National culture and safe work behavior of construction workers in Pakistan. *Journal of Safety Research*, 29 – 35.
- Mohsen, T., Reg, D.(2011). Making sense of Cronbach's alpha. *Journal of Medical Education*, 2:53-55
- Muhlberger, A., Wieser, M. J., & Pauli, P. (2008). Darkness-enhanced startle responses in ecological valid environments: A virtual tunnel driving experiment. *Biological Psychology*, 77, 47–52
- Neal, A., Griffin, M.A.(2006). A study of the lagged relationship among safety climate, Safety motivation, and accidents at the individual and group levels. *Journal of Applied Psychology*, 91(4), 946-953.
- Neal, A., Griffin, M. (2000). Perceptions of Safety at Work: A Framework for Linking Safety Climate to Safety Performance, Knowledge, and Motivation. *Journal of Applied Psychology*, 347 – 358.
- Neal, A., Griffin, M.(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*, 946 – 953.
- NST (2012). Occupational accidents by sector for 2008 to 2011. Retrieved March 20, 2012 from Straits Times on 12th March 2012.

- Nunnally, J.C.(1978). *Psychometric Theory (2nd Edition)*. New York: McGrawHill.
- Occupational Safety and Health Act 1994 and Regulations (2007)*. (14thed). Ulu Kelang, Kuala Lumpur: MDC Publishers Sdn. Bhd.
- Oliver, W., Sigurdur, O.S. (2008). When workplace safety depends on behavior change. *Topics for behavioral safety research*, 589-598.
- Pidgeon, N.F.(1991). Safety culture and risk management in organizations. *Journal of Cross-Cultural Psychology*, 22, 129–141
- Paul, P.S., Maiti, J. (2007). The role of behavioral factors on safety management in Under ground mines. *Journal of Safety Research*, 45, 449–471.
- Sean, M., Whitaker., Rod, J. G., Malcolm J., Paul M. (2003). Safety with access scaffolds: *Development of a prototype decision aid based on accident analysis*, 249 – 261.
- Seo, D.C.(2005). An explicative model of unsafe work behavior. *Safety Science*, 43, 187– 211.
- Siskind, F. (1982).Another look at the link between work injuries and job experience. *Monthly Labor Review*, 105, 38–40.
- S. Larsson, A. P., Torner, M.(2008). *Psychological climate and safety in the construction industry-mediated influence on safety behavior*. *Journal of Safety research*, 405-412.
- Sulastre, M. Z., Faridah, I.(2011). Employers’ Behavioral Safety Compliance Factors toward Occupational, Safety and Health Improvement in the Construction Industry. *Social and Behavioral Sciences* 36, 742 – 751.
- Talkatz, N., Eitan, N., Zvistern. (2005). Safety Climate In Health Care Organizations: A Multidimensional Approach. *Safety Science*, 1075 – 1089.
- Vinodkumar, M.N., Bhasi, M. (2009). Safety climate factors and its relationship with Accidents and personal attributes in the chemical industry. *Safety Science*, 47, 659-667.
- Williams, J., Geller, E.S., 2008. Communication strategies for achieving a total safety culture: employers need to overcome the perception that giving safety-related feed back creates interpersonal conflict. *Occupational Hazards*. *Safety Science*, 70, 49–51.
- Zhang, J., GAO S., TAO J. (2011). Study on Unsafe Behavior Pre-control Method Based on Accidents Statistic, *Safety Science*, 1964 – 1969.

Zikmund, W.G.(2003). Business Research Methods. 7th Edition :South Western: Ohio.

Zohar, D. (2002). Modifying supervisory practices to improve subunit safety: A leadership-based invention Model. *Journal of applied Psychology*, 87, 156-163.

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