

THE EFFECTIVENESS OF PAVEMENT REHABILITATION AT KUALA  
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*Specially dedicated to my beloved father, mum, my sisters, brothers and all my friends.*

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## **ABSTRACT**

General function of a pavement is to provide a safe and comfortable riding surface to road users. However, pavement distress is major problems faced by contractor. Pavement rehabilitation is essential which can be improve and remain the functional of the roads networks and can be retard of deterioration. Since rehabilitation of pavement is a vital and continuous activity, maintenance shall be done effectively to avoid any reoccurrence and repeatedly works. Thus, in fulfill and meet pavement goals, the aim of this study is to determine sources of pavement distress and to determine the effectiveness of rehabilitation works in term of cost, quality and time at Kuala Lumpur Karak Highway. In view to the above, a thorough planning and scheduling had been organized on the methodology such as reading, adopting literature review, combination of analyzing of case study and adopting of actual data on site. The process of data collection involved obtaining data from contract document, bill of quantity, consultant reports and operations report. Then, the data are presented and analyzed conjunction with the aim and objectives of this study. In conclusion, some sources of distress identified to improve the effectiveness of pavement rehabilitation implemented at KL Karak Highway.

## ABSTRAK

Fungsi utama permukaan jalan adalah menyediakan keselamatan dan keselesaan kepada pengguna. Sungguhpun begitu, kerosakkan permukaan jalan merupakan permasalahan terbesar kepada kontraktor. Pembaikpulihan jalan, adalah amat penting dimana ianya dapat meningkatkan dan mengekalkan fungsi jalan serta ianya dapat mengekang kerosakkan jalan yang berterusan. Oleh kerana pembaikan jalan adalah penting dan merupakan satu aktiviti yang berterusan, penyelenggaraan jalan hendaklah hendaklah dijalankan secara berkesan agar ianya tidak berterusan rosak. Oleh itu, tujuan bagi kajian ini adalah untuk menentukan punca-punca kerosakkan jalan dan menentukan keberkesanan pembaikpulihan jalan daripada segi masa, kos dan kualiti. Kajian kes ini akan dijalankan di Lebuhraya Kuala Lumpur Karak. Sehubungan dengan itu, satu perancangan yang menyeluruh telah dilakukan terhadap kaedah-kaedah yang digunakan iaitu merangkumi daripada pembacaan, kajian literature, kombinasi kajian kes dan data daripada tapak. Proses bagi mendapatkan data-data telah diperolehi melalui kontrak dokumen, *bill of quantity*, laporan jururunding dan laporan operasi. Seterusnya, data-data yang diperolehi akan dipersembah dan dianalisis berdasarkan kajian kes yang dijalankan. Akhirnya, satu kesimpulan untuk kajian ini didapati seperti kajian dijalankan. Sebagai kesimpulan, punca-punca kerosakkan jalan yang dikenalpasti adalah meningkatkan keberkesanan kerja-kerja pembaikpulihan jalan.

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**LIST OF ABBREVIATIONS**

ADT	-	Average Daily Traffic
IKRAM	-	Institut Kerja Raya Malaysia
ISSA	-	International Slurry Seal Association
MHA	-	Malaysia Highway Authority
NCR	-	Non Conforming Records
SAMI	-	Stress Absorbing Membrane Interlayer

## **CHAPTER 1**

### **INTRODUCTION TO STUDY**

#### **1.1 Introduction**

Flexible pavements almost are being used at all networks of local roads, federal roads, expressway, highways and others road in our country. It is important that of these flexible pavements meet the required of pavement performances goals. Once the construction of the pavement works is completed, it is most essential to implement pavement preventive maintenance that emphasizes keeping roads in good condition through early application of maintenance treatments.

Pavement maintenance and rehabilitation major and minor incorporates all activities undertaken to provide and maintain serviceable roadways. Huge amount of money or capital had already being invested in the construction of roads and highways. In this country, several highways had been constructed namely North South Highways, East Coast Expressway, Penang Bridge, Shah Alam Expressway, Kulim-Butterworth Expressway, Seremban – Port Dickson Highway, Malaysia – Singapura Second Crossing Expressway, Sungai Besi Highway, Cheras – Kajang Highway, Damansara Puchong Highway, Ampang Kuala Lumpur Elevated Highway, Lebuhraya Penyuraian Trafik Kuala Lumpur Barat (SPRINT), Lebuhraya

Baru Pantai (NPE), Lebuhraya Lingkaran Penyuraian Trafik Kajang (SILK), Lebuhraya Koridor Guthrie (GCE) and Kuala Lumpur - Karak Highway. Huge amount of money would also be invested on the continuous maintenance of highways which is vital to ensure road worthiness, safety and end user satisfaction.

Kuala Lumpur Karak Highway was privatise in year October 1994, responsible on operations and maintenance of highways. Kuala Lumpur - Karak highway start from KM 19.20 and ends at KM 79.20 with total length will be 60km. On August 2004, highway concessionaire was executing theirs major project at KL Karak, pavement rehabilitation. This project is divided to six main packages and was awarded to three main contractors with sum of contract amounting around RM 60,000,000.

## **1.2 Problem Of Study**

Since 2004, several problems are frequently encountered during operations and maintenance of KL Karak Highways. Some of the problems such as ageing of operations and services building, slope stability, highways safety and flexible pavement distress.

However, flexible pavement distress is a major problem faced by concessionaire of KL Karak Highway during their operations and maintenances. The problems during operations were identified as follows:

1. Poorly identifying type of flexible pavement distresses
2. Poorly identifying sources of pavement distresses
3. Ineffectively corrective maintenance of pavement
4. Poorly identifying method of rehabilitations.



5. Poorly implementation method of rehabilitations during constructions

### **1.3 Aim And Objectives Of Study**

The aim of this study is to evaluate the Pavement Rehabilitation as a method to repair the existing pavement in order to meet pavement performances goals and to fulfill the standard requirement. The study will cover the pavement behaviour and performances, types of distresses in flexible pavement, sources of pavement problems, selection methods or options of rehabilitations and standard specifications requirement during constructions works. This study will evaluate the performance of flexible pavement from completed pavement rehabilitation and to ensure that the initial objectives are achieved. To achieve the above aim, the following objectives are identified:

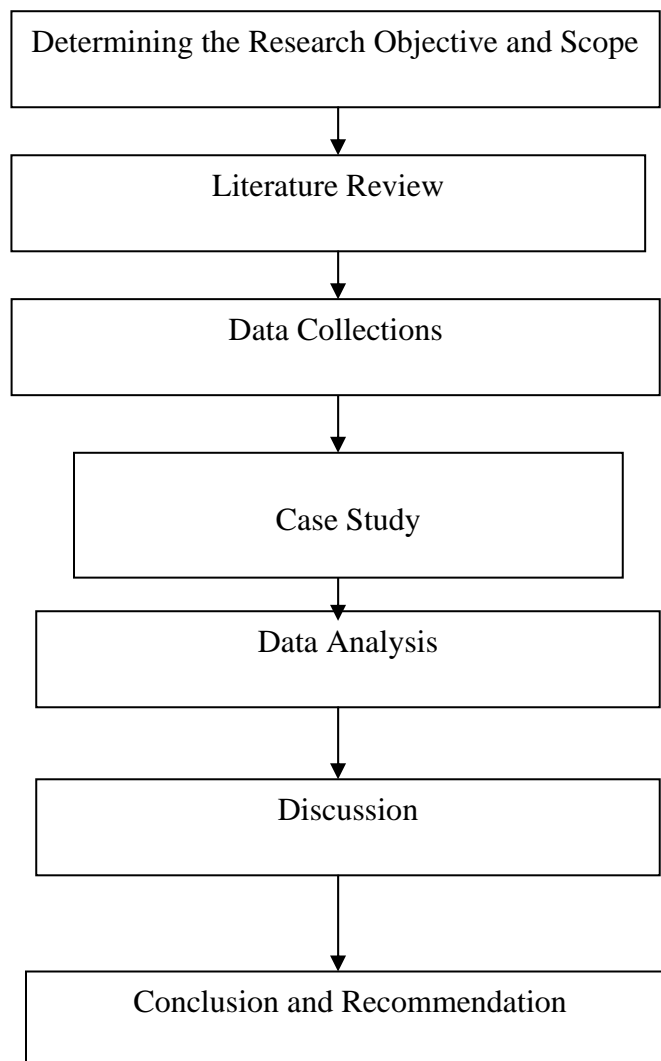
1. To determine sources of pavement distress at Kuala Lumpur Karak Highway
2. To evaluate the effectiveness of pavement rehabilitation in term of time, cost and quality at Kuala Lumpur Karak Highway

### **1.4 Scope of Study**

The scope of this study shall be on the highway flexible pavement on the problem at Kuala Lumpur - Karak Highways and limited to year 2004 until 2006.

## 1.5 Brief of Methodology

The methodology used in conducting this research is through literature search. The literature search for the study obtained through are journal papers, conference papers, technical reports, books and websites browsing to understand and meet the objectives of the study. Besides that, the data for study has been generated using methodology case study. The overall sequence of research process undertaken is shown in Figure 1.1.



**Figure 1.1** Research methodology sequence