

Concurrent Flow Lanes: Phase II

Problem

As has been demonstrated in various regions within the United States, the use of express toll lanes or similarly functioning high occupancy toll (HOT) lanes can lead to more effective use of existing roadway capacity, improved traffic flow along general purpose lanes and additional revenue to support much needed transportation improvements. A platform and associated modeling and analysis techniques are required for the study of potential alternative concurrent flow lane designs.

Objectives

The primary objective of this second phase of a multi-phase effort was to ascertain whether or not a chosen simulation software platform, the VISSIM micro-simulation platform, provides a suitable environment for modeling and analyzing traffic operations, including the specific details associated with modeling concurrent flow lanes with designated access points, along significant portions of the Maryland freeways.

Description

This effort culminated in a fully calibrated simulation model of existing conditions and supporting modeling techniques necessary to replicate vehicular behavior in the presence of both continuous access HOV lanes and limited access HOT lane facilities. Parameters chosen through the calibration effort were employed in additional simulation experiments designed to assess the potential benefits of proposed alternative HOT lane facility designs under 2030 demand estimates. The modeling techniques were applied to the southbound lanes of a 7-mile segment of I-270 within the State of Maryland (between the interchanges with I-370 and the I-270 Spurs).

Results

Results of runs of the developed and calibrated existing conditions simulation model show, through a comparison of mean travel times by roadway segment, that the chosen VISSIM simulation platform using developed modeling techniques is a suitable tool for modeling the I-270 roadway segment with concurrent flow lane operations. In fact, once calibrated, no significant statistical difference was found between mean segment travel times produced by the simulation and those recorded in a traffic study on the actual roadway facility for all segments of the study area. Results from this effort also indicate that proposed HOT lane alternative designs in the area of the study roadway segment have significant potential for improving roadway performance even given increased traffic demand in future years. Moreover, the model was able to identify possible flaws in access design.

Report Information

Miller-Hooks, E., X. Chen, C-S. Chou (2009). "Concurrent Flow Lanes – Phase II," Maryland State Highway Administration Report MD-09-SP608B4C.