

UNIVERSITI TEKNOLOGI MARA

**EVALUATION OF OPERATING
SPEED ON PAVEMENT
ROUGHNESS AT TWO LANE
HIGHWAY: A CASE STUDY WITHIN
SELANGOR**

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

Faculty of Civil Engineering

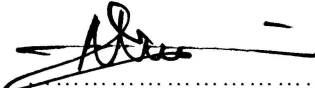
August 2016

AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation 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 Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

A survey conducted by Federal Highway Administration FHWA to the local community were clarified that the single most important factor affecting the ride quality was pavement roughness. From previous study, it shown that pavement roughness have an influences towards the comfort of the driver, fuel efficiency, safety, and vehicle maintenance. Therefore, to improve the driving conditions of the highway system, pavement roughness should be addressed with priority. Numerous studies have shown that initial pavement roughness greatly affects future roughness and roughness progression. Thus in this study, specifically investigates the impact of operating speed on pavement roughness. Considering the importance of pavement roughness towards riding comfort, it is imperative to study the factors from traffic engineering perspective such as crucial traffic parameters that involved to the pavement roughness. The goal of the study is to evaluate the operating speed with regards to pavement roughness, obtained from the actual speed of vehicles generally operates on the road and other traffic engineering parameters. The objectives of this study are to perform survey of road profiling in order to measure pavement roughness by incorporating International Roughness Index (IRI) index, to evaluate operating speed with regards to pavement roughness with the installation of Automatic Traffic Counter (ATC), to develop several models those are able to relate traffic engineering parameters with regards to pavement roughness (IRI index), and finally to validate the models and perform sensitivity analysis in order to check the sensitivity of each significant parameters. The scope of this study is to explore the traffic engineering parameters such as 85th percentile speed and space mean speed with regard to road roughness profiling of JKR R5 Design Standard of straight road within 5 zones in Selangor state. In this research, road tubes are used for gathering the data of traffic parameters where every single vehicle that passed through the tubes will create a pulse and count using the Trax Appollyon as machine counter. Roughometer III was used in this research to perform a survey of road profiling using International Roughness Index (IRI). Multiple linear regression analysis was used to develop a statistical relationship between operating speeds and road roughness index. In the validation stage, the empirical data were compared with the predicted data using the paired T-test statistic and discrepancy measure such as Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), and Mean Absolute Percentage Error (MAPE). Finally, the models have successfully developed and validated according to the established statistical procedures in the study. The findings are hoped to provide as a starting point towards the development of a national standard for predicting operating speed with regards to the pavement roughness.

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