Identifying Strategies to Improve Lane Use Management in Indiana

Introduction

In the context of increasing demand and growing funding deficits, the primary objectives of the study are: (a) develop guidelines on the conditions in which to adopt lane use management strategies in Indiana, (b) identify potential corridors/sites to implement these strategies, and (c) assess the expected costs and benefits of these strategies for one of the identified corridors/sites.

The study develops a systematic simulation-based methodology to evaluate lane use management strategies for Indiana. A 10-mile stretch of the I-65 corridor south of downtown Indianapolis was selected to demonstrate the methodology.

Findings

Assessment of the impact of reversible lane strategy implementation on the I-65 corridor indicated that this strategy improved traffic flow conditions. Average travel speed in the major flow direction (NB I-65 stretch during the morning peak) is higher under the reversible lane scenario when compared to the base case scenario. Furthermore, the travel time savings (expressed in monetary terms) in the major flow direction were positive due to the improved person throughput. However, economic analysis of the HOV lanes indicated that this strategy is not feasible for implementation.

Microsimulation analysis of traffic predictive ramp metering strategy implemented for I-65 at the Raymond ramp location indicated improved flow speeds on the I-65 corridor. However, the average travel time on the ramp increased due to the ramp signal. The net present value (NPV) was positive implying the economic feasibility of this strategy.

A comparison of the three lane use management strategies illustrated that reversible lane and ramp metering strategies are found to be economically feasible with positive NPVs. However, the NPV for reversible lane strategy is found to be the highest and therefore is the preferred lane use management strategy for the I-65 corridor stretch analyzed. HOV lane strategy was found to be economically infeasible due to low HOV volume on these lanes.

The study also presents recommendations for the implementation of the three lane use management strategies. The implementation of the reversible lanes strategy is recommended when the minor flow direction has at least two lanes and the ratio of major to minor direction flows is greater than a threshold value (at least 1.7:1). Similarly, the implementation of HOV lanes is feasible only when a minimum occupancy level (at least 600–800 vhphpl) exists on the HOV lanes.
Similarly, the feasibility of ramp metering needs to be evaluated using the combined volume of the ramp and the freeway. Single lane ramp metering is recommended when the ramp volume is between 1200 and 1400 vph, and dual lane metering when the ramp volume is greater than 1400 vph. A comprehensive list of recommendations is presented in Chapter 12 of this report.

**Implementation**

Findings from this study can be used in the decision-making process of implementation of lane use management strategies on the I-65 corridor. The study provides a simulation-based methodological framework to evaluate the various strategies. It also provides recommendations on the traffic conditions under which the various lane use management strategies could be identified as potential candidates for simulation-based analysis to determine the strategy to implement.

As future congestion bottleneck areas arise in Indiana, the associated corridors could be analyzed for the effectiveness of lane use management strategies.

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