INTERNATIONAL ROUGHNESS INDEX PREDICTION MODEL FOR FLEXIBLE PAVEMENTS IN SRI LANKA

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Declaration of the candidate and supervisor

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Abstract

Due to the significance as an indicator of the pavement condition, International Roughness Index (IRI) is using globally as a pavement performance parameter. It also provides an idea about the riding comfort of a particular road segment and the level of riding quality. Therefore, it is using as a quality assurance criteria of roads just after construction or rehabilitation.

But in Sri Lanka, there is no proper pavement performance models has been developed yet to suite our own conditions. Hence any simple planning level analysis cannot be perform due to lack of a proper performance model(s). In Road Development Authority, HDM 4 software is using for performance modelling and predictions. But, HDM 4 has developed basically taking into account of road conditions in countries all over the world. The aim of this paper is to develop an accurate IRI prediction model for Road pavements in Sri Lanka using linear regression analysis and compare it with the default HDM 4 Model.

The key parameters that the IRI value directly related on a particular pavement was decided based on the literature and the availability of data. The proposed regression model from this paper predict IRI as a function of Pavement Age from construction or last Rehabilitation (years), Average Daily Traffic (ADT), Percentage of Area of All cracks identified on pavement surface (%), Percentage of Raveling Area (%) and Number of potholes. After completing three trials by changing different variables the final IRI prediction model developed is,

$$IRI = 1.594 + 0.207\ Age + 0.1202\ e^{-\ln(ADT / 10\hat{}4)} + 0.1343\ Ravel\ \% + 0.0295\ No.\ of\ potholes$$

A set of available data was used to calibrate the regression model and using other set of data, relationship between the measured and predicted IRI values for the proposed model was observed using the coefficient of correlation (R- value) as a statistical measure to determine how close the data are to the fitted regression line, as the validation process. The proposed model yielded an R-value of 0.75. Finally the developed model was compared with the default HDM 4 Model which is currently using in Sri Lanka.

Key words: IRI, regression analysis, age, AADT, initial IRI, cracks, R-value

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