

EVALUATION OF CHANGEABLE MESSAGE SIGNS (CMS) ON I-4 AT EXITS 30A AND 30B TO ASSIGN RAMP TRAFFIC AND AT PRINCETON ST. TO SIGN FOR CULTURAL EVENTS

PROBLEM STATEMENT

In 1998, the Florida Department of Transportation (FDOT) was asked by FHWA to evaluate the safety impact of the use of changeable message signs functioning as (1) freeway guide signs on Interstate 4 (I-4) to assign traffic to Universal Theme park via exit 30A or 30B based on traffic congestion on exit 30A and (2) guide signs to inform motorists on interstate I-4 on current downtown cultural destinations. This evaluation was approved as an extension of an earlier Request to Experiment, using similar technology signs, to vary destinations at the I-4/US 192 interchange. Earlier evaluations examined the conspicuity and motorist acceptance of these signs using survey methodology. These data indicated that most motorists surveyed noticed the signs and that, of those respondents who noticed the sign, a large percentages saw the attraction of their choice on the signs and selected the correct exit with the help of the signs.

Initial observations to determine if there were any negative safety effects were made immediately after each sign became operational. Staff at the Regional Traffic Management Center monitored these sites using cameras placed at sign and exit sites and did not observe changes in erratic maneuvers, sudden braking, etc., following the introduction of the signs. They also did not observe any change in vehicle speeds after the signs were implemented. Although these casual observational methods would be adequate for discriminating a sudden extreme reduction in safety, relatively large changes would not be apparent without the use of more systematic data collection procedures. One reason why important decreases in safety might not be noted by causal observation techniques is that serious conflicts and crashes normally occur at relatively low rates. Even if operational changes produced a four- or fivefold increase in these variables, such an increase might not be readily apparent to a person watching monitors while carrying out other duties. For this reason, FHWA requested a safety evaluation of the changeable message signs assigning motorists to exit 30A or 30B and to inform motorists of current cultural destinations in Orlando.

OBJECTIVES

The objectives of this research were to determine (1) the safety and efficacy of CMS signs used to assign eastbound traffic to Universal Theme Park based on exit congestion, and (2) the safety of CMS signs at the Princeton Street exits used to direct visitors to cultural events.

FINDINGS AND CONCLUSIONS

An examination of crashes along the entire route indicated a statistically significant increase in crashes at the first eastbound exit following the actuation of the system in 1998. Analysis of driver behavior at the first eastbound exit revealed that the reassignment of the theme park exit was associated with an increase in the percentage of motor vehicle conflicts, including the percentage of vehicles cutting across the exit gore and the percentage of motorists making unsafe lane changes in the immediate vicinity of the exit. A human factors analysis revealed that the method used for switching the designated theme park exit on the series of changeable message signs led to the presentation of conflicting messages to motorists. The second experiment evaluated the use of a phased method of switching the designated theme park exit to eliminate the delivery of conflicting messages. The new method for switching the designated theme park exit was not associated with an increase in motorists cutting across the exit gore or unsafe lane changes.

An examination of crashes along the route indicated no significant difference in crashes after these signs were introduced near the beginning of 1999. These data validate the safety of this application of CMS signs.

BENEFITS

This research detected a problem with the way the CMS signs were used to assign traffic to Universal Theme Park exits and developed a solution to the problem. Based on these results, it is recommended that this system for assigning the active exit based on traffic congestion be added to the MUTCD. This research also confirmed the safety of using CMS signs to provide information on cultural events. This use of CMS signs was not associated with an increase in crashes. It is also recommended that this use for changeable message signs be added to the MUTCD. These data document the importance of the sign change protocol employed with CMS signs. It is very important that such signs not provide conflicting information to motorists.

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