UNIVERSITI TEKNOLOGI MALAYSIA

DECLARATION OF THESIS / UNDERGRADUATE PROJECT PAPER AND COPYRIGHT

Author's full name : NURUL WAHIDA BINTI MOHAMED

Date of birth : 19TH APRIL 1984

Title : ROAD MAINTENANCE MANAGEMENT SYSTEM : A CASE STUDY AT PUBLIC WORK DEPARTMENT

Academic Session : 2009/2010

I declare that this thesis is classified as :

☐ **CONFIDENTIAL** (Contains confidential information under the Official Secret Act 1972)*

☐ **RESTRICTED** (Contains restricted information as specified by the organization where research was done)*

☐ **OPEN ACCESS** I agree that my thesis to be published as online open access (full text)

I acknowledged that Universiti Teknologi Malaysia reserves the right as follows:

1. The thesis is the property of Universiti Teknologi Malaysia.
2. The Library of Universiti Teknologi Malaysia has the right to make copies for the purpose of research only.
3. The Library has the right to make copies of the thesis for academic exchange.

Certified by :

_____
SIGNATURE

_____
840419-11-5002
(NEW IC NO. /PASSPORT NO.)

Date : 30 APRIL 2010

_____
SIGNATURE OF SUPERVISOR

PROF. DR. MUHD ZAIMI ABDUL MAJID
NAME OF SUPERVISOR

Date : 30 APRIL 2010

NOTES : * If the thesis is CONFIDENTAL or RESTRICTED, please attach with the letter from the organization with period and reasons for confidentiality or restriction.

I hereby declare that I have read this project report and in my

opinion this project report is sufficient in terms of scope and quality for the

award of the degree of Master of Science (Construction Management)

Signature   : ....

Name of Supervisor : PROF DR MUHD ZAIMI ABDUL MAJID

Date   : 30 APRIL 2010

ROAD MAINTENANCE MANAGEMENT SYSTEM : A CASE STUDY AT

PUBLIC WORK DEPARTMENT

NURUL WAHIDA BINTI MOHAMED

A project report submitted in fulfilment of the

requirement for the award of the degree of

Master of Science (Construction Management)

Faculty of Civil Engineering

University of Technology Malaysia

APRIL 2010

I declare that this project report entitled *"Road Maintenance Management System :*
A case Study at Public Work Department" is the result of my own research except is
cited in the references. The project report has not been accepted for any degree and
is not concurrently submitted in candidature or any other degree.

Signature   : ....

Name   : NURUL WAHIDA BINTI MOHAMED

Date   : 30 APRIL 2010

ACKNOWLEDGEMENT

ABSTRACT

Road should be viewed as an important national assets. Like any other assets, road must be regularly maintained to keep them serviceable. The study conducted on the Road Maintenance Branch, whereby this branch was established specifically to manage the assets of the Federal Road to the Public Work Department of Malaysia. The aim of this study is to investigate on how to improve road maintenance management system in order to reduce time and cost. The study is carried out through interviews, questionnaires and archives from the Public Work Department. Interviews were conducted with the personnel involving in road maintenance management. The questionnaires were distributed to those who are involved in maintenance activities at the Public Work Department. The type of road involved in this study was a Federal Road, P27 under Public Work Department supervision. The data collected were analyzed using an average index method to obtain the result. From the result, the most common problem occur during the implementation of Road Maintenance Management System is to get the funds for the road maintenance. Public Work Department should consider to monitor the work carried out by the concessioners in order to improve the Road Maintenance Management System.

ABSTRAK

Jalanraya merupakan aset penting bagi sesebuah Negara. Seperti aset – aset negara yang lain, jalanraya seharusnya diselenggara setiap masa untuk memeastikan kelancarannya. Kajian ini dilaksanakan terhadap Cawangan Senggara Jalan, dimana ia ditubuhkan untuk menguruskan aset Jalan Persekutuan bagi Jabatan Kerja Raya Malaysia. Focus kajian ini adalah bagi melaksanakan penyiasatan bagaimana untuk meningkatkan system pengurusan penyelenggaraan jalan bagi mengurangkan kos dan masa. Kajian ini dijalankan melalui kaedah temuramah, soal selidik dan maklumat – maklumat dari Jabatan Kerja Raya. Temuramah dilakukan terhadap pegawai yang terlibat dalam pengurusan penyelenggaraan jalan. Soal selidik pula diagihkan kepada pegawai yang terlibat dalam aktiviti penyelenggaraan di Jabatan Kerja Raya.Kajian ini melibatkan Jalan Persekutuan, P27 dibawah perlaksanaan Jabatan Kerja Raya. Data yang dikumpul dianalisa dengan menggunakan kaedah Index Purata untuk mendapatkan keputusan. Daripada keputusan yang diperolehi, masalah yang biasa timbul semasa perlaksanaaan system pengurusan penyelenggaraan jalan ini adalah bagi mendapatkan peruntukkan. Manakala, bagi meningkatkan system pengurusan penyelenggaraan jalan adalah pihak Jabatan Kerja Raya perlu memantau kerja – kerja yang dilaksanakan oleh pihak konsesi.

TABLES OF CONTENTS

LIST OF CONTENTS	PAGE

CHAPTER	TITLE	PAGE

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.0   INTRODUCTION

According to Ahmad (2002) maintenance is always a must for any structure in order to maintain its serviceability and to prevent deterioration that may shorten the service life. In reality, maintenance works are not given the attention it should have a budget allocated for maintenance work in which seldom become a prior consideration. However, it is a fact that maintenance is the most important and the activity to be carried out to prolong or at least maintain serviceability of structure until the end of its service life.

Structures as stated do not solely refer to buildings. Other structures such as bridges, roads, harbours, drainages and any kind of engineering structures are also included. Maintenance on these structures may differ in various ways, but all of it must be carried out in a strategic and systematic way. This study is conducted to investigate on how to improve Road Maintenance Management System.

1.1 BACKGROUND OF STUDY

In this new era, the product we design not only for use and demolish but we start to find or consider new strategies to effectively protect, manage and sustain our pavement so that not only they are safe to use, but can also be maintained effectively and last longer.

In Malaysia, especially in government sector many new pavement and surfacing types have been considered by both the engineers in the Public Works Department (PWD) and the consultant engineers. Once the concepts are decided the designers either from the consultants or the PWD are allowed to proceed with the detail design.

With respect to the pavement and surfacing types encountered, a majority of the proposals are of the conventional types. However there are proposals that may be classified as non traditional.

Besides the new design of pavement surfacing types, the major problem still appear. From News Straits Time, 18 August 2003 the Chief Director of Work Public says that, "Local authority got more complaint from the road user everyday because of unsatisfied work done".

Therefore, maintenance the road is important to make sure the traffic flow smoothly. But most of the developed countries are faced with high maintenance cost on the aging transportation highway. Fwa (2006) highlighted that highway maintenance can broadly define as an action taken to retain the road pavement in a safe and useable condition. Road maintenance normally excludes upgrading and strengthening of the road elements, but maybe done if these appear to be the most cost – effective actions in the long terms. Maintenance could be emergency, remedial (routine or recurrent) and preventive (periodic) type.

Road maintenance must be planned, managed, design and executed. Planning and management are done by means of maintenance management systems and procedures. These system and procedures are normally different from a pavement and bridge management systems since it do not focus on long term and strategic repair and upgrading issues. Relevant pavement and bridge can be identified for protective and preventive actions as part of a road maintenance program. On time maintenance is extremely important.

Dipak (2005) conduct a study for roads maintenance at Nepal found that the main objectives of road maintenance is to ensure the serviceability of the road network and minimize the cost of road transportation, which is comprised of

i. Agency cost: Capital cost of construction and maintenance of the facilities over their design life; and
ii. Road User Cost.

Regarding to Reginald (1986), it is important to view maintenance in the context of the overall construction process. The role played by maintenance in the construction process can start from design stage. The involvement of maintenance department in this stage is as an advisor to the designer to figure out the maintenance problem in the future.

Regarding to the Armstrong (1984), some of the advantages of the involvement of maintenance department in early stage are it would able to check the practicability of the design details, the suitability of patent joint, anticipate leaks, staining, expansion joints, and many other things that can prevent further defects in the future caused by miss-design.

1.2   PROBLEM STATEMENT

Most of the road in Malaysia was under responsibility of Department of Public Work (PWD). Maintenance of road was directly under Branch of Road Maintenance. From the statistic of complaint from the road user is 31% on road defect or failure of the road.

Dipak (2005) addressed from his study a number of challenges to achieve sustainable management of Nepal's road network like institutional problems concerning management and utilization of the fund and capacity constraints in road agencies.

Derek *et al* (1986) described three main problems in maintenance which are inadequate financial, bad management, and poor design.

Financial is the main measurement for the action will take for maintenance activities and for some householders' maintenance budget is the easiest part to cut if they faced financial problem.

The second problem is bad management, which could be interpreted as idleness and waste among the maintenance personnel. The maintenance manager and the staff's ability and responsive to the maintenance problem is one of the tool of effective maintenance management.

The design also part of the problem in maintenance. It is important to give more attention to decide which materials and elements will be use, and unfortunately it is uncommon at the design stage both designer and owner take maintenance as one of the design consideration. Poor design also includes the poor quality materials used.

From the above problem, the government spend more money to maintain and repair the road. So, from the study about road maintenance management system, it will help the government how to reduce the cost for maintenance and also to make sure the road in good condition with minimum maintenance.

1.3 AIM AND OBJECTIVES

The aim of this study is investigation on how to improve road maintenance management system. To achieve the aim of this study, the following objectives have been set:

    i.   To study the road maintenance management system in the Malaysia construction industry;

    ii.   To identify the common problem in road maintenance management system; and

    iii.   To identify the basic approach for improving road maintenance management system.

1.4   SCOPE OF STUDY

The scope of research for achieving the goals is focus on maintenance work done for all Federal Road under PWD Supervision and also related to the management system on maintenance at PWD. Road Maintenance Branch is the main target for this study because this branch was implementer for the Road Maintenance Management System. In Road Maintenance Branch, it has a few units that was involved in this study which is "Unit Kejuruteraan Pemulihan Jalan", "Unit Pengurusan dan Penyelengaraan Jalan Zon Tengah/Timur", "Unit Pengurusan dan Pemyelengaraan Jalan Zon Selatan", "Unit Pengurusan dan Penyelengaraan Jalan Zon Utara" and "Unit Kejuruteraan Senggara".

1.5   RESEARCH METHODOLOGY

To carry out the study, several research methodologies were used, which includes initial discussion, literature review, data collection, data analysis and conclusion. Figure 1.1 showed the flow chart of Research Methodology used to achieve the objectives that have been set.
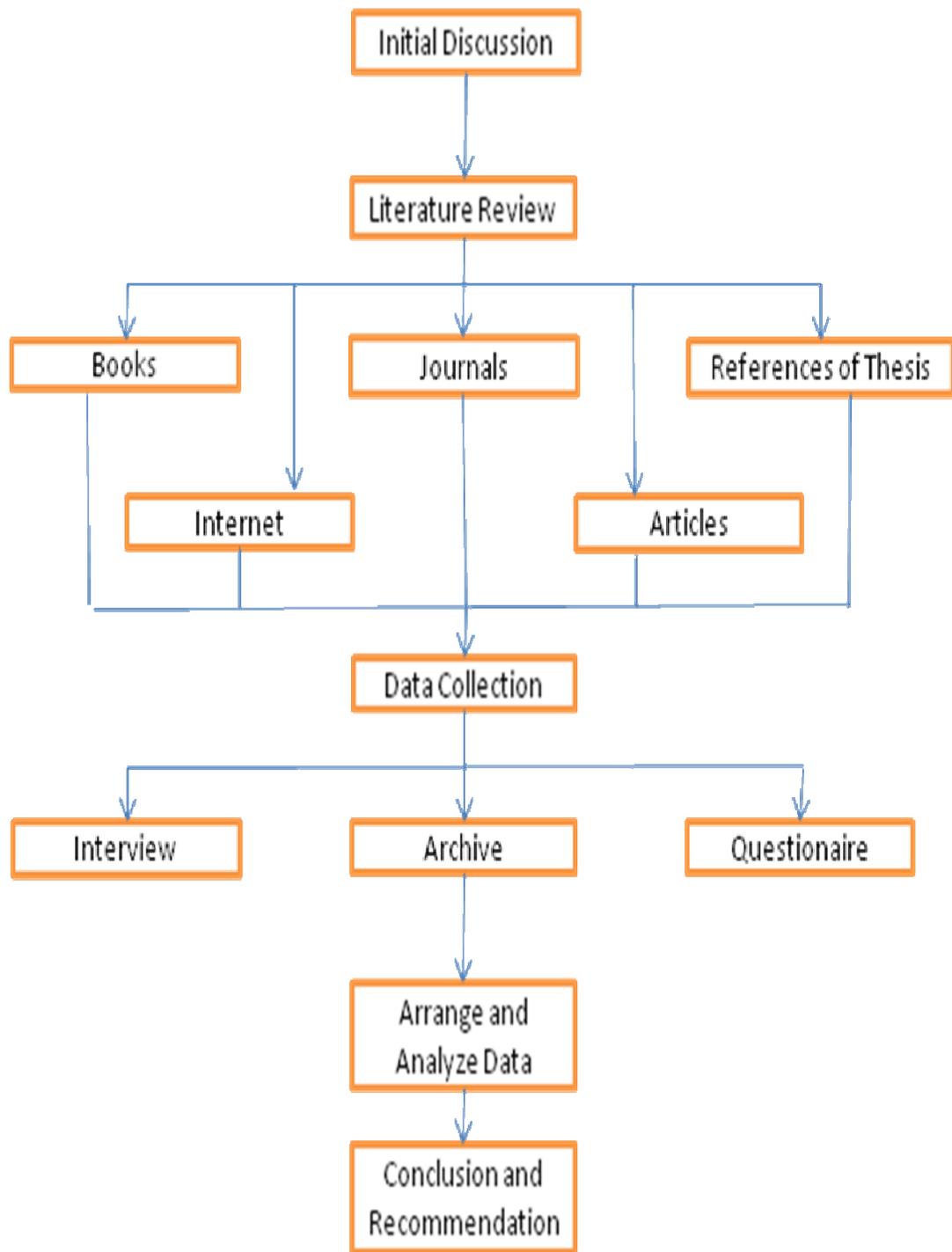
Figure 1.1: Flow Chart of Research Methodology

1.6   SUMMARY OF CHAPTERS

Chapter One explained about the background of study and the problem of statement. The aim and objective are defined in this chapter including the scope of study. Flow chart of the research methodology is also highlighted in this chapter to give an overall guideline for this study.

Chapter Two discussed about the literature review of this study. This chapter explained the theoretical background of the study and discuss the work done by previous researchers.

Chapter Three discussed about the research methodology. This chapter described the detail methodology used for this study. The research methodology includes literature review, data collection, data analysis and conclusion.

Chapter Four discussed about the Road Maintenance Management System which currently implemented at Public work Department. The process of Road Maintenance Management System was confirmed through the interviews and archives data.

Chapter Five discussed about the data analysis which were gathered though the interviews and questionnaires. The method of the analysis used in this study is an average index.

Chapter Six discussed about the conclusion and the recommendation for this study. The conclusion was based on the objective given at the initial study. Recommendation for the further study is also highlighted in this chapter.