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# WORKSHOP TIME GUARD SYSTEM

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This report is submitted in partial fulfillment of the requirements for the  
Bachelor of Information and Communication Technology (Software Development)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
NATIONAL TECHNICAL UNIVERSITY COLLEGE OF MALAYSIA  
2004

## ADMISSION

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**WORKSHOP TIME GUARD SYSTEM**

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## DEDICATION

To my beloved family and friends,  
who bring passion and spirit

## ACKNOWLEDGEMENTS

*After having completed this report, I would like to express my sincere appreciation to a number of individuals, for their cooperation and support throughout the development of this project, without them this would not have been possible.*

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## ABSTRACT

The Workshop Time Guard System is a web-based application that is specially built for the third party logistics provider and workshops, with the goals to improve efficiency and shortening processing time by automating all processes and workflows involved in a central application. As the project will be the enhancement version from the current system, this project will focus more on human resources planning and efficiency such as pending job assignment, mechanic job log, task efficiency, evaluation to mechanic performance and mechanic duty shift control. By implementing the new solutions to the system, the maintenance staff will be better informed of pending jobs or faults at the workshop whereas the mechanic will be able to access to the necessary information instantly to rectify the problem. A number of improvements on the existing features will also be included, such as urgent task handling, vehicle quality inspection and job activation to ensure more accurate time estimation and further improve the flexibility of the system in handling the various situations. The project will be carried out systematically with the waterfall model of Software Development Life Cycle and Structured System Analysis and Design methodology. The business process and environment is analyzed to enable a more thoroughly understanding of the problems, opportunities and directives that triggered the project. The system design includes the preliminary or high level design and detailed design to fulfill the requirements. In implementation phase, the design is translated into a machine-readable form using the appropriate programming language. The testing strategy and approach is adopted to validate the quality of the system prior to release. Overall, this project is expected to deliver a range of mission-critical applications, including a proprietary environmental compliance database for its corporate administrative staff, and a fleet management application for its vehicle maintenance crew at the workshop.



## ABSTRAK

*Workshop Time Guard System* merupakan aplikasi yang dibina khas untuk kegunaan syarikat pengangkutan dan bengkel yang bermatlamat demi memperbaiki keberkesanan and memendekkan masa pemprosesan dengan mengawal proses dan aliran kerja yang terlibat secara automatik dalam satu sistem berpusat. Sebagai versi peningkatan dari sistem yang sedia ada, projek ini akan memfokus kepada perancangan tenaga kerja dan keberkesanan proses seperti pembahagian kerja antara mekanik, jadual kerja mekanik, keberkesanan kerja, penilaian kepada keupayaan mekanik, dan pengawalan sesi pekerjaan. Dengan mengimplementasikan sistem tersebut, mekanik dijangka akan sentiasa menyedari tugas yang dibahagikan dan mempunyai maklumat yang secukupnya untuk menjalankan tugas mereka. Beberapa pembaikan pada sistem yang sedia ada juga dirangkum dalam projek ini, seperti pengurusan terhadap kecemasan, pemeriksaan kualiti dan pengaktifan kerja demi memastikan jangkaan masa yang lebih tepat dan seterusnya memperbaiki keupayaan sistem beroperasi dalam pelbagai situasi. Projek ini akan dijalankan secara sistematis melalui fasa *Software Development Life Cycle* dan *Structured System Analysis and Design*. Masalah dan persekitaran perniagaan dianalisis demi memastikan kefahaman kepada masalah, peluang dan arah pembangunan sistem. Rekabentuk sistem dibangunkan termasuk rekabentuk awal dan rekabentuk terperinci demi merealisasikan syarat yang telah ditentukan. Dalam fasa implementasi, rekabentuk diterjemahkan kepada bahasa yang boleh dibaca oleh komputer dengan pengaturcaraan yang sesuai. Kaedah pengujian dilaksanakan demi menjamin kualiti sistem sebelum kegunaan pengguna. Secara keseluruhannya, projek ini dijangka dapat menghasilkan satu aplikasi yang *mission-critical*, dimana terhasilnya satu pangkalan data yang berkesan kepada staf pengurusan syarikat dan aplikasi pengurusan kepada pekerja bengkel.

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## LIST OF ABBREVIATES

3PL	-	Third Party Logistic
BSO	-	Business System Options
CD	-	Compact Disc
DFD	-	Data Flow Diagram
DSS	-	Decision Support System
ERD	-	Entity Relationship Diagram
ERP	-	Enterprise Resource System
GB	-	Giga Bytes
GUI	-	Graphical User Interface
HCI	-	Human Computer Interaction
HQ	-	Head Quarter
IIS	-	Internet Information Services
IP	-	Internet Protocol
LAN	-	Local Area Network
MB	-	Mega Bytes
PC	-	Personal Computer
PHP	-	Personal Home Page
RAM	-	Read Only Memory
SDLC	-	Software Development Life Cycle
SME	-	Small Medium Enterprise



SQL	-	Standard Query Language
SSADM	-	Structured Systems Analysis and Design Methodology
TCP	-	Transmission Control Protocol
TSO	-	Technical System Options
WAMP	-	Windows-Apache-MySQL-PHP
WAN	-	Wide Area Network
WIMP	-	Windows, Icons, Menus, and Pointing devices
WTGS	-	Workshop Time Guard System

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## CHAPTER I

### INTRODUCTION

#### 1.1 Overview

As a result of recent technological advances, many firms are now relying on the information technology to automate an enormous amount of works in their day-to-day operations. In freight and logistic industry, efficiency is everything. As part of the industry main concern, the company always seeks to improve its vehicle fault repairing and maintenance at the workshop, where time costly and error prone processes are common.

The industry needed its administrative staff at the vehicle maintenance department to have a better control on the existing vehicle repairing and maintenance process, from authorization to vehicle arrival and departure from the workshop. This project will attempt to automate the entire workflow, by providing the company staff a fast and easy way to track and manage the information from a central application.

When applied to the repairing process in the workshop, the efficiency is highly dependant on the way the workshop maintenance staff performs the given task. In another word, to improve efficiency of the workshop, this project is likely to include a feature that could evaluate the staff performance. The system will also include a module that will allow the mechanic to be better informed of pending jobs and faults.

In order to support the operations from the remote locations, this project will be specially designed with the web-based architecture in mind. All data will be controlled in a central web server and database server, whilst the user interface will be developed based on a web browser.

## 1.2 Problem Statements

In freight and logistic industry, efficiency is everything. As part of the industry main concern, the company always seeks to improve its vehicle fault repairing and maintenance at the workshop, where time costly and error prone processes are common.

The freight company is facing a problem which its vehicle maintenance support team have very limited control over the existing vehicle repairing and maintenance processes, especially after the faulty vehicle has been send to the workshop for repairing.

Another common problem that encountered by the workshop is the delay of response times towards the receiving jobs as the workshop staff remained manually assigns tasks or jobs to the mechanics. Without a proper planning to the tasks and schedule, it sometimes led to infighting among the maintenance crew and downtime in the repairing line.

The current mode operation is rather straightforward, which the mechanic works by the order of team leader or supervisor. Problems arise as the mechanic usually needs to put aside on going task to carry out the necessary adjustments or work when being assigned for multiple tasks at the same time.

The quality inspection is somewhat another issue that has been overlooked in the process. The vehicle testing process is usually carried out by the mechanic in the

middle of service progress. However, this process is less transparent and sometimes it does not really reflect the actual condition.

Lack of standardization in performance evaluation is simply another issue that must not be ruled out. Most of the time, the task efficiency and the mechanic performance can only be done through the observation by supervisor. However, the accuracy of evaluation usually raises a doubt as there is no supportive data to prove the actual situation.

### 1.3 Objectives

This project will be developed to the specification by emphasizing on the time efficiency of the repairing and maintenance services at the workshop. It is anticipated this project will strive to archive the following objectives:

- i. Improve the efficiency on task assignment by eliminating the inaccuracies in manual process.
- ii. Faster response to the tasks in urgency.
- iii. Boosts maintenance staff productivity by allowing the maintenance to have direct access to the information necessary to rectify the problem immediately.
- iv. Reduce downtime in the vehicle repairing line as the maintenance staff will be better informed of pending jobs or faults.
- v. More transparency in the vehicle quality inspection process.
- vi. Accurate evaluation and measurement to task efficiency and mechanic performance.
- vii. Better control of maintenance crew's duty shift.



## 1.4 Scopes

The key to implementing any system is to ensure that it improves methods of working, not necessarily to change them fundamentally. Therefore, the scope of this project will follow the existing business workflow with the target to further shortening processing time by automating all processes in a central application. Besides retaining a number of features from the current system, this project will focus more on human resources planning and efficiency such as pending job assignment, mechanic job log, task efficiency, mechanic performance and mechanic duty shift control. Besides, this project will also include some enhancements on the existing features, such as urgent task handling, vehicle quality inspection, job activation, etc. This is to ensure more accurate time estimation and further improve the flexibility of the system in handling the various situations. In general, this project is tends to improve the following areas:

- i. Pending Jobs and Task Assignment

This function shall cover a list of pending jobs following the faulty vehicles arrived at the workshop. The pending jobs can be assigned to the suitable mechanics, based on their current work load, duty shift and availability.

- ii. Mechanic Job Log

This function will be specially designed for the mechanic use. This shall allow the mechanic to check for their job log initiatives, planning and controlling of their own schedule of work as well as retrieve the essential information to rectify the faulty vehicles without having to refer to the third party.

- iii. Vehicle Quality Inspection

This function shall include every repair detail of the vehicles, which including the status of the vehicles, services performed, expected time required, etc. The function shall support the entire quality inspection session, which allows only the vehicle that pass the quality inspection to be departed