DEVELOPMENT OF PASSENGER CAR UNIT FACTORS FOR FOUR LANE ROADS UNDER SRI LANKAN CONTEXT

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Degree of Master of Engineering

Department of Civil Engineering

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July 2017

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Dissertation submitted in partial fulfillment of the requirements for the degree Master of Engineering in Highway and Traffic Engineering

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DECLARATION OF THE CANDIDATE AND SUPERVISOR

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ACKNOWLEDGEMENT

First of all I would like to thank my project supervisor Dr. H.R. Pasindu for his valuable support and help given throughout my research to succeed.

I am grateful to the Master of Engineering lecture panel including Prof. J.M.S.J. Bandara, Dr. W.K. Mampearachchi, Dr. H.R. Pasindu, Mr. Loshaka Perera Dr. De Silva G. L. D. I. and all other lecturers for their valuable lectures, comments and guidance.

Further I would like to thank the staff of Transportation Engineering division of department of Civil Engineering of University of Moratuwa for their continuous support.

ABSTRACT

Passenger Car Unit (PCU) or Passenger Car Equivalent (PCE) is a metric used in Transportation Engineering, to assess traffic-flow rate on a road or an intersection. A Passenger Car Equivalent is essentially the impact that a certain mode of transport has on traffic variables compared to a single passenger car.

Roads in Sri Lanka carry heterogeneous traffic, where road space is shared among many traffic modes with different physical dimensions and prevailing loose lane discipline. PCU factors used in Sri Lanka at present are somewhat older and do not reflect static and dynamic characteristics of modern vehicles, road conditions or driver behavior.

Data collection was done on various four lane road segments. Location for the study is identified based on uniformity of road characteristics in terms of pavement width, shoulder type, etc. There should be no visual obstructions to traffic because of bus stops, road side developments, etc. No intersection or side roads along the road stretch so that there are no changes in the traffic volume over the entire stretch. No signalized intersection for 3km road length.

Traffic volume data was collected using video camera to record vehicles in both directions during peak hours. These video footages were observed and the traffic volumes, speeds and 85% value of road width used by traffic volume were calculated.

Then using modified density method proposed by Tiwari, Fazio, and Pavitravas (2000), the PCU factors were derived.

$$PCU_{Xi} = \frac{(k_{car} / W_{85car})}{(q_{Xi} / u_{Xi}) / W_{85Xi}}$$

The results obtained, showed that there is a variation from homogenous conditions to heterogeneous conditions. These results can be used for traffic volume analysis, capacity calculations, road network planning and design purposes, etc. in Srilankan four lanes roads. Further research can be carried out to evaluate PCU factor for 6 lane roads, different highways and intersections.

Key words: PCU—PCE—Road capacity

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBRIVIATIONS

Abbreviation	Description
TRB	Transportation Research Board
PCU	Passenger Car Unit
HCM	Highway Capacity Manual
PCE	Passenger Car Equivalent
TRRL	Transport and Road Research Laboratory
USA	United States of America
MCL	2 wheel Motor cycle
TWL	Motorized Three wheel
CAR	Passenger Car
VAN	Van, Jeep
LBU	Large bus unit
HV	Single unit truck