

MANAGING PHYSICAL HAZARDS ON CONSTRUCTION SITE

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ABSTRACT

Physical hazards on construction site are defined as those types of hazards that can harm a worker from external sources on construction site. Physical hazards on construction site is contribute high accidental and cause death. This paper based on study that has been conducted which involves types of physical hazards and consequences of physical hazards towards the workers on construction site. Besides, the solution in managing the physical hazards on construction site is included. The study is focused at Kuantan, Pahang and Kuching, Sarawak areas. This study will increase awareness among the workers in the construction site in delivering a project responsibility by also focusing to physical hazards factors. Two (2) methods have been used to achieve the objectives of this study which are questionnaire and interview. Thirty six (36) respondents are given their feedback by answering the questionnaires. Data and results are analyzed using two (2) methods which are Microsoft Excel and Statistical Package for Social Sciences Software (SPSS). The data collected from the questionnaire survey have been analyzed using Average Index (AI). As conclusion, types of physical hazards on construction site are including noise, radiations, excessive temperature and pressure, mechanical, electrical and illuminations. There are few consequences caused by physical hazards which are fatigue, hearing loss, spinal injury, less sensitivity to touch and temperature, dry skin and eyes, cancer, heat exhaustion, heat stroke, burns, crushing, breaking, cutting, painful shock, death and dazzle. This study result shows the popular solutions in managing physical hazards on construction site by respondents are management commitment and leadership by employer in safety and also accident prevention programs.

ABSTRAK

Hazad fizikal di tapak bina ditakrifkan sebagai jenis-jenis hazad yang boleh membahayakan pekerja dari sumber luaran di tapak bina. Hazad fizikal di tapak bina mengakibatkan kemalangan yang tinggi dan menyebabkan kematian. Kajian ini berkaitan jenis-jenis hazad fizikal dan kesan-kesan hazad fizikal ke atas pekerja di tapak bina. Selain itu, penyelesaian dalam menguruskan hazad fizikal di tapak bina turut dikaji. Kajian ini difokuskan di daerah Kuantan, Pahang dan Kuching, Sarawak. Kajian ini akan meningkatkan kesedaran dikalangan para pekerja di tapak bina selain memikul tanggungjawab disamping mengambil berat faktor hazad fizikal semasa melakukan kerja di tapak bina. Dua (2) kaedah telah digunakan untuk mencapai objektif kajian iaitu borang kaji selidik dan temubual. Tiga puluh enam (36) responden yang memberi maklum balas dengan menjawab borang kaji selidik tersebut. Data dan keputusan yang diperolehi dianalisis dengan menggunakan dua (2) kaedah iaitu Microsoft Excel dan Statistik Paket Perisian Sains Sosial (SPSS). Data yang dikumpul dari soalan kaji selidik dianalisis dengan menggunakan kaedah Indeks Purata. Kesimpulannya, jenis-jenis hazad fizikal di tapak bina ialah bunyi, radiasi, suhu dan tekanan yang tinggi, mekanikal, elektrik dan pencahayaan. Terdapat beberapa akibat kesan daripada hazad fizikal iaitu antaranya, keletihan, gangguan pendengaran, kecederaan tulang belakang, kurang kepekaan terhadap sentuhan dan suhu, kulit dan mata kering, kanser, keletihan, strok, melecur, hancur, patah, terpotong, kematian mengejut, kematian dan silau. Keputusan kajian menunjukkan penyelesaian yang kerap diamalkan di dalam menguruskan hazad fizikal di tapak bina di kalangan responden adalah komitmen pengurusan dan kepimpinan oleh majikan dalam keselamatan dan juga program pencegahan kemalangan.

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CHAPTER 1

INTRODUCTION

1.1 Background

Construction industry is one of the largest industrial in most industrialized countries. The construction industry is currently being recognized as a major economic force in Malaysia. Figure 1.1 shows construction industry is one of the most hazardous industries and highest accidental caused death in 2009. Construction workers are at risk of exposure to various health hazards that can result in injury, illness, disability or even death. The risk of ill health or health hazard can be grouped under chemical, biological, and physical hazard (Davies and Tomasin, 1996). Physical hazards are the most common and will be presented in most workplaces at one time or another. They include unsafe conditions that can cause injury, illness and death.

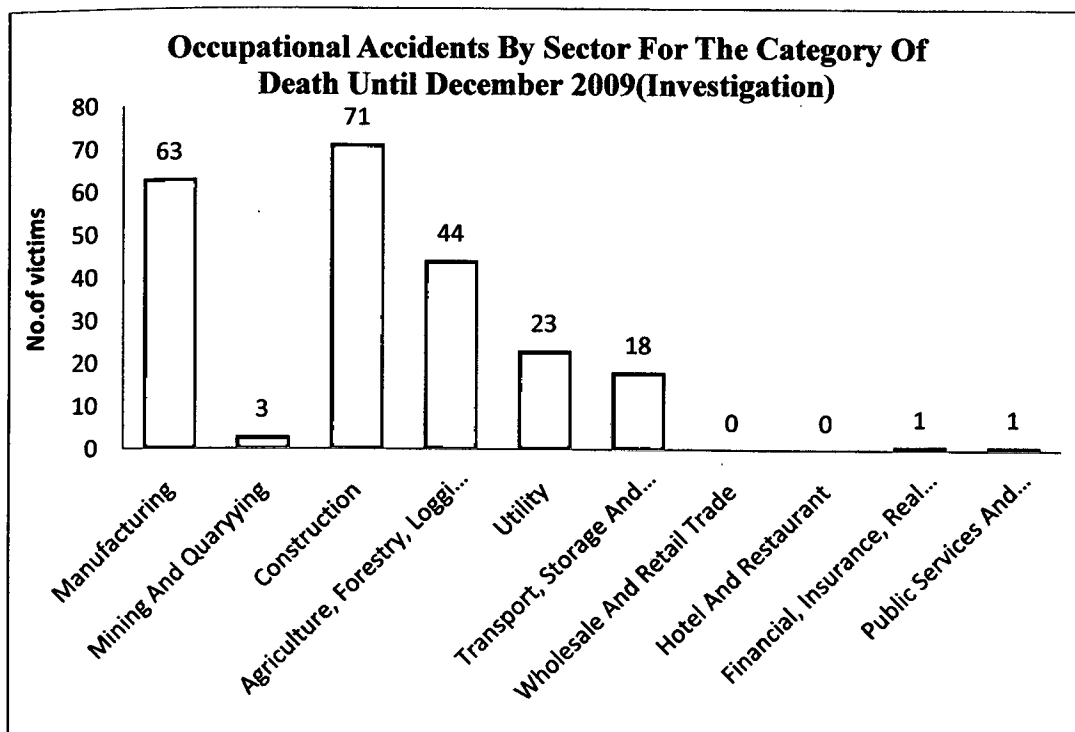


Figure 1.1: Occupational Accident by Sectors for Category of Death until December 2009 (safety, 2010)

As note in the American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Value TLV booklet, physical hazards are characterized separately from the health hazards. Physical hazards are defined as those types of hazards that can harm a worker from external source. Types of physical hazard are loud noise equipment, temperature extremes (working in Tyvek coveralls in an asbestos containment area), radiation (exposures to the sun or welding flash), chemical burn (acids or caustics), fire or explosions. Other physical hazards include but are not limited to, slips and falls, trench or excavation cave-ins, exposed machinery because of improper guarding, equipment moving about on site, confined spaces, and falling objects.

Based on the Social Security Organization (SOCSSO) report in 2000, the fatality rate in the construction industry in Malaysia was of more than three (3) times of all workplaces. In the field of occupational safety and health, Malaysia is now moving away from the traditional approach whereby it is believed that all occupational hazards can be controlled through detailed regulations.

In general, accidents at work occur either due to lack of knowledge or training, a lack of supervision, or a lack of means to carry out the task safely, or alternatively, due to an error of judgment, carelessness, apathy or downright reckless. In addition to these factors, the short term and transitory nature of the construction industry, the lack of a controlled working environment and the complexity and diversity of the size of organizations, all have an effect on safety performance within the industry. In construction, it is suggested that 'unsafe behavior' is the most significant factor in the cause of site accidents and therefore provides evidence of a poor safety culture. Never the less, according to a report by the HSE cited in, nearly 90% of all construction accidents leading to death could (or should) have been prevented, 70% by positive management action (Edwin Sawacha, 1999).

Positive management action on construction is proven effective in prevented all construction accidents. Physical hazards on construction also will be decreased when positive management action is taking over. There should be many types of solutions in managing the physical hazards.

To prevent physical hazards at construction works, all possible physical hazards that may be encountered should be identified before commencement of construction work. The environmental conditions may also create additional physical hazards. These factors should also be identified, for example, heat and noise. The information for hazard identification can be obtained from the equipment and material supplier, site

owner and principal contractor. If such information is not available, then a contractor should take actions to identify unknown substances or seek assistance from a specialist if necessary.

1.2 Problem Statement

According to the industrial statistic from SOCSO, the rate of fatal accident in Malaysia is 7.7:1000 in year 2004. The rate is not satisfying and can be categorized as still high if compared to the 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 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 (10) years. Although regulation in occupational safety and health are quite impressive, the level awareness and practicability of such regulation within the society of construction industry generally lower than what supposed to come in force.

There is high ratio of accidental in Malaysia construction industry. Hazards are known as the main cause of accident. In order to perform a conducive and safe work condition and minimize accident on construction, hazard factors should be managed.

According to SOCSO the number of recipients for compensation has increased 36 percent (36%) from 182,763 people in 1995 to 247,790 person in 2003. In 2003 alone SOCSO has paid about RM 754 million, a staggering 161 percent (161%)

increased from RM 289 million in 1995, as compensation for the industrial accidents. For the year 2004 it is estimated that the amount of compensation could reach over RM 800 million payable to over 260,000 recipients (Fong, 2004). Therefore, the amount we are spending yearly of hidden costs is run into billion of ringgit for accident and disease in industrial. It is shown that construction industry is one of the critical industries and need a huge and fast overhaul from the current site safety practice.

However, physical hazards that have risk of ill health can only be notified after long term of period and shall cause sickness or death after certain period of time. In order to ensure a safe and conducive working condition there are basic steps that should be taken namely identifying the hazards, identify the consequences and managing the risk.

1.3 Objective

The aim of this study is to investigate the seriousness consequences of physical hazards on construction sites. To achieve the aim, the following objectives have been listed.

1. To identify types of physical hazards on construction site.
2. To identify consequences of physical hazards towards workers on construction site.
3. To analyze solutions in managing physical hazards on construction sites.

1.4 Scope Of Study

The scopes of this study have been determined in order to facilitate the literature study by focusing on certain field and specific. The scope of study area is focused on construction sites in Kuantan Pahang and Kuching Sarawak, Malaysia which city of among the largest state in Malaysia. The types of project that have been considered in this study are road and building construction project. The methods that will be used in this study for data collection are questionnaire and interview session. The target respondents are persons who are very well about the work progress in construction site such project manager, safety officer, site supervisor, site engineers and site coordinator. Man workers also are one of the respondents to be included.

1.5 Significance Of Study

There are several valuable benefits expected by implementing this study. The purpose of this study is to increase awareness among workers in the construction site in delivering a project responsibility by also focusing to physical hazards factors. It can ensure good practice of project management in an effort to common injuries that are related to poor safety precautions. Applying of managing physical hazards can reduce the potential of accident, injuries, and illness besides it can improve the performances and productivity of the projects.

1.6 Methodology of study

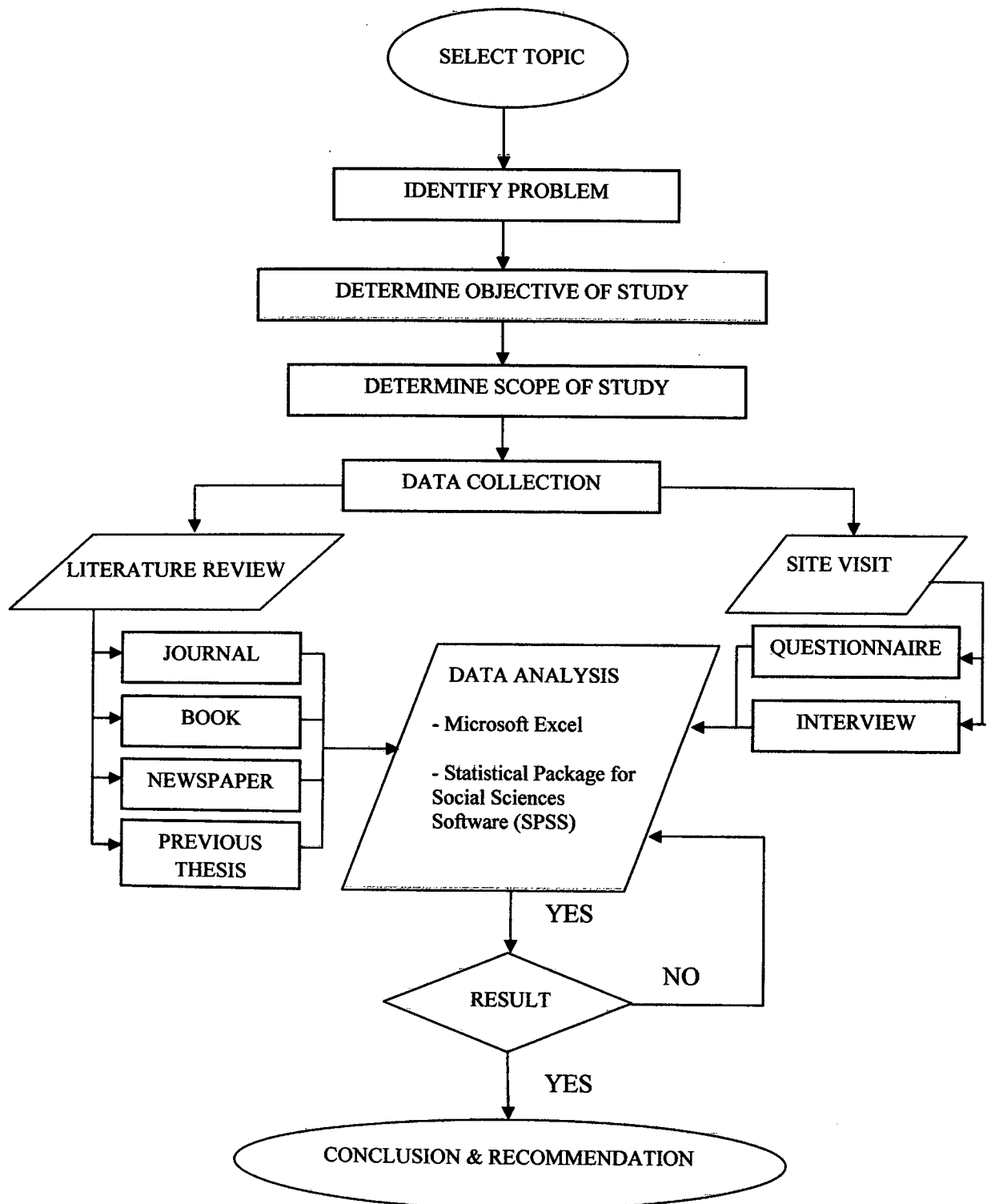


Figure 1.2: Methodology of study

The study methodology is used in order to collect data, analyze data report on findings and results. For data collection, the methods that will be used are literature reviews and site visit by distributing questionnaire and conducting interview with the related person. Therefore, the data collection will be analyzed by Microsoft excel and statically Package for Social Science Software (SPSS) as shows in Figure 1.2.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Workers in a construction site may be exposed to various hazardous substances and physical agents, for examples, asbestos, lead, silica dust, organic solvents, sewer gases, welding fumes, radiation, noise and vibration. Excessive exposures to these substances or agents may result in acute injury, chronic illness, permanent disability or even death. Loss of concentration at work and fatigue arising from poor health conditions may increase the risk of accidents. Construction work is featured by high labour turnover, constantly changing work environment and conditions on site, and different types of work being carried out simultaneously by several contractors. These features would further increase the health risks of workers (Guidance Notes On Health Hazards in Construction Works, February 2004).

2.2 Definition

2.2.1 Hazard

A hazard is anything that can cause harm, for examples falls, slips, chemical burns. A hazard is something that presents a danger. Hazard, at most of the time is obvious, but it may be intangible too. Hazards may exist in the form of chemical hazard, physical hazard, biological hazard, ergonomic hazards. Hazard is also a condition or substance that has potential to adversely affect the health of people in a workplace. The severity of the hazard, the amount, the duration and frequency of exposure to the hazard affects the health and safety of the worker (Shariff, 2005).

The hazard presented by a substance is its potential to cause harm. Hazard is associated with degrees of danger, and is quantifiable (Channing, 2003).

Hazard is seen as the situation that in particular circumstances could lead to harm, where harm is the loss to a human being (or to human population) consequent on damage and damage is the loss of inherent quality suffered by an entity physical or biological (Channing, 2003).

2.2.2 Physical Hazard

Physical hazards are defined as those types of hazards that can harm a worker from external sources. (Larry R. Collins, 2001)

2.3 Types of Physical Hazard

The second category of occupational health hazards is physical agents. Physical agents include noise, vibration, ionizing radiation and lasers, illumination, temperature and pressure extremes. Management need to be aware of these physical agents because their potential to produce harmful effects either immediate or through accumulative effects (Shariff, 2005).

2.3.1 Noise

Noise is defined as any unwanted sound. Exposure to noise has many adverse effects on workers ranging from physical stresses to physiological imbalances. Noise can contribute to accidents by making it difficult to hear warnings. Excessive noise can also destroy one's hearing or ability to hear. The amount of damage noise produces depends on how loud the noise is and how long the duration it has been exposed. The frequency or pitch also has some effects which are high pitches are more damaging than low pitch (Shariff, 2005).

2.3.2 Vibration

Noise and vibrations often originate from the same source and are most frequently associated with each other. There are two (2) types of vibration which are whole body vibration and segmental vibration. The first example is such as sitting on a moving tractor, and secondly operating a chain saw mechanical high pressure mechanical jack.

2.3.3 Radiations

There are two (2) types of radiations, ionized radiation and non-ionized radiation. Ionized radiation is now increasingly being used in industry such as non destructive testing on pipelines through use of x-ray. Radioactive gauges are also used in quality control in analytical chemistry and critical tolerances of parts or moulds.

Ionizing radiation is used for detecting weakness of metal structure on a construction site. Radioactive substances which have previously been stored or used may be released in demolition of buildings. Construction workers exposed to such ionizing radiation may have increased risk of developing cancer and genetic disease. Recognized safe system of work must be observed, including, for example, isolation, segregation of workers, installing warning notices and signs (Trefoil sign), monitoring and decontamination.