

UNIVERSITI TEKNOLOGI MARA

**A STUDY ON EXPRESSWAY
MERGING AND DIVERGING
TRAFFIC OPERATION**

NURUL QASTALANI RADZUAN

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

Faculty of Civil Engineering

February 2015

I certify that a Panel of Examiners has met on 9th July 2014 to conduct the final examination of Nurul Qastalani binti Radzuan on her Master of Science thesis entitled “A Study on Expressway Merging and Diverging Traffic Operation” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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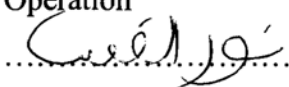
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AUTHOR'S DECLARATION

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 results of my own work, unless otherwise indicated or acknowledged as referenced 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 Acedemic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Merging lane is a path for drivers to accelerate their vehicle at a desired speed from the ramp terminal prior into entering the highway main stream. Conversely, diverging lanes allow the drivers to slow down their vehicle enabling them to enter the ramp terminal conveniently. The length of the speed-change lane should be in optimum design to ensure that the drivers are allowed to make appropriate lane changes. AASHTO (2004) provides a minimum merging lane length for entrance terminals and also a minimum diverging lane length by considering the design speed of ramp terminal and design speed of highway main stream without considering flow rates of influenced area. This research proposed a novel merging and diverging model using statistical platform called Minitab to predict merging and diverging lane lengths, respectively based on macroscopic parameters for Malaysia road traffic conditions. A video recorded traffic empirical data was collected and the post processing analysis was conducted by means of Semi-Automatic Video Analyser (SAVA). The validation of the proposed model is performed by comparing the predicted length data of the model with the empirical length data using paired t-test. The effect of merging and diverging lane lengths were further analysed by using the collected empirical speed data of merging and diverging speed on the ramp and the effective length used for the traffic operation on ramps. The research observed macroscopic and microscopic parameters have significant findings towards the traffic operation.

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