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JUDUL: **RISK ASSESSMENT PROCESS OF HAZARDS IN
CONSTRUCTION SITES**

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Date : MAY 2006

**RISK ASSESSMENT PROCESS OF HAZARDS IN
CONSTRUCTION SITES**

NORLIANA BINTI SARPIN

**A project report submitted in partial fulfilment of the
requirement for the award of the degree of
Master of Science (Construction Management)**

**Faculty of Civil Engineering
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MAY 2006

“I declare that this project report entitled “Risk Assessment Process of Hazards in Construction Sites” is the results of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree”.

Signature :

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Date : MAY 2006

To my beloved husband, my lovely son, my mother and father,
my families, my lecturers and all my friends.....
Thanks for all the love and encouragement.....

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ABSTRACT

Recently the issue of occupational safety and health have attract the attention of many parties in the construction industry. The number of accident occurrence in construction site have been regard as high if compared to other industries. One of the main cause of accident in many construction sites is hazards, therefore an effective risk assessment process of hazards has the potential to overcome the problem. This study is carried out to determine the process of risk assessment of hazards currently applied in construction sites in Malaysia. The study also aim to proposed a guideline that can be used by the construction personnel in order to improve the implementation of risk assessment of hazards. A framework of the current applied risk assessment process of hazards have been developed from the combination of the result of interview session carried out by the author with ten construction companies. The study found that the major risk assessment process of hazards in construction sites listed were approved by the respondent as 'high application' and 'medium application'. Based on the study analysis, a guideline have been proposed and it is expected by this guideline, construction personnel will be able to implement the risk assessment process of hazards effectively in construction sites in Malaysia.

ABSTRAK

Isu keselamatan dan kesihatan pekerjaan telah menarik perhatian ramai pihak di dalam industri binaan baru-baru ini. Bilangan kejadian kemalangan di tapak bina juga dianggap tinggi berbanding dengan industri lain. Salah satu punca utama kemalangan di tapak bina adalah disebabkan oleh bahaya yang wujud di tapak bina itu sendiri. Oleh itu, satu proses penilaian risiko bahaya mempunyai potensi untuk menangani masalah ini dengan berkesan. Kajian ini telah dijalankan untuk menentukan proses penilaian risiko bahaya yang kini digunakan di tapak bina di Malaysia. Matlamat kajian ini pula adalah untuk mencadangkan satu garis panduan agar boleh digunakan oleh kakitangan pembinaan dalam mempertingkatkan pelaksanaan penilaian risiko bahaya di tapak bina. Satu rangka proses penilaian risiko bahaya yang kini digunakan di tapak bina telah dihasilkan daripada kombinasi keputusan dari sesi temuduga yang dijalankan oleh penulis dengan sepuluh syarikat pembinaan. Kajian ini juga menunjukkan bahawa proses penting di dalam penilaian risiko bahaya telah dipersetujui oleh responden sebagai ‘penggunaan tinggi’ dan ‘penggunaan pertengahan’. Hasil daripada analisis kajian yang dijalankan, satu garis panduan telah dicadangkan dan adalah dijangkakan bahawa garis panduan ini dapat membantu kakitangan pembinaan dalam pelaksanaan proses penilaian risiko bahaya di tapak bina di Malaysia dengan lebih berkesan.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The construction industry in Malaysia is currently being recognised as a major economic force and also generate the country development. The growth of the industry are seriously frayed during economic recession in year 1998 to 1999, however at the end of year 1999, the economic are recover and assist the fast growth of the construction industry. The positive development has stimulate other industry to activate and expanding. Yet, beside the positive effect there is a negative consequence arise from the incremental of activity and the usage of various equipment and machinery which lead to the arising in risk of accident and occupational safety and health if there is no prevention policies done by all the parties involved in order to controlled the risk (Fong,2000).

Risk has been defined in a number of ways. The Health and Safety Executive defined risk as the chance high or low that somebody will be harmed by the hazard (HSE,1998). Hertz and Thomas (1983) stated the definitions of risk which taken from the Random House College Dictionary as exposure to the chance of injury or loss. The Health and Safety Commission (1995) defined risk as the likelihood that

harm will occur (Jannadi et al, 2003). According to Lim (2003), risk is defined as, (1) the probability of unwanted event, (2) combination of hazard, (3) unpredictability, partiality of the actual result differ from expected result, (4) loss uncertainty, or (5) probability of loss. However, risk in this study is defined as the chance or probability high or low of harm actually being done.

Risk will be apparent at all stages of the life cycle of a construction project: at appraisal, sanction, construction and operation (Perry and Hayes,1985). One of the most severe risk in construction industry is in the safety and health aspect. Construction industry are known as one of the most hazardous industry. According to the Social Security Organization (SOCSO) the number of construction accidents in Malaysia for 1995 to 2003 has increased by 5.6 percent from 4,406 cases in 1995 to 4,654 cases in 2003. In addition, the fatality rate has increased by 58.3 percent from 60 cases in 1995 to 95 cases in 2003. The fatality rate from construction accident are among the highest compared to the overall industry. The number of recipient for compensation has increased to 36 percent from 182,763 person in 1995 to 247,790 person in 2003. In 2003 alone SOCSO has paid about RM 754 million, a staggering 161 percent increased from RM 289 million in 1995 as compensation for the all industrial accident. Going by the Accident Iceberg Theory, the hidden or indirect costs of an accident is eight to 33 times more than that of its apparent or direct cost (Fong, 2003). Therefore, just imagine the amount of hidden costs that we are spending yearly to finance these accident and diseases it can run into billion of ringgit. The statistic discussed is to give a clear picture that construction industry is one of the critical sectors that need a huge and fast overhaul from the current site safety practice.

There is a popular belief that the construction site is unsafe and the risks that the workers are subjected to are usual. It is also known as place where accident always happen. The accidents happen may cause physical injuries or health illness in long term. The rate of accidents may be reduced if the hazard which is the main cause of accidents were identified and being taken care. The term hazard in this study is defined as anything that cause harm such as scaffold, excavation, roof work,

working from ladders and many more. There are two major categories of hazard in construction sites namely, (i) The risk of physical injury or physical injury hazard, where the agents are normally associated with the process of works or equipment used and climatic conditions such as excavations, scaffolding, falsework, structural framework, roof work, cranes, plant and machinery, etc. (ii) The risk of ill health or health hazard, where grouped under chemical, physical and biological hazard (Davies and Tomasin, 1996). Hazard that has risk of physical injury can cause direct injury to the worker at site and if severe can cause death. However, hazard that has risk of ill health can only notified after long term of period and shall cause sickness or death after certain period of time (Hinze, Pedersen and Fredley, 1998).

In Malaysia, the increasing degree of awareness in construction safety issue, has influence to move away from traditional approach whereby it is believed that all occupational hazard can be controlled through detailed regulation. On 25th February 1994, Occupational Safety and Health Act 1994 (OSHA) came in force providing protection on safety and health for work activities in all economic sectors. The primary aim of OSHA 1994 is to promote safety and health awareness and to install a safety and health culture among all Malaysian workforce. It is hoped that the Act will ensure that all parties concerned, particularly employers and workers, are more responsible and accountable in their efforts to provide and maintain a safe and healthy workplace. It is stated in Section 15 (1) and (2) Occupational Safety and Health Act 1994, employers have a duty to ensure, as far as practicable, that employees are not exposed to any hazard at the workplace. The government, through Department of Safety and Health (DOSH) has launch a series of program to control the occupational safety and health issue. One of the effort done by DOSH is the enforcement of schedule checking at construction site via sport-check from time to time. During the operation, the contractors who break the regulation will be given a written notice requiring improvement or Prohibition notice to prohibits the use of a process or equipment or the hazardous equipment will be seize. These action are taken to improve the occupational safety and health in construction site in order to reduce the risk of accident in workplace.

The knowledge in safety awareness among the workers at construction site are very important. The knowledge can be gain through training. According to Hinze, (1997) training should be at the core of every safety program. Regarding with it, in Malaysia, all the construction workers are required to attend an Occupational Safety and Health Induction Training Course which organized by National Institute of Occupational Safety and Health (NIOSH). The effort to organized the induction training is consistent with the regulation in Section 15 (2) (c) OSHA 1994. The purpose of induction training are to give the basic knowledge about occupational safety and health to the workers, to give self awareness about occupational safety and health in workplace, to explain the workers about rule and regulation in occupational safety and health of construction sector and also to change the worker's way of thinking to be more aware with occupational safety and health in the workplace. The induction training and supervision will foster the workers to do the job in the safer way so that they can become more effective and efficient. The training are not just for the benefit of the workers, but also to the employer in terms of reducing the risk of accident occurrence and the cost related to it. The cost of accident are categorized as either direct or indirect cost (Hinze, 1997).

Malaysia are now moving towards globalisation era. All the business are deal with no border and of course more competitive. This situation are also face by construction industry. Only the established and secured companies are able to take place in the competitive emulation and have ability to maintain in the market. The company ability are not just depends on making profit only, but it is more important to prevent from interminable loss. Loss in the perspective of occupational safety and health is no accident that cause injury to workers and damage to goods. When an accident happen at construction site, it cause a lot of loss and negative impact to the construction company. The most obvious loss is delay in project completion due to below normal of productivity. Accident also can cause the company to pay more due to overtime work, increase number of worker to expedite the progress of work, replace the injured worker with replacement worker which will consume administrative time on the project and it will required additional orientation and training for the replacement worker and all of the expenditure will end up with incremental of cost. It also effect in the increasing of insurance premium and many

more. All of this situation cause loss to the company and directly can decrease company competence. Therefore it is clearly noticeable, by controlling the occupational safety and health issue the company will be able to compete in the nowadays competitive world of business. The Ministry of Human Resource targeted in the next 5 years time the accident rate in Malaysia will reduce to 3:1000 in order to make the industrial sector more competitive and able to compete on the international arena and further on to gain reliance from the foreign investor.

1.2 Problem Statement

According to industrial accident statistic from SOCSO, the rate of fatal accident in Malaysia is 7.7:1000 in year 2004. The rate are still not satisfying and can be categorized as still high if compared to rate of accident in developed country such as Sweden, Japan, Korea and European Country which is 3:1000. Even though there have been a marked reduction in the number of industrial accident and the rate of accident per 1000 workers are declining from 15.4 in 1995 to 7.7 in 2004 since the introduction of OSHA 1994, but still there has not been a credible improvement over the last ten years. Although regulation in occupational safety and health in Malaysia are quite comprehensive, the level of awareness and practicability of such regulation within the society of construction industry generally lower than what supposed to come in force.

Due to the scenario, construction industry is still being considered as a high risk industry because there is a high risk of accident occurrence. Hazard is known as a main cause of accident in construction site. In order to formulating a safe and conducive working condition and also minimised the number of construction accidents, a risk assessment on hazards should be perform. According to Loughborough University of Technology in the UK, risk assessment is defined as a proactive process of assessing the risks associated with specified activities and

processes, which is an essential part of managing health, safety and environment issue within all types of organisations. Generally, risk assessment process is include of five step namely analysing work activities, hazard identification, estimating risks, evaluating risk and planning control. It is important to regularly review the steps, especially if there are changes in the work environment, introduction of new technology or changes of standard. The step above could be utilised in formulating a more conducive working conditions and environments at construction sites and hopefully the number of construction accidents could be minimised.

1.3 Aim and Objective of The Study

The aim of this study is to assess a Guidelines of Risk Assessment Process of Hazards in Construction Sites in Malaysia. In order to achieve it, the following objectives have been identified :

- a) To determine the process of the risk assessment of hazard currently applied in construction sites
- b) To determine the level of application of risk assessment process of hazards in construction sites.
- c) To propose a Guidelines of Risk Assessment Process of Hazards in Construction Sites.

1.4 Scope of Research

This research will be carried out with a careful study based on the interview and questionnaire survey. The scope of research will focus on a construction project in Johor Bahru. The interview sessions were carried out with the key personnel of a construction company. The questionnaires were distributed to professionals who worked with the client, contractor and consultant organisations and have direct involvement in construction projects.

1.5 Research Methodology

The methodology of research will help to realize the essential stages of methodology performed or steps of process carried in order to achieve the objectives of this research. Figure 1.1 shows the research methodology flow chart that has been used in this research.

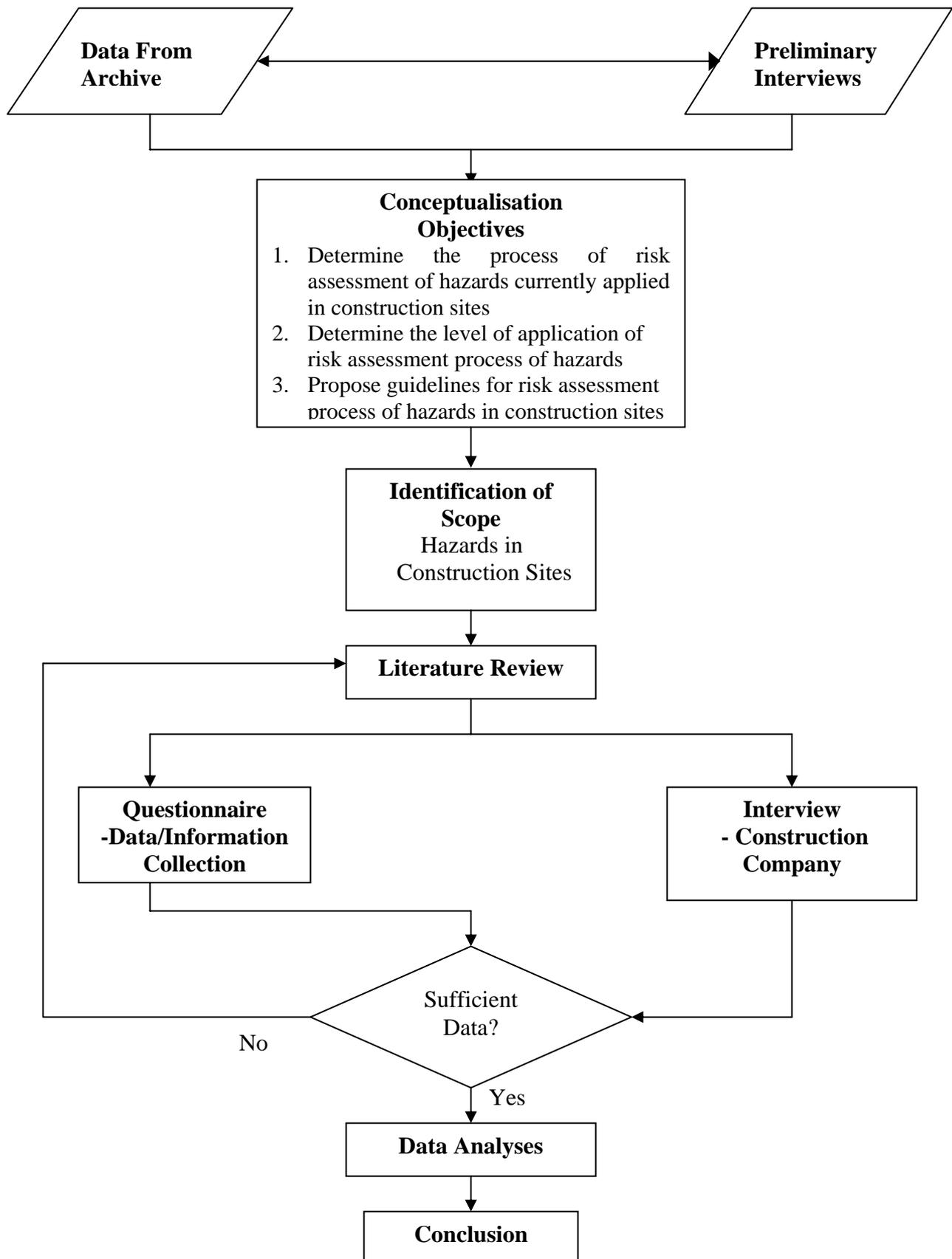


Figure 1.1 Research Methodology Flow Chart