

**STUDY OF SAFETY MANAGEMENT & PROFESSIONAL TO ACHIVE
ZERO ACCIDENT IN CONSTRUCTION SITE**

MOHD ILLAHI BIN MOHD ASHRI

AA07193

A thesis submitted in fulfillment of the requirements for the award of the degree of
Bachelor of Civil Engineering

Faculty of Civil Engineering & Earth Resources
University Malaysia Pahang

NOVEMBER 2010

ABSTRACT

Safety management & Safety Professional cannot be separate due to ensure all activity on site is doing safely in term of environmental, hazard and accident on site. The most serious factor accident on site is identifying by the 16 type of factor. The purpose of study is to identify concept of construction safety management and the roles and responsibilities of the safety professionals to prevent accidents and deaths during construction site. 100 of survey questionnaires that were mailed to local construction company which is located in Kuala Lumpur and Selangor. The purpose of the questionnaire is obtain the factor influencing site safety; the important of safety management, position and disciplines in the safety profession, and safety professionals roles and responsibilities. The analysis can be categorized under two method which is descriptive statistic method and secondly the inferential statistic method or bivariate statical analysis.

ABSTRAK

Pengurusan Keselamatan dan Keselamatan Profesional adalah nama yang tidak boleh terpisah kerana memastikan semua aktiviti di tapak dilakukan secara selamat dari segi persekitaran, bahaya dan kemalangan. Kajian ini juga menunjukkan faktor kemalangan paling serius di tapak dengan mengenalpasti 16 jenis faktor kemalangan. Tujuan kajian adalah untuk mengenalpasti konsep pengurusan pembinaan keselamatan dan peranan serta tanggungjawab para profesional keselamatan untuk mengelakkan kemalangan dan kematian selama pembinaan. 100 set soalan survey telah dihantar kepada syarikat pembinaan tempatan di sekitar Kuala Lumpur dan Selangor. Tujuan soal selidik ini adalah untuk mengetahui faktor yang mempengaruhi keselamatan di tapak projek, kepentingan pengurusan keselamatan, jawatan dan disiplin dalam kerjaya keselamatan, peranan dan tanggung jawab para profesional keselamatan. Analisis ini boleh dikategorikan di bawah dua kaedah yang merupakan kaedah statistik deskriptif dan kedua-dua kaedah statistik inferensial atau analisis statistik bivariat.

LIST OF CONTENT

TITLE	i
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGMENT	iv
ABSTRACT	v
ABSTRAK	vi
LIST OF CONTENT	vii
LIST OF TABLE	x
LIST OF FIGURE	xi
CHAPTER 1 : INTRODUCTION	1
1.1 Problem Statement	2
1.2 Objective	4
1.3 Scope Of Study	4
1.4 Planning Of Text	5
1.5 Research Methodology	5
CHAPTER 2 : CONSTRUCTION SAFETY MANAGEMENT	8
2.1 Definition Of Safety Management	8
2.2 The Nature Of The Construction Industry	13
2.2.1 The Concept Of The Risk, Accident, Hazard, Danger And Damage	14
2.3 Main Requirements Of The Management Of Health And Safety At Work Regulation 1992	16
2.4 Management Attitudes Toward Safety	19
2.5 Safety Management System	20
2.5.1 Occupational Safety And Health Administration (OSHA) Proposed Safety Management System	21

2.5.2	Safety Management Systems Elements In Construction	22
2.5.3	Decision Criteria In Adopting Safety Management Systems	24
CHAPTER 3: THE ROLE OF SAFETY PROFESIONALS		27
3.1	What Is Safety Professionals?	27
3.2	Code Of Ethics And Professionals Conduct	29
3.3	Basic Goal Of Safety Professionals	31
3.4	Functions Of The Safety Professional Position	33
3.5	Responsibility For Safety	39
3.5.1	Integrating Safety Into Operations	39
3.5.2	Expertise And Skills In Human Relations	40
3.6	Buttressing Line Commitment	41
3.6.1	Working With Top Management	41
3.6.2	Working With Job-Site Managers And Foremen	42
CHAPTER 4: RESEARCH DESIGN AND METHODOLOGY		44
4.1	Introduction	44
4.2	Design Of Questionnaire	44
4.2.1	Questionnaire Structure	45
4.2.2	Respondents	47
4.3	Analytical Methodology	48
4.3.1	Introduction	48
4.3.2	Methods Of Analysis	50

CHAPTER 5: ANALYSIS OF THE IMPORTANT OF	
SAFETY MANAGEMENT AND ROLES AND	
RESPONSIBILITIES OF SAFETY PROFESSIONAL	52
5.1 Survey Result	52
5.2 Part A: Safety Management	52
5.2.1 Factor Influencing Site Safety	52
5.2.2 Most Serious Factors	54
5.2.3 Purpose Of Safety Management	56
5.2.4 Implementation Of Safety Management	58
5.2.5 Performance Increased	59
5.3 Part B: Safety Professional	61
5.3.1 Position/Titles Of Safety Professional	61
5.3.2 Disciplines	62
5.3.3 Major Role	63
5.3.4 Roles And Responsibilities Frequently Performed	65
5.3.5 Most Effective Roles And Responsibilities	66
CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS	68
6.1 Conclusions	68
6.2 Objective Achievement	71
6.3 Recommendation	73
REFERENCES	74
APPENDIX	76
DISCLAIMER	82

LIST OF TABLE

TABLE 2.1	Accident Causes Traced Back to Management Responsibilities	19
TABLE 4.1	Types of Question	47
TABLE 4.2	Data Descriptive Statistics	51
TABLE 5.1	Factors Influencing Site Safety	53
TABLE 5.2	the Serious Factors Causing Accidents on Construction Sites	55
TABLE 5.3	Number of Selection Average Percentage Increased	59
TABLE 5.4	References for the Bar Chart	64

LIST OF FIGURE

FIGURE 1.1	Research Process Diagram.	7
FIGURE 2.1	System Safety Functions.	20
FIGURE 2.2	Overall Structure of the Safety Management System Evaluation.	26
FIGURE 4.1	Research objectives are translated into specific questions.	45
FIGURE 4.2	Questionnaire Flow Chart.	46
FIGURE 4.3	Analytical Methodology.	50
FIGURE 5.1	Bar Chart Shows the Number of Selection For The Purpose of Safety Management.	57
FIGURE 5.2	Pie Chart Shows the Percentage Implementation of Safety Management.	58
FIGURE 5.3	Pie Chart Shows the Percentage of Selection For Average Percentage Increased Each Year.	59
FIGURE 5.4	Bar Chart Shows the Number of Selection Position/titles For Safety Professional.	61
FIGURE 5.5	Bar Chart Shows the Number of Selection Important Disciplines for Safety Professional.	62
FIGURE 5.6	Bar Chart Shows the Number of Selection For Major Roles of Safety Professional.	63
FIGURE 5.7	Bar Chart Shows the Number of Selection for Roles and Responsibilities of Safety Professional Frequently Performed.	65
FIGURE 5.8	Pie Chart Shows the Percentage of Most Effective Roles and Responsibilities.	67

CHAPTER 1

INTRODUCTION

1.0 Background

The construction industry is one of the important industries that contribute to the increasing of the GDP (Gross Domestic Product) in our country economic. Over the years, more building projects have been done to support the development and increasing of human population.

However, in the construction industry, accidents that are not unpredictable may take place at any time during the construction period that may put construction workers lives at risk. Building construction has the greatest frequency of occupational injuries in comparison with other sectors.

Poor safety management and the failure to control risk during the construction activities may lead to accidents or injuries among the construction workers. For that reason, the effective safety management is essential to prevent accidents and deaths, and besides that safety also contributes to profitability because it save the high direct cost such as medical costs and indirect costs such as liability claims from injured workers.

Therefore, to move the construction industry closer to its goal of zero accidents it is important to improve the efficiency of safety management in the construction.

1.1 Problem Statement

The building industry is characterized by continual changes, bombardment of varying technologies, poor working conditions and the involvement and the need for coordination of different interdependent trades and operations. Due to the hazardous nature of work, safety is a serious problem in the industry. In recent years, safety records in the construction industry are so worse that safety has become a matter of grave concern to the government.

The major causes of accidents have been identified, and can be directly attributed to unsafe design and site practices. 'Accidents arise from different causes that can generally be classified as physical incidents posing hazardous situations and behavioral incidents caused by unsafe acts' (Kartam 1997).

According to a **Journal of construction Engineering and Management, September/ October 2002**, the construction process itself is also seen as being poorly planned in terms of both design and construction, with major inadequacies relating to the erection, maintenance, and demolitions of buildings structures. An underlying belief is that the majority of accidents is not caused by careless workers but by failure in control, which ultimately is the responsibility of management.

Based on an article **CIDB News, Jun 1998**, according to statistics from the Department of Occupational Safety and Health (DOSH), the casualties at construction site in the Klang Valley alone has increased from 31 in 1994 to 58 in 1995 and 64 in 1996. In the first six month at 1997, there were 48 deaths resulting from accidents and this takes up 75% of the total deaths from accidents in 1996. A campaign on Safety and Quality at Work Sites has been launched by CIDB in February 1998. The campaign is aimed at creating not only a safe working environment at construction sites, but also to emphasize on construction quality and proper site safety managements techniques.

From the **Journal of Construction Engineering and Management, May/June 2002**, The behavior of individual employees is the primary causes of an accident but this assumptions conflicts with the philosophy of some safety professional that all accidents are preventable and that all accidents are a result of management failure because five listed from eight proposed root causes are associated with an unsafe conditions that implies a deficient management of safety, the other three listed are associated with unsafe act by the injured party.

According to a **Journal of Construction Management and Economics (1999)** it stated that physical loading, poor order, untidiness and dust at sites, cluttered passages and work spaces are the main problems of construction. The risky nature of the tasks on sites need proper safety management and job training on sites.

In addition, an article in the **Safety Management Newsletter (December 2002)** entitled "When Employees Raise Health and Safety Concerns" elucidate that safety professionals needs to be taken seriously if there are employees who raise health and safety concerns about their working conditions.

From the statement mentioned earlier shows that the proper safety management can create safer working conditions and prevent any accident on the construction site. The safety professionals play the major roles to ensure the safety management successfully practices in order to achieve zero accidents in construction site.

Safety professional affect the job-site management by recommending methods for monitoring safety performance because their excellent safety records influence by top management involvement and good safety professional support.

Thus, my main objective is to show how the jobs of safety professionals ensure the safety management in construction sites successful to achieve safer working conditions and prevent any accident during construction.

1.2 Objectives

The objectives of this dissertation are:

- i) To identify the concept and importance of construction safety management
- ii) To identify the roles and responsibilities of the safety professionals to prevent accidents and deaths during construction

1.3 Scope Of Study

The scope of my dissertation covers the safety management in the buildings construction in Kuala Lumpur and Selangor state.

1.4 Planning Of Text

This dissertation is divided into six (6) chapters, specially cover the following:

- Chapter 1 - Introduction
- Chapter 2 - Construction Safety Management
- Chapter 3 - The Roles of Safety Professionals
- Chapter 4 - Research Design and Methodology
- Chapter 5 - Analysis of the Important Of Safety Management and the Roles and Responsibilities of Safety Professional
- Chapter 6 - Conclusions and Recommendations

1.5 Research Methodology

The research using several methodologies to meet this dissertation's objective such as:

i) Literature Review

This study will review the relevant on the subject of safety management and safety professionals including all reading sources such as books, journals, magazines, dissertations and also through the internet.

ii) Interview

Data collection also undertaken by having formal conversations and interviews with a few site safety officers and professionals to gain additional knowledge.

iii) Questionnaire Survey

Further analysis is carried out by questionnaire survey in order to extract detailed research that aimed at finding of the objectives. The questions will center on the areas mentioned in the objectives. A multi-option format will be designed to obtain a high level of response.

iv) Analysis of The Result

This stage will bring together and review all the information collected in the previous stages. This is part of the writing up stage where all the results will be presented in graphical format to allow discussion and interpretation to be made on the research findings.

v) Writing up

This stage involves writing up the content of the dissertation and should cover the chapters proposed in the Planning of Text.

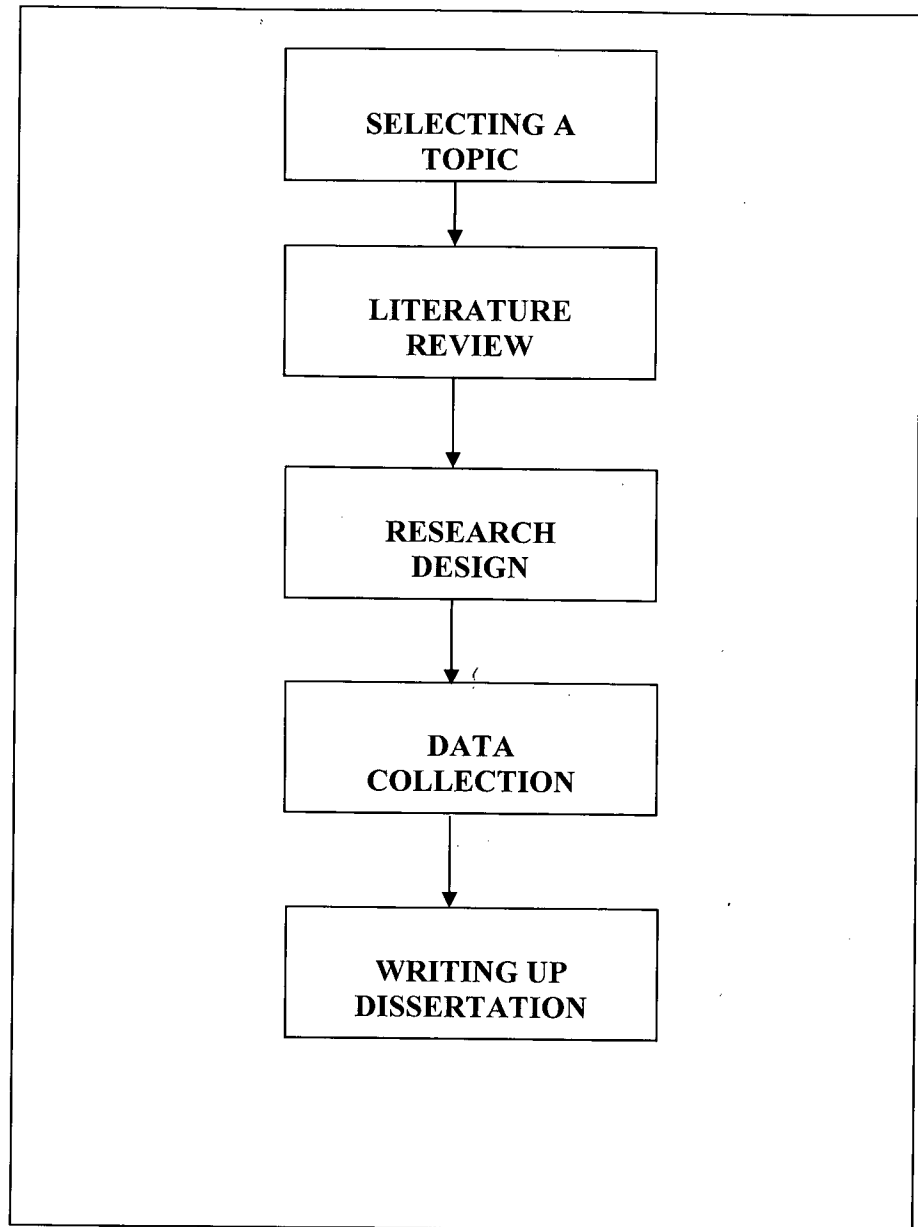


Figure 1.1: Research Process Diagram

CHAPTER 2

CONSTRUCTION SAFETY MANAGEMENT

2.1 Definition of Safety Management

Safety can be defined as the absence of danger from which harm or loss could result (Jacques 1996) or "freedom from hazards". However, it is practically impossible to completely eliminate all hazards. Safety is therefore a matter relative protection from exposure to hazards.

Safety management, like many other management activities, consists of planning, organizing, controlling and communications.

Planning

Planning is essential to the ongoing success of any project and the components of the project, including safety. A well-planned operation involves a series of deliberate steps. First, the safety practitioner must forecast the needs of safety department for the coming year. This involves reviewing the records of successes and failures as well as all the resources used in the past. This forecasting of coming need or predicting when will occur is a result of looking at the past and studying the future

Once forecasts are made, the practitioner must then anticipate the resources needed to meet those demands and make requests accordingly. A proposed safety standard that will be coming into effect may require unusual demands as will the planning. The practitioner does not wait for incidents to occur, but rather anticipates and plans to deal with problems before hands.

Established plans often become standards by which the practitioner can judge the performance of the safety program. They should involve from the mission and the objectives of the organization. Once safety objectives are written and methods by which those objectives can be accomplished are laid out, then budgets and timetables are formulated.

Astute safety practitioners soon realize that management supports their efforts to the extent that these efforts support those of the organization.

Organizing

Safety usually operates from a purely staff position. The implications of this pervade safety affect the way it operates in the organization. To understand the management of safety, an understanding of line and staff positions is essentials.

i) *Line positions*

Line positions are charged with carrying out the major functions of the organization. First-line supervisors, project managers, and even company presidents are considered line officers within an organizing.

ii) *Staff positions*

Staff positions are charged with supporting or helping the line positions. Staff positions have no real authority over line activity; staff members only assist and advise the line officers. Any authority which staff position are given beyond that of assisting or advising is only a result of a line manager giving that authority.

Safety managers, safety engineer, safety professional, safety technicians, or whatever their titles are nearly always considered staff personnel and nearly always operate from a staff position. Their job is to monitor safety, compare what they find against existing standards, and advise line management as to any corrective actions that need to be taken from a safety standpoint. Their ideal position within the organization is reporting to the chief executive officer, but, typically, the safety practitioner reports to personnel or human resources departments.

Controlling

Controlling occurs through a number of sub functions. It involves looking at what is happening in the organization by monitoring, comparing the results of the observations to establish standards, and then taking appropriate corrective actions. This occurs through inspections, audits, records reviews, interviews with employees and supervisions, and a careful watch on what is happening in the organization.

Controls are needed to establish this perception, and therefore they must be subjective, involving both the observer and the event being measured. Controls must also be focused on results, which suggest that inspections and record-keeping are critical safety management functions. These two factors, measurement and information are indeed what make up controls. To give the safety manager control, we must establish controls which have certain specifications, many of which we can derive from legislated safety standards:

They must be economical, with better controls requiring little effort. For example, computer applications in safety have proved economical tools for record-keeping.

- i) They must be meaningful and related to key activities. For example, safety standards should be incorporated into task designs at an early stage.
- ii) They must be appropriate, i.e. priorities must be correctly established. Past safety programs were severely limited because they focused on accidents which we know to be rare events.
- iii) They must be congruent, i.e. not misleading. One of the problems which we face in safety is false complacency because of inadequate hazard identification.
- iv) They must be timely. In safety, this means we must have controls which are both stable and maintainable over time.

- v) They must be simple and understandable; this means that controls must be "user-friendly".
- vi) They must be operational. Safety controls require analysis which provides feedback or communication to improve management control.

Communications

The ability to communicate effectively is critical to the success of safety practitioners. They must be able to speak in terms that management understands. This requires knowledge of accounting, economics, and modern production and quality theory. Strong human-relations skills and related language ability are important to any successful safety effort. The safety practitioner will be working with top management and front-line workers. He needs to have the personality and ability to relate to both groups effectively.

2.2 The Nature of the Construction Industry

The construction industry is characteristically one in which most of its products are unique with respect to form, size, and purpose (Berger 1998). Whereas they are not unique, work operations, which are similar and repetitive, are often executed in work environments which change from hour to hour due to several factors such as weather conditions, locations, and height. Construction workers are constantly expected, therefore, to familiarize themselves with new situations that may be potentially hazardous.

Construction is often severely affected by natural phenomena such as changing weather and climatic conditions. The working environment that not constant and varies may produces several hazardous situations. The construction industry has often been described as an industry characterized by fragmentation. This description has arisen due to the number of stakeholder and participants in the construction process from project inception through to final project completion. Fragmentation, for instance, result in:

- i. Increased costs
- ii. Low productivity
- iii. Poor communication
- iv. Increased and often unnecessary documentation
- v. Ineffective and inefficient project management
- vi. Unnecessary delays
- vii. Unsatisfactory quality performance
- viii. Poor safety performance

The construction industry has been described as one with poor health and safety culture.

2.2.1 The Concept Of Risk, Accidents, Hazard, Danger And Damage

Risk

Expression of possible loss over a specific period of time, or number of operational cycles. It may be indicated by the probability of an accident times the damage in dollars, lives, or operating units.

Accidents

Accidents are unplanned events that often result in injuries or damage that interrupt the routine operation of an activity. Accidents are always preceded by the unsafe act of employees or hazardous conditions in the workplace.

Hazard

Condition with the potential of causing injury to personnel, damage to equipment or structures, loss of material, or lessening of the ability to perform a prescribed function. When a hazard is present, the possibility exists of these adverse effects occurring.

Danger

Expresses a relative exposure to hazard. A hazard may be little danger because of the precautions taken. A high-voltage transformer bank, such as those in power transmission systems, has an inherent hazard of electrocuting someone as long as it is energized. A high degree of danger exists if the bank is unprotected in the middle of busy inhabited area. The same hazard is present even when the transformers are completely enclosed in a locked underground vault. However, there is almost no danger to personnel. An above ground installation with a high fence and locked gate has a danger level between these two.

Numerous other examples can be cited showing how danger levels differ even though the hazard is the same. A person working on a very high structure is subject to the hazard that he could fall to his death. When he wears an anchored safety harness, the danger is reduced but is still present, since the harness might break.

Damage

Severity of injury or the physical, functional, or monetary loss that could result if control hazard is lost. An unprotected man falling from steel beam 10 feet above a concrete pavement might suffer a sprained ankle or broken leg. He would be killing in a similar 300 feet. The hazard (possibility) and danger (exposure) of falling are the same. The difference is in the severity of damage that would result if a fall occurred

2.3 Main Requirements Of The Management Of Health And Safety At Work Regulations 1992

1. Risk Assessment

All employers and self-employed persons are required to assess the risks to both their own employees and others arising out of their undertakings. Then to identify the measures they need to take to comply with the relevant statutory provisions. Such assessments must be reviewed as necessary, and where there are five or more employees significant findings must be recorded.

2. Health and Safety Arrangements

Every employer must make arrangements for the effective planning, organization, control; monitoring and review of the measures previously established as necessary and record the arrangements if five or more people are employed. This may not be a particularly onerous exercise if the risks are well known and the means of dealing with them are well established.

3. Health and Safety Assistance

Every employer must have access to one or more persons to assist him to carry out the measures identified. The traditional role of the safety officer in contracting organizations may become a wider ranging professional role and may design organizations will need their own specialist in this field.