



TECHSUMMARY *November 2020*

DOTLT 1000098 / LTRC Project No. 16-5SS

Diverted Traffic Measurement

INTRODUCTION

Bluetooth devices are increasingly used to measure travel time. Apart from measuring travel time, Bluetooth could also be used to measure the impact of implementing a policy. For example, instead of widening I-10 between the I-10/I-12 split and the Mississippi Bridge, DOTD decided to make use of local arterials that could be used to divert some of the traffic currently using that section of the freeway. To measure the effectiveness of the policy, travel time on both the I-10 and major east-west arterials in the vicinity (e.g., Perkins, Corporate, Jefferson, and LA 30) could be measured before and after implementation of the policy and then compared to assess how local arterials are acting as substitute for lack of capacity during congested periods. However, the problem is that no study has ever been done before using Bluetooth devices to measure traffic diversion behavior that reflects efficacy of implementing the policy. Thus, it is not known the level of diversion that occurs when congestion levels on the I-10 freeway between the Mississippi Bridge and the I-10/I-12 split in Baton Rouge rises higher than on parallel arterials.

Because it is not possible to observe the traffic diversion behavior before the policy was implemented, an alternative scenario that mimics the conditions that might exist is sought. For example, one could observe the behavior pattern during normal uncongested conditions and then compare it with congested conditions that develop when an incident occurs that reduces the capacity on I-10 between the Mississippi Bridge and the I-10/I-12 split.

OBJECTIVE

The purpose of the project was to determine the extent to which local arterials can substitute for lack of capacity on urban freeways. Motorists, particularly motorists making local trips, are likely to use local arterials in preference to a freeway if the congestion is much higher on the freeway. This project was aimed at measuring the level of diversion that occurs when congestion levels on I-10 between the Mississippi Bridge and the I-10/I-12 split in Baton Rouge rises higher than on parallel arterials. Measurements will be aimed at identifying at what level of difference in congestion does diversion of traffic begin to occur, what is the time lag between the onset of congestion and diversionary behavior, and how stable is the behavior from event to event. Incidents on the freeway and on arterials can provide the conditions in which meaningful measurements can be made.

SCOPE

The scope of the project was limited to I-10 between the Mississippi Bridge and the I-10/I-12 split because the issue of increasing the capacity of I-10 in that vicinity is not favored, and alternative solutions, such as increasing the capacity of parallel arterials, could be more cost-effective. Scope was also limited to measuring diversionary behavior of traffic traveling east on the I-10.

LTRC Report 605

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METHODOLOGY

The methodology consisted of conducting five critical tasks. The first was to conduct a literature review. The second was to identify alternative routes that could be traversed by traffic traveling east when I-10 east becomes congested. Third was to install Bluetooth devices and volume counters to collect travel time data and volume on alternative routes. Fourth was to collect travel time and volume data on alternative routes over a period in which incidents occur on the study section and cause increased congestion on I-10 east. And fifth was to conduct analysis on the diversionary behavior that is observed during increased congestion.

CONCLUSIONS & RECOMMENDATIONS

The findings of the study indicate that diversionary behavior occurs when the travel time index is 1.5 or above on parallel arterials. The time lag observed is 15-30 minutes for incidents occurring on I-10 between the Perkins exit and Citiplace, but for incidents occurring on I-10 between Nicholson Drive and the Perkins exit, the time lag measured is between 0 and 15 minutes.

The stability of diversionary behavior was defined in terms of variance in time lag observed from incident to incident. The variance in time lag behavior for category 1 incidents was 50, and the variance in time lag behavior for category 2 incidents was 54. Values 50 and 54 are considerably high, which implies that diversionary behavior is not stable from incident to incident.

From an application perspective, it is suggested that government authorities implement traffic management strategies that encourage motorists to use parallel arterials when freeways become congested. The results observed in this research effort may not be relevant to other areas since they are based on data from the Baton Rouge area. Finally, it is important to conduct the study on a larger scale to see if the conclusions made in this study regarding traffic diversionary behavior can be generalized.

Also, the diversionary behavior observed in this research demonstrates that the road network used in this study is resilient to disruptions caused by accidents. Future researchers can identify and quantify other factors apart from the availability of alternate roads and quantify the resilience of the road network used in this study.