

TESIS STATUS APPROVEL FORM

JUDUL: Hazard Identification,Risk Assessment and Control

SESI PENGAJIAN: 2006

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(HURUF BESAR)

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HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL

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**This report is submitted in partial fulfillment of the requirement for the
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ABSTRAK

Sistem *Hazard Identification, Risk Assessment and Control* atau lebih dikenali sebagai (HIRAC) merupakan sebuah aplikasi yang dibangunkan untuk membantu pengguna mengenalpasti risiko dalam setiap pekerjaan di Continental Sime Tyre. Pengguna aplikasi ini ialah pegawai keselamatan & kesihatan dan penyelia jabatan di Continental Sime Tyre. Sistem semasa yang digunakan masih dalam bentuk manual. Diantara masalah yang dihadapi ialah kebanyakan borang penilaian risiko tidak lengkap dan maklumat-maklumat *Hazard Identification, Risk Assessment and Control* tidak diuruskan dengan sistematik yang menyebabkan data berulang dan menyebabkan kejituan data diragui. Aplikasi ini akan membantu pengguna mengenal pasti punca-punca kemalangan dalam setiap pekerjaan di setiap jabatan dan menganggarkan jumlah risiko yang dihadapi dan cara-cara untuk mengurangkan risiko tersebut. Pada masa yang sama, pengguna boleh mengemaskini rekod-rekod kemalangan, punca-punca kemalangan dan cara-cara untuk mengatasinya. Aplikasi ini akan menggunakan SQL Server 2000 sebagai pangkalan data yang menguruskan maklumat-maklumat HIRAC. *Internet Information Service* atau lebih dikenali sebagai IIS digunakan sebagai aplikasi server. Aplikasi ini dibangunkan dengan menggunakan metodologi *System Development Life Cycle* (SDLC) dan *Database Life cycle* (DBLC)

ABSTRACT

Hazard Identification, Risk Assessment and Control or HIRAC System is a risk assessment tool which will assist users in identifying hazard and estimating risk involved in each identified hazard. Hazard Identification, Risk Assessment and Control users are the safety personnel and department supervisors. The current Hazard Identification, Risk Assessment and Control system being used is manual application. Among the problems faced in the current system are most of the forms are incomplete and there is improper information management system. Due to these reasons there are issues of data redundancy and data inconsistency. This risk assessment tool will identify possible hazard involved in each task in departments. Once the hazard has been identified, risks involved will be estimated and categorized. If the estimated risk falls in a category, which is higher than the low risk category, then possible control measures will be recommended. At the same time, the user can add new work plan, task, hazard and control measures into the system to update existing information system. The application will be using SQL Server 2000 as the Database Management System and Internet Information Service as web server that manages the business logic of Hazard Identification, Risk Assessment and Control system. The Hazard Identification, Risk Assessment and Control application is developed using System development Life cycle and Database Life cycle.

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LIST OF ABBREVIATION

ABBREVIATION	DESCRIPTION
HIRAC	Hazard Identification, Risk assessment and Control
CST	Continental Sime Darby
PJ Plant	Petaling Jaya Plant
WHIMS	Wildfire Hazard Identification and Mitigation system
SDLC	System Development Life cycle
DBLC	Database Life Cycle
GIS	Geographical Information System
MTRC	Mass Transit Railway Corporation
FTA	Failure tree Analysis
FMAE	Failure mode and Effect analysis
ERD	Entity Relationship diagram
DML	Data manipulation Language
DCL	Data control Language
RDMS	Relational Database Management System
SQL	Structured Query Language
DFD	Data flow Diagram
FDD	Functional Decomposition Diagram
1NF	First Normal Form
2NF	Second Normal Form
3NF	Third Normal Form
GUI	Graphic User Interface
PPE	Provide Personal safety devices
PSM	Project Sarjana Muda

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CHAPTER I

INTRODUCTION

1.1 Project Background

Tragic news like lost of an arm, a finger and even life has become part and parcel in industrial environment. Hazard Identification, Risk Assessment and Control (HIRAC) is a risk management procedure used in the industry to identify hazards, assess risks involved and identify control measures to reduce the risks. Below are terminologies according to Joint Standards Australia/ Standard New Zealand committee OB/7(1995),involved with HIRAC:

- Hazard - Source or situation with potential harm (It could either cause human injury or ill health, damage to property or work environment).
- Hazard identification – It is a process of recognizing the existence of hazards and defining its characteristics.
- Risk - The chance of something happening that will have an impact on the objective. In safety line it is the combination of likelihood of harm occurring and consequence of the harm.
- Risk assessment – The overall process of risk analysis and risk evaluation.

- Risk Control- It is a part of risk management that uses any suitable method to control and reduce the residual risks to tolerance in the industry.

The factors that contribute to the increasing rates of industrial accidents are:

- There is no hazard identification procedure to identify the hazards in working environment.
- Hazard identification process is incomplete and potential hazards are left unidentified.
- No control measures are taken to eliminate or reduce the risks of facing these hazards.

HIRAC system will be assisting the safety personnell of Continental Sime Tyre (CST) Petaling Jaya Plant (PJ Plant) and it's department supervisor to identify hazards for each task in a work plan. These hazards will be identified based on the past hazard records with similar types of tasks.

Other than identifying hazards, the system should be able to estimate risks for each hazard in a task. According to the Joint Standards Australia, risk estimated for each hazard in a task is influenced by four major factors such as:

- Likelihood – Probability of an accident to occur due to the identified hazard within a certain time frame.
- Severity- Seriousness of an injury to the identified hazard.
- Exposure rate – Frequency a worker has to do the task (daily, weekly or even monthly bases).
- Existing control- Identify the control measures and type of which exists in the current environment

The HIRAC system should be able to generate statistical reports to display likelihood, severity or consequences, and exposure rates to hazards and estimated risks for each identified hazard in a task.

Apart from that, the system should be assisting the department supervisor or safety personnel of CST to identify control measures used to reduce or eliminate the risk. At the same time, the user is able to introduce new control measures, apart from existing control measures in the database of the system.

1.2 Problem Statements

Identifying hazards for each task in a work plan is a crucial step in HIRAC process. In the current situation, the user has to identify hazards based on:

- His/ her own knowledge regarding the task (in terms of experience and other reference materials).
- Information provided by the worker who performs the task.
- Information provided by other safety personnel/ department supervisors who face similar situations.
- User manual that explains how the task should be carried out.
- Work inspection conducted by the safety personnel.

The information from HIRAC, Safety Inspection Checklist and few others are forms stored in the filing cabinet. From the situation mention above, there are several problems faced by the safety personnel. Among the problems faced during the process of hazard identification are:

- Some of the hazards or controls may be left out due to human errors such as carelessness or even forgetfulness.
- It is time consuming to identify similar tasks from past records if the user has to manually go through each document in the filing cabinet.

1.4 Scopes

HIRAC system will assist the safety personnel and department supervisors of CST (PJ plant) in the following functions:

1.4.1 Identify hazards for each task in a work plan.

List of hazards will be generated based on the past risk assessment records for similar tasks. A User keys in the tasks in the work plan in the department. The system will search the database if there are similar and identify potential hazards. The user has the option to reject or accept the recommended hazard or add new hazard to task hazard list.

1.4.2 Identify possible control measures that should be taken to reduce risk of accidents.

The system will generate control measure lists that contain control measures to eliminate or reduce the risks faced by the identified hazard. The user does not have to re-enter same the control measure repeatedly. The system will estimate risks and categorize it. If the estimated risk in the category is medium or high, it will trigger the system to produce the list of possible control measures to handle identified hazard.

1.4.3 Data/ information are stored in secure place.

Information regarding accidents in a plant, list of tasks, identified hazard and control measures are stored in a secure place to avoid cases of forms being lost or misplaced. The data will be stored in the SQL server 2000, while of information that has to be stored in the database is:

- Causes of accidents.
- Hazard classification in the terms of severity.
- Hazard classification in terms of likelihood.
- Count the total number of accident cases in each severity category.
- List of tasks, hazards and controls involved in a work plan
- Estimated the risk involved based on the likelihood matrix, severity matrix and exposure rate.
- Control measures and control measure types.
- Departments the accidents took place and the department the work plan is carried out by workers

1.4.4 Assist user to produce statistical report.

The system will assist a user produce a statistical report that displays likelihood, severity of the accident, exposure rate and estimated risk involved in each identified hazard. The user does not have to manually key in the likelihood, severity, exposure rate matrix to produce estimated risk for the identified hazard. The system will generate a graph that represents likelihood, severity, exposure rate and estimated risk once the task hazard is identified.

1.5 Project Significance

This project will assist the user in (CST) to reduce or lower the accident rates caused by unidentified hazard. This will create a more secure working environment, where most of potential hazards will be identified.

The system would store information gathered from past work plan, task, hazards, accident and control measures in a centralized database, where users can find information in a much semantic manner. At the same time, it is less time consuming than going through bundle of documents in failing cabinet or brainstorming sessions each time the new job/ work plan is discovered.

Apart from that, the risk will be estimated more accurately because the user does not have to manual key in the likelihood matrix, severity matrix and the exposure rates. Instead, it be automatically generated based on the number of accident rates and exposure rates for a particular hazard and task.

1.6 Expected Output

Among the expected outputs of this project is its ability to identify hazards based on tasks. The system makes sure that no hazard is overlooked or left out because of the user's inexperience or carelessness. At the same time, a user could add other hazards which he or she finds appropriate. The user is able to access previous information regarding hazards and control measures of similar task in a systematic manner.

The system should also be able to estimate risks involved in each task accurately because the likelihood and severity automatically generate based on the number of accident and exposure rates for each identified hazard and task.