

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF HEAVY VEHICLES' TYRE
INFLATION PRESSURE ON FLEXIBLE
PAVEMENT**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Civil Engineering

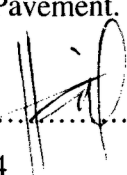
May 2014

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as reference work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

In recent years, overinflated tyre pressure and the effect of increased heavy vehicles' axle load on flexible pavements responses have become a subject of great concern because of the higher stress level induced causing more damages to the pavements. The purpose of this study was to evaluate the effects of various tyre inflation pressures on the determination of tyre contact/footprint area for flexible pavement. A survey to collect data on current levels of tyre inflation pressure was carried out at two major expressways in Klang Valley, Malaysia. The full scale experiment was then conducted on a heavy vehicle with 1:1:2 axle configuration, 10 R 20 tyre size and attached trailer with constant axle load. The data showed that the operational levels and maximum recommended of tyre inflation pressure of heavy vehicles in that area were as high as 827 kPa (120 psi). The effect of varying tyre inflation pressure at different measured temperature on tyre contact area by conducting full-scale field experimental work revealed that the increase of tyre inflation pressure resulted to a decrease on the images of the tyre footprint area.. The analysis carried out to compare the tyre contact area values obtained from the full-scale field experimental work on morning session with the conventional circular area method showed that there is a big difference when the tyre inflation pressures start to increase. KENPAVE linear elastic program was used to analyse the effects of measured actual tyre-pavement contact area and the results was compared using conventional circular tyre contact area. It was found that high tyre inflation pressure produced less contact area (actual), giving more detrimental effect on the flexible pavement compared to the conventional circular tyre contact area method. Meanwhile, it was also found that the temperature of tyres when the heavy vehicles were in operational gave less significant impact on tyre inflation pressure for the Malaysian condition. It is recommended that for future research in this area, the scope of this study is needed to be enlarged to other expressways throughout Malaysia and other types of heavy vehicles, size of tyre and different pavement thickness to obtain additional data and higher confidence level of the effects of tyre inflation pressure.

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TABLE OF CONTENTS

AUTHOR'S DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix

CHAPTER ONE: INTRODUCTION

1.0	Background of Study	1
1.1	Problem Statement	2
1.2	Objectives	3
1.3	Scope and Limitations	3
1.4	Significance of Study	4
1.5	Summary	4

CHAPTER TWO: LITERATURE REVIEW

2.0	Introduction	5
2.1	Factors Affecting Flexible Pavement Design	6
2.1.1	Heavy Vehicles' Traffic and Loading	7
2.1.2	Heavy Vehicles' Traffic and Loading in Malaysia	9
2.1.3	Environmental Conditions	10
2.2	Pneumatic Tyre as Vehicles' Road Interface	13
2.2.1	Functions of Tyre	13
2.2.2	Types of Tyre	14
2.2.3	Tyre Marking and Applications	16
2.2.4	Tyre Inflation Pressure	19
2.3	Heavy Vehicles' Tyre – Pavement Contact Parameter	20
2.3.1	Conventional Circular Area Distribution Model	20