Florida Department of Transportation Research

Lifting High-Occupancy Vehicle Lane Eligibility and Shoulder Use Restrictions for Traffic Incident Management

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Traffic incidents severely degrade freeway operations, increasing traffic delays, fuel consumption, emissions, and safety concerns. Where restricted access lanes exist, they might be used as a tool to manage traffic during an incident on general purpose lanes (GP).

Restricted access lanes fall into two categories: high-occupancy-vehicle lanes (HOV) and high-occupancy/toll lanes (HOT). HOV are for vehicles with two or more occupants; they reduce travel time and make it more reliable and predictable, encouraging use of carpools or public transit, reducing congestion, and improving air quality. HOT are HOV that allow low-occupancy vehicles to pay to gain access. In Florida, HOV and HOT are deployed on segments of I-95 in Miami-Dade, Broward, and Palm Beach counties, one of Florida's largest and most heavily used roadways.

In this project, University of Florida researchers developed guidelines about when to open HOV/HOT lanes to GP traffic in the event of an incident. The researchers also explored the feasibility of opening the shoulder as an incident management technique.

The literature on opening HOV/HOT after an incident on GP revealed that many federal and state transportation agencies see this as a viable strategy; however, its effectiveness depends on many factors, such as available capacity of HOV/HOT, traffic demand, incident duration and capacity loss, and specific lane configurations. Agency policies showed no consensus on criteria for opening HOV/HOT, often deferring to on-site responders for that decision.

The researchers examined five incidents on I-95 GP lanes and how incident response affected HOV/HOT operations. Delays on HOV/HOT were estimated from the difference between incident and incident-free travel times. Number of blocked lanes and duration of blockage were not directly correlated to an incident's impact on travel time,

THE HOV lanes (center) on this stretch of I-95 could be used to manage traffic after an incident on the general purpose lanes (right).

making these poor choices as top criteria for opening HOV/HOT. However, analyses of these incidents allowed development of a method to determine when to divert GP traffic to HOV/HOT for various scenarios. Using deterministic queuing analysis, they derived formulas for vehicle and passenger incident delays when HOV/HOT were open after an incident or not, providing a useful discriminant for when to open lanes.

The researchers reviewed legal and operational parameters for lifting HOV/HOT restrictions in response to GP incidents. They found that the Florida Statutes (FS) delegated authority for some aspects of relevant operations to the Florida Department of Transportation (FDOT) and some to the Florida Highway Patrol (FHP).

A review of shoulder lane use during incidents showed that benefits during peak periods are considerable. However, there are maintenance and enforcement issues, as well as legal issues, such as the basis for shoulder use in FS.

Careful study of traffic management is important for heavily traveled corridors, such as I-95 in south Florida. The guidance provided by studies such as this one is critical for maintaining the efficiency of this important highway for its many users.

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For more information, visit http://www.dot.state.fl.us/research-center