

PERPUSTAKAAN UMP



0000073641

**EFFECTIVE SAFETY MANAGEMENT ETHICS FOR CONSTRUCTION
INDUSTRY**

ZULIZA AMINA BINTI ZULKIFLI

**A report submitted in partial fulfillment of the
requirements for the award of the degree of
Bachelor of Civil Engineering**

**Faculty of Civil Engineering & Earth Resources
Universiti Malaysia Pahang**

JUNE 2012

ABSTRACT

This thesis presents an effective safety management ethics for construction industry in Malaysia. Concerning construction safety performance, based on records of accident and injury rates are high, construction industry regarded as dangerous field of employment. The main objectives of this study are to justify behaviour of unethical self attitude and factors affecting safety performance in construction industry and to propose an effective safety management ethics for construction industry as illustrated in safety poster to overcome the occupational safety and health problems. Focusing on promote effective safety management ethics by safety poster which aimed to remind awareness of construction parties involved in construction to build their safety attitude and personal safety awareness. This study was conducted by survey questionnaire method using survey monkey internet tools to 44 collected respondent's emails consist of personnel that involved in construction industry of safety background or Civil Engineering background. Comparative literature conducted from the resources of government publication, safety books and guidelines also articles and journals that related to safety management ethics of construction industry. From the respondent's survey, personal factor is the major factor affecting safety performance with the human attitude and behaviour of disobey safety rules and regulations. The comparative literature resulted of proposed five elements of effective safety management ethics to build safety attitude which is site safety environment and culture practice, safety training, procedural and method of works guidelines, machineries and equipments inspection and last but least safety facilities and PPE. Safety attitude evaluation by Based Behaviour System (BBS) and aimed in driving zero harm and zero defect in developing and sustaining safety construction culture in Malaysia.

ABSTRAK

Tesis ini membentangkan etika pengurusan keselamatan yang berkesan untuk industri pembinaan di Malaysia. Mengenai prestasi keselamatan pembinaan, berdasarkan rekod kadar kemalangan dan kecederaan yang tinggi, industri pembinaan dianggap sebagai bidang pekerjaan yang berbahaya. Objektif utama kajian ini adalah untuk menjustifikasikan sikap tingkah laku sendiri yang tidak beretika dan faktor yang mempengaruhi prestasi keselamatan dalam industri pembinaan dan untuk memeringkat dan mencadangkan satu etika pengurusan keselamatan yang efektif untuk industri pembinaan. Memberi tumpuan kepada menggalakkan etika pengurusan keselamatan yang berkesan melalui poster keselamatan yang bertujuan untuk menggalakkan kesedaran pihak yang terlibat dalam pembinaan untuk membina sikap keselamatan mereka dan kesedaran diri. Kajian ini telah dijalankan melalui kaedah soal selidik menggunakan alat kaji selidik internet 'survey monkey' melalui emel kepada 44 orang responden yang terdiri daripada kakitangan yang terlibat dalam industri pembinaan yang mempunyai latar belakang Keselamatan dan Kesihatan Pekerjaan dan Kejuruteraan Awam. Kesusasteraan bandingan yang dijalankan adalah dari sumber penerbitan kerajaan buku-buku keselamatan, dan garis panduan juga artikel dan jurnal yang berkaitan dengan etika pengurusan keselamatan industri pembinaan. Daripada kajian responden, faktor peribadi adalah faktor utama yang menjejaskan prestasi keselamatan dengan sikap dan tingkah laku manusia yang tidak mematuhi peraturan keselamatan dan pengawalseliaan. Kesusasteraan bandingan menunjukkan lima unsure disusun mengikut keutamaan dalam etika pengurusan keselamatan yang berkesan untuk membina sikap keselamatan iaitu amalan keselamatan persekitaran dan budaya di tapak bina, amalan latihan keselamatan, prosedur dan garis panduan kaedah kerja, pemeriksaan jentera dan peralatan dan kemudahan keselamatan dan PPE. Penilaian sikap keselamatan melalui Sistem Berasaskan Kelakuan (BBS) dan memandu sifar kemudahan dan kecacatan dalam membangunkan dan mengekalkan budaya keselamatan pembinaan di Malaysia.

TABLE OF CONTENTS

	Page
SUPERVISOR'S DECLARATION	ii
STUDENT'S DECLARATION	iii
DEDICATION	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	vi
ABSTRAK	vii
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xiii
LIST OF SYMBOLS	xv
LIST OF ABBREVIATIONS	xvi
CHAPTER 1 INTRODUCTION	
1.1 Project Background	1
1.2 Problem Statement	6
1.3 Project Objectives	7
1.4 Research Questions	7
1.5 Expected Outcomes	7
1.6 Scope of Study	7
1.6.1 Empirical Research	8
1.6.2 Documentary Research	8
1.6.3 Suggestions	8
1.7 Significant of Studies	9
CHAPTER 2 LITERATURE REVIEW	
2.1 Introduction	10
2.2 Summary	47

CHAPTER 3 METHODOLOGY

3.1	Introduction	48
3.2	Planning in Study Methodology	48
	3.2.1 Identify the Problems and Project Objectives	49
	3.2.2 Data Collection	49
	3.2.3 Result and Data Analysis	51
	3.2.4 Conclusion and Recommendation	52
3.5	Study Flowchart	53

CHAPTER 4 RESULTS AND ANALYSIS

4.1	Introduction	54
4.2	Survey Questionnaire Analysis	54
	4.2.1 Survey Monkey Analysis	55
	4.2.2 SPSS Analysis	67
	4.2.3 Survey Questionnaire Result	74
4.3	Comparative Literature Analysis	75
	4.3.1 Comparative Literature Data	75
	4.3.2 Comparative Literature Result	89
4.4	Safety Poster	93

CHAPTER 5 CONCLUSION AND RECOMENDATIONS

5.1	Introduction	94
5.2	Conclusion	95
5.3	Recommendations	97

REFERENCES	99
-------------------	-----------

APPENDICES

A1	List of Questions Analyzed in SPSS	103
A2	1) Data of Respondent's Questionnaire Answers	104
A2	2) Data of Respondent's Questionnaire Answers	105
A2	3) Data of Respondent's Questionnaire Answers	106
A2	4) Data of Respondent's Questionnaire Answers	107
B	Survey Monkey Result	108
C	Questionnaire Form	113

LIST OF TABLES

Table No.	Title	Page
2.1	Analysis of Factors Affecting Safety Management in Constructions Project	13
2.2	Exploring the perceived influence of safety management practices on project performance in the construction industry	15
2.3	Factors Influencing the Implementation of Safety Management System for Construction Sites	17
2.4	Developing a model to measure the effectiveness of Safety Management Systems	18
2.5	“Safety is everyone's job:” The key to safety on a large construction site	19
2.6	Occupational risk assessment in construction industry- Overview and Reflection.	21
2.7	Construction Job Safety Analysis	23
2.8	Problems and Solutions on the Implementation of HSE Management System	25
2.9	The role of safe work method statements in the Australian construction industry	27
2.10	Developing a Risk Assessment model for construction safety	28
2.11	Safety in construction- a comprehensive description of the characteristics of high safety standards in construction work	30
2.12	Use of association rules to explore cause–effect relationships in occupational accidents in the Taiwan construction industry	32
2.13	Why operatives engage in unsafe work behavior: Investigating factors on construction sites	34
2.14	Safety capital: The management of organizational knowledge on Occupational health and safety.	36
2.15	Integrating Safety & Health Performance into Construction CPM	39
2.16	A comparative study on adopting human resource practices for safety management on construction projects in the United States	41

	and Singapore.	
2.17	Safety hazards and motivation for safe work in the construction Industry	43
2.18	Towards occupational health and safety systems in the construction industry of China	45
4.1	The Frequency Analysis of Respondent's Opinion of Human Attitude is the Main Factor of Safety Cases and Accidents.	61
4.2	Descriptive Statistics	71
4.3	KMO and Bartlett's Test	72
4.4	Descriptive Statistics	73
4.5	KMO and Bartlett's Test	73
4.6	Comparative Literature of Journal Articles	77
4.7	Comparative Literature of Government Publication	80
4.8	Comparative Literature of Books	85

LIST OF FIGURES

Figure No.	Title	Page
1.1	Occupational Accidents Category of Death by Sectors 2010	2
1.2	Occupational Accidents Category of Death by Sectors 2009	2
1.3	Statistic of Occupational Accidents Types Reported in 2011	3
3.1	Flow Chart of Study Methodology	53
4.1	The Analysis of Respondent's Gender	56
4.2	The Analysis of Respondent's Designation	56
4.3	The Analysis of Respondent's Company Field	56
4.4	The Analysis of Respondent's Years of Experience.	57
4.5	The Analysis of Respondent's Awareness of Safety and Health Policy	58
4.6	The Analysis of Respondent's Opinion on Level of Safety and Health Applied in Construction Industry.	58
4.7	The Analysis of Respondent's Experience in Safety Cases or Accidents	59
4.8	The Type of Cases or Site Accidents Experienced by Respondents.	59
4.9	The Analysis of Respondent's Opinion of Human Attitude is the Main Factor of Safety Cases and Accidents	61
4.10	The Analysis of Respondent's Rate of Human Bad Attitude Types that Contributes to Safety Cases or Issues	62
4.11	The Result of Respondent's Rate of Human Bad Attitude Types that Contributes to Safety Cases or Issues	62
4.12	The Analysis of Respondent's Rate of Factors Affecting Safety Performance in Construction Industry.	63
4.13	The Result of Respondent's Rate of Factors Affecting Safety Performance in Construction Industry	64
4.14	The Analysis of Respondent's Rate of the Importance of Safety and Health in Construction Industry	64

4.15	The Result of Respondent's Rate of the Importance of Safety and Health in Construction Industry	65
4.16	The Analysis of Respondent's Rate of the Effective Safety Management Ethics for Construction Industry	66
4.17	The Result of Respondent's Rate of the Effective Safety Management Ethics for Construction Industry	66
4.18	Total Variance Explained	72
4.19	Total Variance Explained	74
4.20	ILO Safety Culture Model	89
4.21	HSE: System Model of Safety Culture	90
4.22	Safety Poster of Effective Safety Management Ethics	93
5.1	Safety Begins With You	96
5.2	Behaviour Based Safety (BBS)	98
5.3	Marrying Safety Management Systems with Behaviour Based Systems For Safety Implementation in Construction Industry	98

LIST OF SYMBOLS

%	Percentage
N	No. of Cases

LIST OF ABBREVIATIONS

CIDB	Construction Industry Development Board
OSHA	Occupational Safety and Health Act 1994
DOSH	Department of Occupational Safety and Health
OSH	Occupational Safety and Health
JKR	Public Works Department of Malaysia
UMP	Universiti Malaysia Pahang
FOS	Factor of Safety
SHE	Safety Health Environment
SPSS	Statistical Package Social Sciences
PPE	Personal Protective Equipment
SOCISO	Social Security Organization
PERKESO	Pertubuhan Keselamatan Sosial
ILO	International Labour Organization
CSHO	Construction Safety and Health Officer
SSS	Safety Site Supervisor
CRG-OSH Practitioner	Central Region Group of OSH Practitioners
NGO	Non Government Organization
BBS	Based Behaviour System

CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

Construction industry is one of the largest industries in Malaysia which has intensified over recent years with the rapid development of our modern country with architectural arts and safe structural design, new and fresh environment, latest technology application and others. The Construction Industry Development Board (CIDB) Malaysia Act 1994 (Act 520) stated that “construction works” means the construction, extension, installation, repair, maintenance, renewal, removal, renovation, alteration, dismantling, or demolition of :

- (a) any building, erection, edifice, structure, wall, fence or chimney, whether constructed wholly or partly above or below ground level;
 - (b) any road, harbour works, railway, cableway, canal or aerodrome;
 - (c) any drainage, irrigation or river control works;
 - (d) any electrical, mechanical, water, gas, petrochemical or telecommunication works; or
 - (e) any bridge, viaduct, dam, reservoir, earthworks, pipeline, sewer, aqueduct, culvert, drive, shaft, tunnel or reclamation works, and
- includes any works which form an integral part of, or are preparatory to or temporary for the works described including site clearance, soil investigation and improvement, earth-moving, excavation, laying of foundation, site restoration and landscaping.

(OSHA 1994)

However, construction can be a dangerous work as the workers will be exposed to the danger of being the first on jobsite, facing potential health risks and exposures throughout the building process.

Historically, construction industry has the greatest number of deaths and accidents as compared to other occupations also regarded as a dangerous field of employment. It has been one of the most dangerous and highest risk industries for fatal and non-fatal injuries, and worldwide remains one of the most dangerous occupations. In that case, occupational safety and health is the most important requirements in construction industry that has to be well manageable and monitored in order to reduce the accident cases in site.

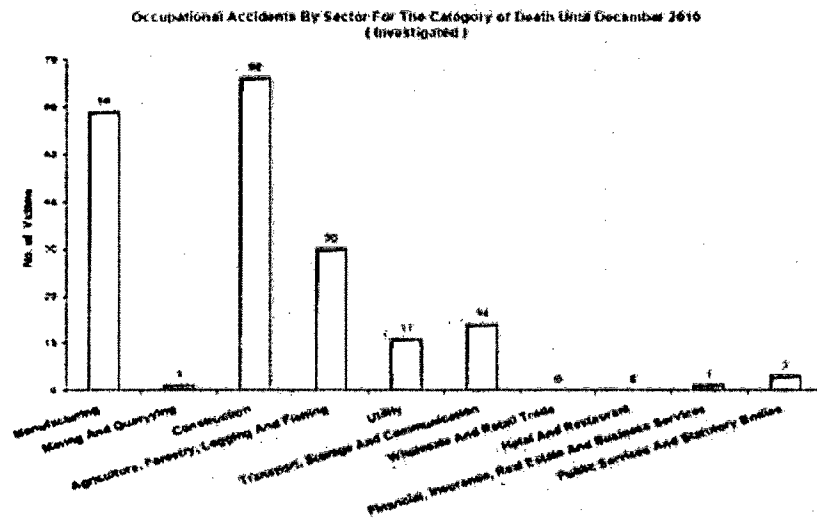


Figure 1.1: Occupational Accidents Category of Death by Sectors 2010

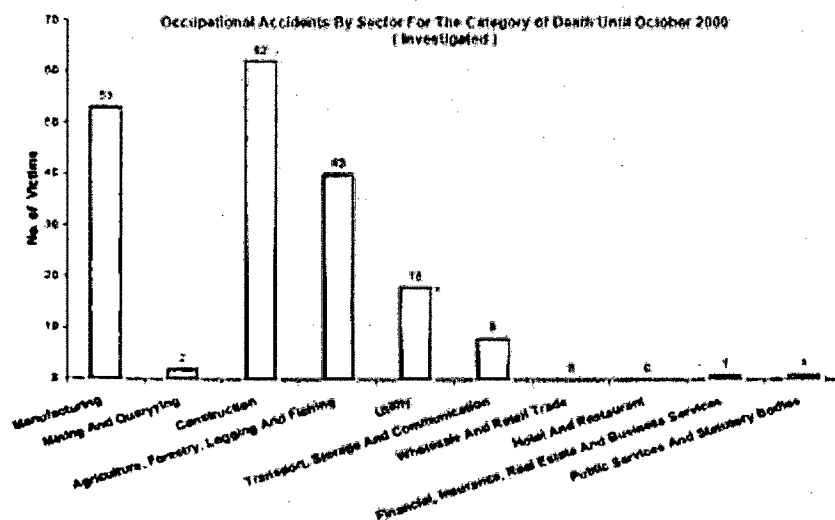


Figure 1.2: Occupational Accidents Category of Death by Sectors 2009

According to the statistical data by Department of Occupational Safety & Health (DOSH), the occupational accidents of construction sector for death category in year 2011 (until August), 2010 and 2009 was recorded as the number of victims are 24, 66 and 62 respectively. The data shows the positive decreases of death in construction industries due to the initiative and efforts in reduce the fatality, injuries and death cases becomes zero accident afterwards because it will become critical following an increase in number of project nationwide. Also referred to Figure 1.3 below of the statistic of occupational accidents categorized by accidents types reported in 2011. From the statistic, highest percentage of 33% died crushed followed by 31% of died falling and the other types of accidents such as death due to landslide, electrocution, exploding and others.

Statistic of Occupational Accident Types Reported in 2011

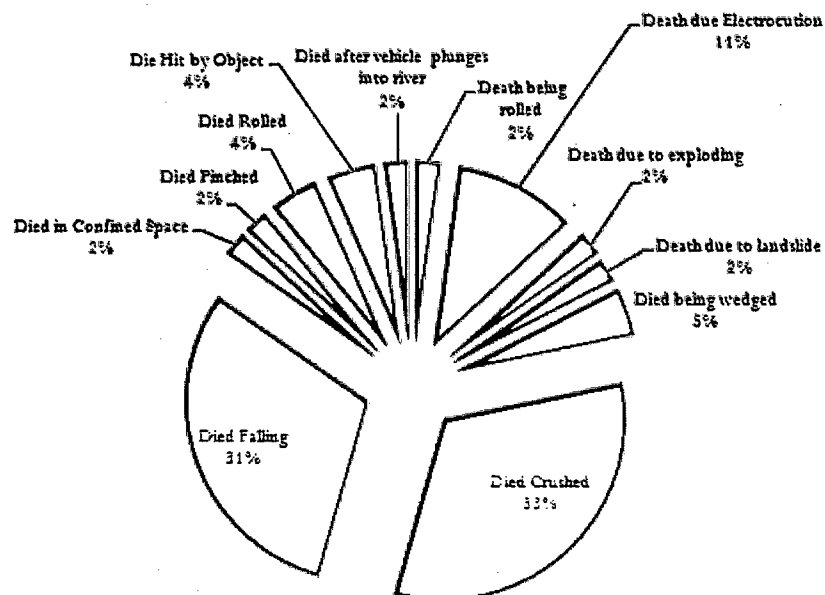


Figure 1.3: Statistic of Occupational Accidents Types Reported in 2011

Besides that, few cases of construction industry happen in Malaysia resources from newspaper articles of The Star on 7th Jun 2009 stated that the Jaya Supermarket demolition are done without approval by DOSH which problems occurs when on 28 May the five storey portion of supermarket building was collapsed right to the

basement during demolition works and seven workers died in the accident. Another cases in Sg.Buloh, Selangor, part of a building under construction collapsed injuring three workers who were trapped beneath the rubble. Next, death accident happen to a site supervisor when he fallen from the level 5 of the building under construction while inspect the works due to the unstable platform, no safety belt, no safety net and railings. Worst case in construction industry happen when the death accident happens to public people in Pulau Pinang 4 October 2011 where the unstable crane base causes the crane collapsed and crashed the shop houses near the site construction.

Regarding this situation it shows how important safety and health in construction industry to be well manageable by all parties that involved in construction site the owners, consultants, contractors, sub-contractors and workers otherwise may face some very serious problems such as hazardous condition which can cause death or serious injuries, problem in bad safety records of perform work in unsafe manner and legal actions and costs.

So to overcome this, one the latest initiative by DOSH published in News Straits Times on 12 August 2011 stated that all construction sites nationwide must employ a site safety supervisor beginning January next year. The roles of site safety supervisor are to inspect and rectify dangerous practices and to ensure the provisions on statutory requirements with respect to safety and health matters.

This study or project of 'Effective Safety Management Ethics for Construction Industry' will investigate and identify the unethical factors or causes and problems of the death and injuries cases regarding occupational safety and health that affecting safety performance of construction industry in Malaysia. The main causes and problems regarding the unethical attitude that will lead to lack of construction management, the construction works itself exposes to high risks and hazards, poor awareness and simply take for granted about the safety and health issue also the limited cost spending for safety and health attire in site and others to be explore and expose.

Regarding the factors identified, an effective safety management ethics solution and initiatives proposed to overcome these problems and reduce the fatalities, injuries and death in construction industry. An effective safety management will control all the unethical factors of occupational safety and health with provide full facilities and attire of safety and health requirement, effective training provided by OSH programme of safety management and the legal compliance required to understand their own responsibilities and the necessary actions to be taken towards upgrading occupational safety and health standard and regulation at their respective workplaces and others solutions.

In conclusion, occupational safety and health in construction industry is a compulsory element to be aware of and manage properly and effectively because it will gives the negative impacts to construction industry in reduce the skilled worker, bad reputation of construction company, and economics impact in poor investment which is important in high development to our country that provide the comfortable living, facilities and technologies.

1.2 PROBLEM STATEMENT

Overview of occupational accidents:

- i. Each day, an average of three people die as a result of work-related accidents or diseases, totaling more than 1200 work-related deaths a year.
- ii. Two of every 3 fatalities are related to commuting accidents
- iii. There is one accident in every ten minutes for the year 2011
- iv. One death in every eight hours.

Construction industry faces poor safety performance and safety issues of hazardous, injuries and death due to the major cause of unethical attitude and behaviour factors that will leads to other problems occur in occupational safety and health. Factors of poor safety management, limited safety training, disobey of safety rules, hazardous and risky work environment, lack of safety capital to provide safety facilities and equipment also improper and unplanned method of works that will affecting the safety performance in construction industry.

There are a lot of emphases on OSH for workplace as reported accidents in 2011 increase 12.5% than 2010 as quoted from YB Senator Datuk Maznah Mazlan in closing speech of 2nd Seminar in developing & sustaining safety culture in Malaysia (UMP). However there are gap in construction industry itself where as lot of issue on ineffective & improper safety management ethics in construction industry. This safety management ethics suppose to be implementing strictly in control and monitor all the occupational safety and health rules and regulation at site, safety awareness, training and promote safe construction in all aspects of site safety to avoid safety cases happen.

1.3 PROJECT OBJECTIVES

- i. To justify behaviour of unethical self attitude and factors affecting safety performance in construction industry
- ii. To propose an effective safety management ethics for construction industry.

1.4 RESEARCH QUESTIONS

- i. Does the personal factors affecting safety performance in construction industry due to human attitude and behaviour of workers
- ii. Does the safety management ethics effective to overcome the attitude and personal factors to enhance the occupational safety and health performance in construction industry

1.5 EXPECTED OUTCOMES

- i. A poster of an Effective Safety Management Ethics for Construction Industry

1.6 SCOPE OF STUDY

This study of 'Effective Safety Management Ethics for Construction Industry' will be conducted by 3 types of research which is the empirical research of quantitative and qualitative to study on the unethical factors and safety issue. Then, the documentary research from the primary and secondary sources to analyze and propose the effective safety management ethics and the last one the field research to gain evidence on safety issues.

1.6.1 Empirical Research

The empirical research will be conducted to the experts' involvement of all parties of occupational safety and health in construction industry in Malaysia such as students of civil engineering as trainee, the contractors, the safety officer and supervisor, the consultants, workers also survey monkey community. The empirical research of quantitative done by survey questionnaire. The survey was conducted using survey monkey the online survey software and questionnaire tools by distributes the questionnaire to the collected emails of 100 respondents. The survey data collection and analysis are analyzed by the statistical package SPSS software techniques of Cronbach Alpha for reliability test and Factor Analysis in determine the results expressed in tables and figures.

1.6.2 Documentary Research

The documentary research of primary and secondary sources is the data collection and analyze in comparison of the articles and journals related to the safety management ethics which is the most effective for construction industry also comparative literature of references of books, handbooks, guidelines sources from the UMP Library, International Conference IEEE, DOSH website, and I-Portal. The data will be analyze and compare and records in Microsoft Excel based on five elements proposed as the effective safety management ethics for construction industry.

1.6.1 Suggestions

In this stage, a safety poster of effective safety management ethics for construction will be proposed to built safety attitude and minimize the number of accidents in construction industry.

1.7 SIGNIFICANT OF STUDIES

- i. This study can reduce creates awareness to site construction parties the importance of to build safety attitude
- ii. The results of this study can be used by the government such as the Department of Occupational Safety and Health (DOSH), and Department of Public Works (JKR) to promote safety in construction site.
- iii. Also can be used by the safety officer, safety site supervisor also engineer to practice safety culture and environment to achieved zero harm in construction site

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

According to statistic from Department of Occupational Safety and Health (DOSH) Malaysia, under the Ministry of Human Resource states that in 2007, 2009 and 2010 the construction sector records the highest occupational accidents for the category of death which are 95, 62, and 66 respectively than the manufacturing sector. It shows that construction industry is the most risk of fatality, injuries and death. The most frequent causes are falls, machineries failures and electrocution, collapse, being struck by an object, toxic gases, drowning and fire.

Department of Occupational Safety and Health (DOSH) are responsible for ensuring the safety, health and welfare of workers in both public and private sector as well as protecting other people from the safety and health hazards. As a government agency, the department is responsible for the administration and enforcement of legislations related to occupational safety and health such as the Factory and Machinery Act 1969 and the Occupational Safety and Health Act 1994 with a vision of becoming an organization which leads the nation in creating a safe and healthy work culture that contributes towards enhancing the quality of working life.

Besides DOSH, this study of 'Effective Safety Management Ethics for Construction Industry' aimed to promote the safety awareness for the workers in construction site for their own good. The literature review will be cover the safety factors, causes and issue related to occupational safety and health that affecting the safety performance and the best safety management ethics to be propose and implement for construction industry also the measure of the effectiveness of the

safety management proposed to construction industry. Among the articles and journals that have been reviewed are:

- Analysis of Factors Affecting Safety Management in Constructions Project
- Exploring the perceived influence of safety management practices on project performance in the construction industry.
- Factors Influencing The Implementation of Safety Management System for Construction Sites
- Developing a model to measure the effectiveness of Safety Management systems of construction sites.
- “Safety is everyone's job:” The key to safety on a large construction site.
- Occupational risk assessment in construction industry- Overview and reflection
- Developing a model to measure the effectiveness of Safety Management Systems of construction sites.
- Construction Job Safety Analysis .
- Developing a Risk Assessment Model for construction safety.
- Problems and Solutions on the Implementation of HSE Management System of Construction Enterprise.
- The role of safe work method statements in the Australian construction industry.
- Developing a Risk Assessment model for construction safety
- Safety in construction- a comprehensive description of the characteristics of high safety standards in construction work, from the combined perspective of supervisors and experienced workers
- Use of association rules to explore cause–effect relationships in occupational accidents in the Taiwan construction industry
- Why operatives engage in unsafe work behaviour: Investigating factors on construction sites
- Safety capital: the management of organizational knowledge on Occupational health and safety.
- Integrating Safety & Health Performance into Construction CPM

- A comparative study on adopting human resource practices for safety management on construction projects in the United States and Singapore. Safety hazards and motivation for safe work in the construction Industry
- Towards occupational health and safety systems in the construction industry of China
- Safety hazards and motivation for safe work in the construction Industry