Florida Department of Transportation Research

Crash Prediction Method for Freeway Facilities with High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) Lanes

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Project Manager
Paul Hiers
FDOT Roadway Design Office

Principal Investigator
Sivaramakrishnan Srinivasan
University of Florida

Current Situation

As traffic volumes increase in Florida, managed lanes are being increasingly used. Managed lanes include those for which multiple passengers (high occupancy vehicle, or HOV, lanes) are required or access is permitted based on high occupancy and/or paying a toll (high occupancy/toll or HOT lanes). To date, systematic methods to analyze safety on HOV/HOT lanes in terms of expected crash frequency have not been developed. Crash frequency provides an objective view of the safety of an existing roadway, and it can also be used to predict the crash incidence and severity based on roadway geometry. This information is useful in planning and design.

The inner lane on this stretch of I-95 in Florida is an HOV lane, separated from the general purpose lanes by double lines and a three-foot buffer.

Research Objectives

University of Florida researchers sought to develop methods to estimate expected crash frequency on facilities that include HOT or HOV lanes.

Project Activities

The researchers limited their considerations to urban freeways, where most HOV and HOT lanes could be expected. Data availability further limited study to freeway segments and not ramps or interchanges. Among design elements, the researchers focused on the means of separation between managed and general purpose lanes.

Data from California, Washington, and Florida were used to develop crash prediction methods for facilities with HOV lanes. Data for HOT lanes, which are a more recent development and less common than HOV lanes, were taken from California. Texas and Florida. Methods were developed to select/reject data and to match roadway characteristics data with crash data.

Safety performance functions were determined using models from the 2010 edition of the *Highway Safety Manual* (HSM). For HOV lanes, approximately 500 miles in over 2,300 segments of roadway were used in the analyses. The average segment was about 0.2 miles; segments less than 0.01 mile were not included. Separate analyses were conducted based on the total number of lanes. Roadways with HOV lanes varied in total number of lanes from 6 to 17, but models were developed only for 6-, 8-, 10-, and 12-lane facilities, in order to correspond with HSM models. For HOT lanes, 27 miles of roadway in 48 segments were examined.

Project Benefits

Understanding the safety performance of roadways is critical to designing safer highways. Projects like this one extend this expertise to the latest methods of increasing the efficiency of roadways, HOV and HOT lanes.

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