Corridor Level Traffic Management Through Variable Messaging Systems: A Case Study on East West Links Entering Colombo

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Abstract

Increasing traffic volumes on the major road corridors result in building up traffic congestion during the peak hours. Even in a congested road network, some route options are relatively lower congested while some are overly congested. This implies that drivers are not always well-informed about all the route options they have, and the road network is not in a full equilibrium state. When temporary road closures, partial closures for road maintenance, etc. happen chaotic traffic congestion can be seen as drivers try to find alternative routes without proper information about traffic condition in other roads and possible delays.

Drivers currently can use vehicle in-built navigational system or smart devices with navigational applications to get real time traffic information. But in a country like Sri Lanka, majority rely on their experiences rather than the digital navigational aid. Displaying the dynamic travel time information and route options using Variable Message Sign (VMS) boards as an adaptive traffic control system, is tested to be simple but highly effective by several researchers. Providing information about the real time congestion level on regular routes and possible delays will help the drivers to avoid the overloaded routes and balance the road network which will ultimately optimize the system performance.

One of the key parameters to be considered while implementing an effective VMS system is identifying the locations where the signboards should be erected. These places should be determined considering the route alternatives, possible diversions, and ease of the drivers. This study looks at finding optimal locations to achieve corridor level diversions for the vehicles entering Colombo from east to west direction. The Low-level Road, High-level Road and Kaduwela Road/ Sri Jayawardenapura Mawatha (SJP) corridors are considered the main three corridors from east west direction, connecting the Outer circular expressway and Baseline Road in North-South direction. Among the three corridors SJP is one of the critical corridors where demand exceeds capacity now.

A calibrated macro-model covering Western Province of Sri Lanka, was used for the analysis. Select-link-analysis were done to identify the major origin destination pairs of and the route analysis was done separately for each origin links to identify their destination zones and potential diversion volumes. 6 major locations for corridor level diversion using VMS and 7 minor locations to support the major diversion using auxiliary signage boards were identified. From each major diversion locations potential number of vehicles to divert were identified. The results show that with 30% of potential diversion vehicles directed through VMS, a 10% vehicle reduction in Rajagiriya section and 18% in Malabe could be achieved.

This method can be adopted to any larger corridor level diversions as well as to local diversions inside the city limits and implemented using movable or fixed VMS with real time traffic information system such as M-TRADA, (A travel time estimator using Google API)

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