DEVELOPMENT OF A GEOMETRIC DESIGN INDEX FOR UPGRADING DECISION MAKING – CASE STUDY FOR A PROVINCIAL ROAD NETWORK IN A DEVELOPING COUNTRY

D.P. Lalith Sirisumana

(148316B)

M.Eng in Highway & Traffic Engineering

Department of Civil Engineering

University of Moratuwa

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D.P Lalith Sirisumana

(148316B)

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Supervised by Dr.H.R Pasindu

Department of Civil Engineering

University of Moratuwa

Moratuwa

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DECLARATION

 "I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Master Dissertation under my supervision.

…………………………………… 				Date:…………………
Dr.H.R Pasindu

ABSTRACT

D.P Lalith Sirisumana

Provincial level and local roads comprise nearly 50% of the road network in mileage in Sri Lanka. They play a pivotal role in providing access to the local communities especially in rural areas and an essential component of the economic development of those areas. These roads are under the purview of Local Councils and Provincial Road Development Authorities. Most of these roads do not conform to the design guidelines as they were often developed from local footpaths or gravel roads. Therefore, the travel speeds are very low and safety issues have arisen with the increase in travel demand and the use of motorized vehicles. Therefore, there is need to upgrade these roads to the appropriate design standards to ensure safe and efficient mobility to the road users. However, the road agencies have limited funding to implement upgrading projects on the entire network. Thus, it is pertinent that there is a methodology to prioritize the roads based on the current operational performance so that the funding allocation can be done in the most effective manner. Road upgrading in the context of the study is focused on roadway improvements such as alignment, road width, shoulder etc. In addition to the limited funding, the agencies also lack the technical capacity to carry out detailed investigation and surveys on highway performance that are typically carried out in other road agencies at national level. Therefore, the study proposes a simplified methodology to evaluate the Geometric Design index of the roads based on their roadway and operational characteristics, to be used to assess road network conditions and identify upgrading needs for a highway agency of a low volume road network.

DEDICATION

This dissertation is dedicated to my beloved parents, my charming wife Shirani, and my kids Pubudu, and Ishsra, who have always been with me, through every hurdle I encountered.

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LIST OF ABBREVIATIONS

Wk   - Weightage for factor k;

Rk   - rating for factor k;

n   - Total number of factors.

LOS   - Level of Service

GDI   - Geometric Design Index

PRDA   - Provincial Road Development Authority