

THE HIRARC FACTORS TOWARDS SAFETY PERFORMANCES IN NAZA TTDI  
SHAH ALAM

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„I acknowledge that I have read this research project and in my opinion this research project is sufficient in terms of scope and quality for the award of Bachelor of Technology Management (Innovation Technology)“

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“I declare that all parts of this report are the results of my own work except for the quotations and references, the source of which have been acknowledge in the bibliography”

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Date :.....

## DEDICATION

I dedicate my dissertation this research work to my family, my beloved parents Md Esa and Siti Aminah, and also my dear supervisor En Mukhiffun whose words of encouragement and who taught me that the best kind of knowledge to have is that which is learned for its own sake.

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In the name of Allah, the Most Gracious and the Most Merciful

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I must acknowledge as well the colleagues, and other librarians who assisted, advised, and supported my research and writing efforts .I will always appreciate all they have done, for helping me to develop my skills on keeping in the data and for many hours of proofreading. They have consistently helped me keep perspective on what is important in life and shown me how to deal with reality that possible to complete. In addition special thanks to Naza ttdi Shah Alam who is willing to contribute in the research. I also dedicate this to my many friends who have supported me and helping me throughout the process.

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## ABSTRACT

Over many years a great deal of effort has gone into reducing the number of people who are injured or suffer ill health as a result of construction work. Safety in construction industry is one of OSHA's top concerns. This industry is among the most dangerous industry in the country. Some of the factor that affected the safety and health performance is the knowledge of safety held by the workers and organization. The purpose of this paper is to identify the hazard, risk assessment and risk control and also importance of the factor that influences the safety performance in construction site. Naza TTDI Sdn Bhd was selected among construction industry to investigate the effectiveness of using these HIRARC methods towards the safety performance. The research utilized the SPSS 22.0 to analyze the data collected. A sample of 50 respondents of staff in Naza TTDI Shah Alam was surveyed using a structured questionnaire as an instrument. In addition, the researcher getting information from secondary data such as books, journal, article reports and others that related to this research. The correlation data analysis is to hypothesize that there is a relationship exist between variables, compute mean analysis is used to identify the level of HIRARC factors and multiple regression analysis is to see the contribution between variables.

## ABSTRAK

Sejak dahulu lagi telah banyak usaha dalam mengurangkan jumlah pekerja yang tercedera dan atau mengalami keuzuran akibat daripada kerja-kerja pembinaan sewaktu menjalankan tugas. Keselamatan dalam industri pembinaan adalah salah satu daripada kebimbangan utama OSHA. Industri pembinaan ini adalah salah satu antara industri yang paling berbahaya di negara ini. Antara faktor yang menjejaskan prestasi keselamatan dan kesihatan adalah pengetahuan keselamatan yang dipegang oleh pekerja dan organisasi. Objektif kajian ini adalah untuk mengenal pasti bahaya, penilaian risiko dan kawalan risiko dan juga kepentingan factor-faktor yang mempengaruhi prestasi keselamatan di tapak binaan. Naza TTDI Sdn Bhd telah dipilih di kalangan industri pembinaan dalam menjalankan kajian ini untuk melihat keberkesanan menggunakan kaedah HIRARC ke arah prestasi keselamatan. Kajian ini menggunakan SPSS 22.0 untuk menganalisis data yang dikumpul. Sejumlah 50 sampel responden di kalangan staf Naza TTDI Shah Alam telah dikaji menggunakan soal selidik berstruktur sebagai instrumen. Di samping itu, penyelidik mendapatkan maklumat daripada data sekunder seperti buku, jurnal, laporan artikel dan lain-lain yang berkaitan dengan kajian ini. Analisis data korelasi adalah untuk hipotesis bahawa terdapat hubungan wujud antara pemboleh ubah, mendapatkan min analisis digunakan untuk mengenal pasti tahap faktor HIRARC dan analisis regresi berganda adalah untuk melihat sumbangan antara pemboleh ubah.

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## LIST OF SYMBOLS

P	= Significant Value
B	= Beta
$\leq$	= Less than and equal to
$\geq$	= More than and equal to
%	= Percentage
N	= Total Numbers
R	= Coefficient of Correlation
$R^2$	= Coefficient of determination
Sig.	= Significant

## CHAPTER 1

### Introduction

In time past, usually a relatively high level of risks and hazards would occur in construction industry. One of those challenges is to create a healthier workplace in the construction industry.

Employers were not concern about the health and safety of their employees at workplace. An employee was not provided with safety and health knowledge and equipment and that may cause a risked getting hurt at their workplace anytime about their duties.

Occupational health and safety is relevant to all industry, business and commerce and includes traditional industries, information technology companies, the National Health Service, care homes, school, universities, leisure facilities and offices. The purpose of occupational safety and health unit is to introduce the foundation in which appropriate health and systems may be built. Occupational health and safety affects all aspects of work and may simply require a trained competent manager in a low hazard organization, Phil Hughes ( 2005).

Occupational safety and health should be established in every workplace of all industries for the purpose of protecting the working against any hazard that will arise and also in contributing to the establishment and maintenance of the highest possible degree of physical and mental of the workers. The employer has responsibility to protect the employees from all health hazards that may pose threat to their safety and health, International Labour Organization (1959).

## 1.1 Research background

Construction industry is one of the hazardous industries worldwide due to its unique nature where the environment is risky and is important to pay more attention to improve the construction safety and health performance, Michael Kosman Sadek Zekri (2013). In previous years, the safety and performance awareness during the activities in the workplace has been improve with the controlling of positive safety culture and reducing an accident and will be increasing the work efficiency, Fung, et al. (2005). Safety and health are always been a frequent issues in the construction industry due to its nature dangerous that always been occur at the construction site. During the duties in the workplace, there is more hazardous accident that might be happen due to employee's negligence.

In addition, construction industry has a reputation for being a particularly unhealthy area because of its rate of work-related illness is one of the highest among of all occupational industry. The impure of the construction sites can cause an accident. Example, without a clear walkway, how can people enter or walk around the building without risking themselves with wood slips, trips and falls? Workers on the construction site who is carrying things can make it harder for them to balance with the garbage, wood slips and the wastage construction around the walkway. Somehow it is difficult for them to walk across the construction area.

Has low awareness about safety and poorly designed safety standards. How the workers think it is safe to done their duties while standing on the stepladder? It is a normal hazard that can cause accident or injuries on construction sites. Even so often, the stepladder doesn't appear to be dangerous and most people are used to having it around. But, it doesn't give them so much thought because they might think it may help to make their duties easier even without using it cautiously. Lastly, the workers did not take a heed about the importance of personal protective equipment (PPE) in construction work. PPE is to protect workers from all the hazards that may arise while on duties. The hazardous can happens anytime and it may cause mishap and accidents to the workers.

Failure to communicate within the workers and top management such as workers or top management not following the standards way rules and colliding with different understanding of another workers could resulting in potential injuries and damage.

## **1.2 Aim of the study**

The aim of the study is to evaluate and improve the construction safety and health performance in Naza TTDI Sdn Bhd construction field by using the selected techniques.

## **1.3 Research Questions**

Hazard Identification, Risk assessment and Risk Control (HIRARC). A hazard is something that could create a risk and can potentially be harmful to a person itself and environment. There is the hidden factor that is affecting the construction safety and health performance and also the barriers of safety and health implementation. This research explored the following key questions;

- i. What is the level of HIRARC factors that have been implementing?
- ii. Which HIRARC factors contribute more towards safety performance?
- iii. What is the main factor represents the highest towards safety performance?

## **1.4 Research Objective**

The aim of this research is to analyses the hazards things that occurs and practically can cause the performance of safety and health in the construction project in

Naza TTDI Shah Alam. Based on the discussed research questions, the objective of this research are:

- i. To identify level of HIRARC implement to Naza TTDI Sdn Bhd
- ii. To determine which HIARARC factor that contribute more to safety performance in Naza TTDI Sdn Bhd
- iii. To determine the main HIRARC factor towards safety performance

### **1.5 Scope and limitation of the study**

The scope of this research is the HIRARC system will assist the safety performance in identifying hazards during the workplace, identifying the possible control measures that should be taken to reduce risk of accidents and assists to producing a statistical report between two variables, the independent variables and dependent variables which are the techniques that are going to use and the impact to the safety performance improvement in Naza TTDI Sdn Bhd.

There are the limitation on doing this research where most of the workers have irregular and unimpressed work schedule in the construction site, so the conduction regulations and to meet what is needed are difficult to do. The behaviors and attitude problems of the workers are difficult to changes and a lot of things need to improve in the construction site to make sure the improvement of safety and health performance and can reduce hazard that may happen to the workers. And one of the most limitations is, the construction area is the dangerous place to go in doing this research perfectly.

This research is only limited to only an employee at Naza TTDI Sdn Bhd excludes the outsiders, so the information of research is only based from the statistics given. Questionnaire that had been distributed also limited to 200 respondents in the organization.

The limitation also in asking questions to the respondent about specification on hazards identification, risk assessment and risk control (HIRARC) and safety



performance in Naza TTDI Sdn Bhd based on the research. The questionnaire is divided into several parts and required to answer all the questions in relations to the research.

### **1.6 Significant of the study**

The importance of this study is to identify what are the factors that can cause hazards especially in construction area by adapting those selected techniques. All teams in organization are involved to make sure the improvement of this safety performance and to avoid any hazards that may occur. And, when the hazards have been identified, the process of measuring the risk assessment begins.

The risk control process is taken afterwards the level of hazard to see the improvement in performance such as monitoring. It will change the level of accidents in construction area when we constantly and continually aware with the safety rules in workplace. And the study is aiming to answer the research questions discussed.

### **1.7 Summary**

This study is about safety and health in construction site of Naza TTDI Shah Alam. In this chapter, it explains about the research background of the study. Discussing about the research questions and the answer in research objective to understand what are exactly conducted. The necessity is to increase awareness of employees towards the importance of safety in the workplace.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

Literature review is the part to gather up an information and data of the research study about the safety and health in construction industry of Naza TTDI Shah Alam. The majority of sources are failed to acknowledge the increased managerial burden on health and safety aspects in construction area. This is the evaluation on the previous research in the chapter 1.

Occupational safety and health is highly regulated and accompanied by enforcement training programs where it is such an important aspects in the successful occupational and health program. An accident is an untoward frequent happening in a construction workplace. The owner is responsible to any of the hazardous attacked. And on-job training would have enabled to recognize the danger of hazards and learn safe procedures and resolution for handling the issues.

## 2.2 What is Occupational Safety and Health

Confer on ILO/WHO Occupational health, the prevention from diseases due to workplace or the prevention from illness and protections from risky accidents at work is a suitable capabilities of the workers environment in all sectors.

The purpose of an implementation occupational safety and health is to protect employers and whoever that might be affected by the workplace environment. It is an aspect that concerned with protecting the health, safety and welfare of people that are engaged in employment organization.

It is difficult to create a safe environment. But it is one of the best ways to avoid hazardous. Management should have a responsibility regarding health and safety of the workers at the construction sites. Management team and organizations should have a duty of care to ensure that the employees who may be affected by the companies undertaking remain safe during their duties to ensure the employee's lives and health been protected. Safety hazards are those aspects of the environment in the workplace that have the potential of immediate and harm to an employee, Casio and Wayne (1998).

Other than protect worker, occupational safety and health also been implemented to teach and remind the employee to always be careful in conducting their work. It is also to cultivate a good behavior among them. Workers need to know about occupational safety and health because it is one of the requirements under the law which is the Occupational Safety And Health Act and to make provisions for securing the safety, health and welfare of colleagues in connection with trades and activities.

According to Andrzej S. Nowak, Ted V. Galambos (1990), an important things in safety and health management to be determinate, measurable and achievable by the person concerned are the strong and clear identification of the objective, the procedure about health and safety monitoring activities and the level of performance measurement. In addition, an awareness of safety and health issues by using a system or provide a

training for improving knowledge, attitudes and motivation for reducing or even eliminate the hazards occurs through controlling a hazards and risk assessment tools. And it has been agreed by Jeremy Stranks (2010), where the significant aspects in safety and health management should be emphasis on the responsibilities by person concerned in identifying the objective standards, monitoring level of performance measurement, awareness in safety issues and working through the risk assessment and hazards control (risk control).

### **2.3 Hazard Identification, Risk Assessment and Risk Control (HIRARC)**

In order to achieve the objectives of Occupational Safety and Health, it is needed to look into HIRARC which is the basis of occupational safety and health. Hazard identification is the recognizing of things which may cause injury or harm to a person. Risk assessment is the looking at the possibility of injury or harm occurring to a person if exposed to a hazard, Mshamsuly (2004). Risk control is to measure the problem and start act to reduce the risk of a person being exposed to a hazard.

Hazard identification, risk assessment and risk control is to identify the types of hazards that occur in construction area, to make risk assessment on hazards that has been identified, to suggest risk control to the organization management team and to take action and implementing the control to the problem and improve performance that are going to achieved.

- i. Hazard - A sources or a situation with a potential for harm in terms of human injury or damage property or both of these or anything that may cause harm.
- ii. Danger - it is relative exposure of hazards
- iii. Risk - A appraise of the potential causes of harm in the workplace, to inform the implementation and appliances of reasonable measures to reduce health risks.

The various methods in identifying the hazards in the workplace is through observation, inspection, complaints from the employees, accidents statistic record, information from the manufacturer and the review of other reference sources.

### **2.3.1 What is hazard and hazard identification?**

A hazard is the possibility of an event that might cause in death or injury to the workers during the workplace in the construction site and could also cause damage to the property itself. It is an accident that will affect all the employees, the working place and the management team as well. It may come anytime and workers must be alert and to be aware to prevent all the dangers when it arise. This requires highly trained occupants who are prepared for any eventuality, Andrzej S. Nowak, Ted V. Galambos (1990). This study is about the process of identifying the hazards to avoid the impacts during the selected techniques to analyses the level of hazards occurs in the construction. According to Charles D. Reese (2006), in order to prevent accidents, identify existing and potential hazard which can overcome upon the worksite and the performance of safety. Health hazard may cause illness to an individual practically during their duties. It affected to all parts of body and can cause long term problem as in defect. It somehow difficult to detect until it is well advanced by the individual itself, Guidelines of HIRARC (2008). Identify the hazards by reviewing the workplace, conducting a survey from workers to detect environmental hazards and reviewing records by recognizing that the hazards exist.

In the current situation, identifying hazards based on the knowledge by reference materials, an information provided by the worker, information provided by other safety personnel or specific department supervisors who face similar situations and the work inspection conducted by the safety personnel.

An accident may cause by several factors such as there is no hazards identification procedure to be implemented to identify the hazards in working environment and the potential process of hazards identification has been left unidentified. Therefore, no measurement control is taken to eliminate or reduce the risk of facing these hazards.

### 2.3.2 Types of Hazards

There are three types of hazards in different categories such as health hazards, safety hazards and environmental hazards. Safety hazard is basically will happened because of the carelessness of the worker in construction site. Safety hazards cause harm when workplace controls are not adequate, Guidelines of HIRARC (2008). Example, an accidently tripped the wire at construction site during duties.

Furthermore, environmental hazard is one of the other types. Environmental hazards cause harm when work procedures are not followed by the workers. Environmental hazards such as liquid wastes and fumes, garbage and the dust in construction area. According to Stephen Lim from his presentation slides of OHSAS 18001:2007 (HIRARC) in JP Power Horizon Sdn Bhd, there's formula to analyzes and estimate risk for each hazards in a task is influenced by for major factor such as likelihood and severity;

$$\text{Risk} = \text{Likelihood (L)} \times \text{Severity (S)}$$

- i. Risk – the chance of something happening that will have an impact on the objective. In safety line it is combination of likelihood of harm occurring and severity of the harm.

- ii. Likelihood – the probability of an accident to occur due to the identified hazard within a certain time frame
- iii. Severity – outcome of an event such as severity of injury or workers, damage to property. The seriousness of an injury to the identified hazard

Some of the example of construction hazards is, falls from the ladders, working platform or pitched roofs, falls of materials, wiring, collapse of excavations, the site transport activities, machinery and powered hand tools, accident that associated with bad housekeeping, and the use of personal protective equipment.

### **2.3.3 Risk Assessment**

Risk assessment is an inspection, examination or a review of a problem occurs to preventing and protect the dangers occurs. Risk assessment is a systematic process for describing a generated a probability distribution, quantifying the risk associated with hazardous substances, process, actions or events. It is a process of evaluating the risks that is arising from hazards. During the assessment, every worker should be involved and give cooperation because they are the one who will prevent itself the hazards during their working time so that they will be aware of hazards arising from work activities. Therefore, conveying a risk assessment and implementing a safety statement will reduce an accidents and safety performance and prevent injuries and ill-health in the workplace and reducing the likelihood by ensure the workplaces practices, Health and safety authority (2013).

In carrying out the risk assessment, organizational must presenting an effective system to ensure the effective planning, organizational control,

monitoring and review of the preventive and protective measures are arising from the risk assessment.

According to Jeremy Stranks (2010), there is a series of stages of risk assessment process to ensure the effectiveness and may reduce the risk to the lowest level practicable;

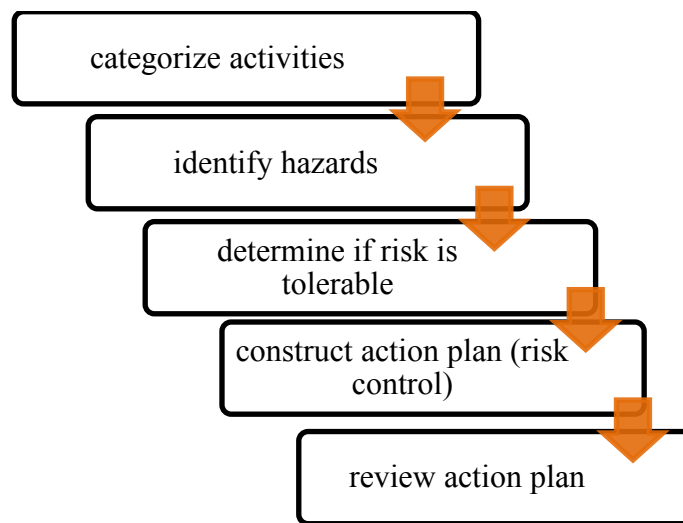


Figure 1.1: process of risk assessment

In risk assessment, the management should make arrangements to cover the following spheres such as the overall plans and objective including the personnel and resources for the organization to achieve the selected performance. Other than that, the sufficient of occupational health and safety knowledge, skills and experience to manage its activity and the operational plans to implement arrangements to control risk identified and meet the requirement identified. After that, be prepared in planning the operational control activities, performance measurement, corrective action and management reviews to implement the corrective action.