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Application of Dynamic Traffic Assignment and Determine Model Parameters for Urban Traffic Conditions in Sri Lanka

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The travel behaviour of people on a road network is not often constant and it changes over the time. Drivers who use a particular road network continuously tend to find more comfortable, congestion free routes with least travel time to reach their destinations. This scenario is complicated in the context of a congested and high-density urban road network where drivers have more freedom to use alternative paths to reach their destinations based on changing traffic patterns within short periods. Further, the presence of navigational tools such as Google Maps help the drivers in making quick decisions in selecting congestion free routes, making route selection more dynamic.

In order to address this dynamic environment, many microsimulation traffic models around the world have developed the dynamic traffic assignment tool which provides the traffic modeller a more realistic modelling environment for urban traffic over the conventional static route assignment. Further, conventional static route assignment may not be able to simulate and give realistic results for urban areas with complex route networks.

However, this facility available in the microsimulation traffic models has not yet been tested under Sri Lankan conditions. Therefore, the objective of this study is to test the dynamic traffic assignment process and find the model parameters that are compatible with Sri Lankan traffic conditions and driver behaviour. For this purpose, PTV Vissim traffic microsimulation software was used.

A 2.5 km stretch of A 000: Kollupitiya-Sri Jayawardenapura road and its vicinity (comprising Rajagiriya junction and flyover) have been considered for the case study. Manual vehicle number plate surveys were carried out at 14 predefined locations covering the entire area to develop origin-destination matrices for different vehicle classes. The average growth factor method was used to develop working matrices from the sample matrices developed through this number plate survey. The origin destination matrices developed for the period between 5.00 pm and 6.00 pm were used as the input for the traffic model. Stochastic (Kirchhoff) traffic assignment method was used to distribute traffic between zones in Vissim. Model convergence, calibration and validation were carried out as per the Vissim manual and Traffic Modelling guidelines developed by Transport for London Institute. The GEH static values of input and output flow values of the modelled network were used as the parameters for model calibration and validation.

The road network developed in Vissim was successfully calibrated to local conditions and a set of model parameters that were compatible with Sri Lankan conditions found. However, there is a need for future research work to find model parameters that are compatible with different road and traffic conditions.

Keywords: *Dynamic Traffic Assignment, Traffic Microsimulation, PTV Vissim, GEH Static, Stochastic Traffic Assignment.*