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DEVELOP DRIVING CYCLES TO DETERMINE FUEL CONSUMPTION AND FOR TRAFFIC ENGINEERING PURPOSES IN COLOMBO CITY

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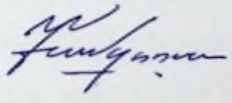
Signature:  Date: 04/12/2014

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ABSTRACT

Driving cycle can be considered as one of the useful methods of modelling traffic behaviour on road for many purposes such as traffic engineering, fuel economy and setting up emission standards. A driving cycle is a series of data points representing the speed of a vehicle versus time in a particular environment. There are hundreds of driving cycles developed all around the world and driving cycles are well established in US, Europe, Australia and in some of the Asian countries. Many driving cycles in those four regions were analysed to identify the best method for Sri Lanka.

Four steps have been identified for cycle construction and the best methods for Sri Lanka was selected after analysing the traffic behaviour of the places where the driving cycles were analysed in the comparison. For both traffic engineering purpose and estimation of emission inventories, the route selection method was done using daily traffic, origin/destination and trip generators and attractors. For the data collection, on-board measurement method was adopted after evaluating the advantages and disadvantages of the chase car method with the on board measurement method. A new approach was used for the data collection after dividing the selected routes and assigning them in to links and combined them using daily traffic proportions. Cycle construction methods were chosen according to the purpose of the cycle construction. Segment based cycle construction method was used to develop a driving cycle for traffic engineering purposes. For fuel economy and estimating emission inventories three methods were used. Micro trip-based cycle construction method was used when there are many "stop-go" conditions. Segment-based cycle construction method used where there are less or no stops between origin and destination (Expressways). Modal cycle construction method was used where there are many variations in driving behaviour (different magnitudes of accelerations and decelerations).

Ten parameters were identified for cycle evaluation and they vary according to the purpose of the cycle construction. Emission related traffic parameters were used to analyse the emission and fuel economy related driving cycles and hence the selected cycle will represent the actual emission or fuel consumption in considered region. Similarly, for the traffic engineering purpose the parameters related to traffic management were considered when evaluating the driving cycle for traffic engineering purpose.

Key Words: driving cycles, vehicle emission, fuel economy, traffic engineering.

DEDICATION

To my loving Parents and to the people supported in many ways to make this dream a reality.

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LIST OF ABBREVIATIONS

DMV	-	Department of Motor Vehicle
AADT	-	Average Annual Daily Traffic
DT	-	Daily Traffic
OD	-	Origin Destination
SAPD	-	Speed Acceleration Probability Distribution
SAFD	-	Speed Acceleration Frequency Distribution
LOS	-	Level of Service

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