IDENTIFICATION OF ROAD DEFECTS, CAUSES OF ROAD DETERIORATION AND RELATIONSHIP AMONG THEM FOR BITUMEN PENETRATION MACADAM ROADS IN SRI LANKA

BY

A.S.P.RANDU HARISCHANDRA

Thesis submitted to the Department of Civil Engineering of the University of Moratuwa in Partial Fulfillment of the requirement for the Degree of Master of Science

Supervised by

Prof. J.M.S.J. Bandara

Department of Civil Engineering
University of Moratuwa, Sri Lanka

August 2004

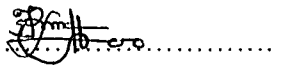
Dedication

To My Mother & Father

For their continuous dedication and encouragement for all the endeavors towards my advancement.

Declaration

This thesis is a report on the research work carried out in the Department of Civil engineering, University of Moratuwa, Sri Lanka, during January 2003 to August 2004. This submission is original and does not have any materials previously published or written by any others anywhere, except where citing is made



A.S.P.Randu Harischandra
Department of Civil Engineering
University of Moratuwa, Sri Lanka.

UOM Verified Signature

Prof. J.M.S.J.Bandara
Department of Civil Engineering
University of Moratuwa, Sri Lanka.

Abstract

The study was particularly concentrated on identifying the causes of road deterioration, road defects and determining the most important parameters which could be used to predict the rate of deterioration particularly in Bitumen penetration macadam roads.

A comprehensive literature review was conducted with literature related to both local an international context to determine the road deterioration factors, road defects, rate of deterioration .....etc both locally and foreign countries. Moreover, the literature review was accompanied with the road condition surveys where sophisticated equipments were used in developed countries while manual data collection methods were used in developing countries like ours.

In achieving the above objectives, a suitable surface condition survey form was developed. Surface condition survey form was accompanied with road surface information, road geometry, sand sealing history and road deformations. Traffic data and sand sealing history were obtained from Provincial Road Development Authority (PRDA) and the rest was obtained by field observations. Data collection was carried out in selected Bitumen penetration macadam roads for about nine months.

Cracks, potholes, edge defects, depressions, corrugations are the significant road defects observed in the field. Traffic, age, road geometry, weather, drainage, construction quality as well construction material, maintenance policy play the major role as road deteriorate agents.

Potholes and cracks were mainly considered in the field observations of road deformations. The data was analysed by using the statistical softwares SPSS and SAS. Category data was used for data analysis and statistical tests were carried out to check the significance of the road deterioration agents. It was found that both potholes and cracks were having significant relationship with age as well as traffic.

Acknowledgement

The author wishes to extend her sincere gratitude to Vice Chancellor, Dean Engineering and the Senate Research Committee of University of Moratuwa for considering the research proposal favorably and granting the necessary fund.

The author is immensely grateful to the supervisor Prof. J.M.S.J. Bandara of the Department of Civil Engineering for his guidance and support.

Acknowledgment are due to Prof.(Mrs.) N. Ratnayake, Director Postgraduate studies, Prof. A.K.W. Jayawardena, Head, Department of Civil Engineering, Dr.S.A.S. Kulathilake, Research Co-coordinator, Department of Civil Engineering, Mr. M.B.S.Fernando, Senior lecturer, Department of Civil Engineering, Mr.R.M. Amarasekara, Provincial Director, RDA, Uva Province, Dr.(Mrs) U.L.D.M.A. Judith, Development and Research Division, RDA, Borupana, Rathmalana, Mr.Wanigapura, Engineer, PRDA, Western Province, Katubedda and the other lecturers the department of Civil Engineering for the positive attitude they adopted in promoting this research project.

Assistance offered by fellow researchers Mrs. Y. De Silva and Mrs. A. Ekanayake, is greatly acknowledged.

The author wishes to thank the following parties outside the university: Asian Development Bank for providing necessary funds for this Master of Engineering Project.

Last, but not least, I wish to pay special thanks to my husband Mr. Saman Cooray for his unfailing support and encouragement.

Finally, the author wishes to thank all others who contributed to the completion of this project.

A.S.P.Randu Harischandra

Table of Content

List of Figures

List of Tables

List of Charts