AN INVESTIGATION ON VEHICLE OVERLOADING IN MUAR – MELAKA ROAD

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DEDICATION

To My dear Parents *(Sutiah Binti Siraj and Marwan Bn Arshad)*
For their endless support

My Supportive Husband *(Md Khair Bin Rathaman)*
For motivating and believing in me

My Lovely Daughters *(Nur Alya Nafisah and Nur Hasya Maisara)*
and My Son *(Muhammad Khalief)*
For their everlasting encouragement in my education

My Friends

This project paper is dedicated to them

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“ In the name of God, the most gracious, the most compassionate”

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ABSTRACT

Vehicle overloading is considered as one of the most substantial concerns in road transport due to a possible road surface damage. The ability of a pavement structure in carrying out its function reduces in line with the increase of traffic load, especially if there are overloaded heavy vehicle passing through the road. This paper investigates the overloading of vehicles in the Muar-Melaka roads. The main objective of this paper is to examine the percentage of overloading based on types of vehicles and their equivalence factor (EF). Data were collected from fixed weighbridge station by considering gross vehicle weight, maximum permissible gross vehicle and axle load for the period of two years. The result showed that heavy vehicle with 2 axles is the most overloaded vehicle with 74.3%. Besides that, 29% of all heavy vehicles weighted are between 1% to 25% overloading. Equivalence Factor (EF) for this case study area is equal to 3.14. Thus, it is can be noted that EF of this road are still in standard design.

ABSTRAK

Kenderaan lebih muatan dianggap sebagai salah satu pekara yang perlu diambil berat dalam sistem pengangkutan jalan raya kerana pekara ini boleh menyebabkan kerosakan pada permukaan jalan. Kebolehupayaan struktur turapan akan berkurangan selaras dengan peningkatan beban trafik, terutamanya jika terdapat terlalu banyak kenderaan berat lebih muatan melalui jalan raya tersebut. Kajian ini dijalankan untuk mengkaji kenderaan lebih muatan di jalan Muar-Melaka. Objektif utama kajian ini adalah untuk mengkaji peratusan lebih muatan berdasarkan kepada jenis kenderaan dan juga "*equivalence factor*" (EF) bagi jalan tersebut. Data yang dikumpul dari stesen jambatan timbang (jenis tetap) dengan mempertimbangkan berat kasar kenderaan, berat kasar maksimum kenderaan yang dibenarkan dan beban gandar adalah bagi tempoh dua tahun. Hasil dapatan kajian menunjukkan bahawa kenderaan berat dengan 2 gandar adalah penyumbang terbesar kenderaan lebih muatan di kawasan kajian ini dengan 74.3%.. Selain daripada itu,, 29% kenderaan lebih muatan yang ditimbang mempunyai muatan lebih 1% hingga 25%. "*Equivalence Factor*" (EF) bagi kawasan ini kajian kes adalah bersamaan dengan 3.14 dan ini menunjukkan bahawa EF bagi jalan ini ini masih sama dengan standard rekabentuk yang sediada.

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CHAPTER 1

INTRODUCTION

1.1 Background

Roads represent the largest asset value of a transport infrastructure in most countries. They are one of society's most essential components. Without them, it would be very difficult to travel from one place to another in a time saving and convenience way. Therefore, every country should have an excellent road system and in order to fulfill this function, roads must be properly designed and possesses durability. However, there are roads built on weaker subgrade material resulting in poor performance and cause losses in both serviceability and economy. Although different factors such as material, environment and design consideration may be able to cause the pavement deterioration, the most important contributing factor is traffic loading especially contributed by heavy good vehicles.(Chatti et al. 2004)

An overloading is defined as a load that exceeds the legal truck limit. According to Mohammadi et al.(1992), overload vehicles are expected to contribute more dramatically to the accumulative damage and the damage ratio is 384 442 to when comparing an 80 000 pound (36 288 kg) heavily loaded truck on five axles with a 2000 pound (908 kg) compact size passenger car. This is

especially true when these heavier loads happen frequently. The increase in the overload occurrences was found to cause a noticeable increase in damage done to pavements. Since the greater percentage of goods transported by road is increasing, it is expected that heavy vehicles will remain a common sight on our roads in the foreseeable future. Careful attention should therefore be given in minimizing the use of heavy vehicles in order to prevent damage of road structure caused by them.

1.2 Problem Statement

Malaysia's road is divided into three main categories namely toll expressway (1,700km), federal roads (17,500km) and state roads (61,100km) and the life spans are between 10 to 15 years (Zakaria and Hassan, 2005). Nevertheless, the damages of the pavements occur earlier than expected. One of the recent issues related to road transportation in Malaysia is the behaviour of overloading vehicles especially the increasing number of trucks. This resulted to damages of roads especially in industrial areas because of the over capacity loads that is not aligned with the specified design lifespan of the road structure.

On the other hand, heavy vehicle also contributed to deterioration of the road. There were 19.3 million registered vehicles in the Malaysian roads, and the government spent RM5 billion between 2001 and 2010 to keep sustaining all the Federal roads. This value can be reduced if overloading of vehicles is prevented. So far, little documented research has been carried out pertaining to on axle load in relation to road damages. The need for one is inevitable due to increasing number of extensive development in Malaysia.

Overloaded vehicles could put road user's lives at risk. These vehicles are difficult to steer, less stable and they require a longer stopping distance; which make them very dangerous especially in sharp curves and steep slopes. Besides, overloading can also cause several detrimental impacts on the reliability of

pavement structure. It does not only reduce the lifespan of the pavement itself but also could cause bad road destruction that could lead to accidents. In addition, data from Malaysia Institute of Road Safety Research showed that 25% of fatal accidents involved heavy vehicles.

1.3 Objectives of this Study

The aim of this study is to evaluate the overloading vehicles at Muar – Melaka roads. The objectives were to:

i. determine the percentage of overloading vehicles.
ii. determine an average equivalency factor (EF) of the road.

1.4 Scope of the Study

In this study, the research scope and limitation are as follow:

i. This study focuses on overloading situation in Muar-Melaka road segment, that is the two-way four lane divided (4/2 D) flexible pavement.

ii. The overloading data were collected in 2011 and 2012

iii. The calculation of equivalence factor (EF) is based on TRRL Road Note 40.

1.5 Study Area

The location of this study is in Muar - Melaka road segment, which consists of Johor Baharu – Muar - Melaka federal road specifically located in Jalan Kesang, Muar District as shown in Figure 1.1. The length of this road section is approximately 46 km. Muar-Malacca road segment is a flexible structure that consists of asphalt surface constructed on stabilized base and sub base course.

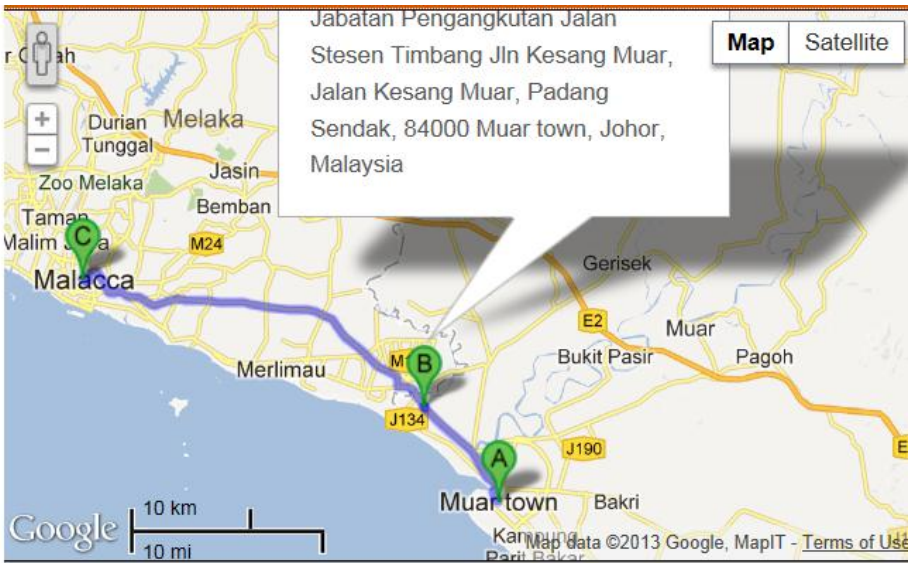

Figure 1.1 : Study Area

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