



TECHSUMMARY *June 2012*

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Evaluation of the Traffic Safety Benefits of a Lower Speed Limit and Restriction of Trucks to Use of Right Lane Only on I-10 over the Atchafalaya Basin

INTRODUCTION

In September 2003, an 11-vehicle crash on I-10 over the Atchafalaya Basin was caused by a truck failing to notice stationary traffic ahead. Five fatalities resulted from the crash, and the Department of Transportation and Research (DOTD) decided to immediately limit trucks to the right lane of traffic and to reduce their speed limit to 55 mph on the elevated section of I-10 over the Atchafalaya Basin. The speed limit for cars was retained at 60 miles per hour. At the time this research study was initiated, no other research study had been conducted to assess the safety implications of the newly implemented policies (reduced speed limit and truck lane restriction) on the Atchafalaya Basin. Although similar policies were implemented in other states such as Texas, the roadway segments on which the policies were implemented had more than two lanes in one direction. A preliminary literature review showed that, although tested, truck lane restriction and differential speed limits had not been implemented before on segments with two lanes in each direction. The Atchafalaya segment of I-10 in Louisiana has two lanes in each direction and operates with both differential speed limits (55 mph for trucks and 60 mph for cars) and truck lane restriction (right lane only).

OBJECTIVE

The primary goal of this research study was to assess the operational and safety impact of the newly implemented policies (differential speed limit and truck lane restriction) on the Atchafalaya Basin segment of I-10. The study was limited to the designated two lane rural freeway segment of I-10 where such restriction policies are in effect. The study investigated and quantified the effectiveness of such policies by monitoring the safety and operational conditions of traffic on the study segment.

SCOPE

The scope of this research study was limited to the Atchafalaya Basin section of I-10, which is one of the elevated sections of the freeway where the new policies of truck lane restriction and speed limit differentials were implemented. For the purpose of this study, traffic data were collected to study the characteristics of traffic flow on that section. The characterization includes analysis of traffic flow under different vehicle composition and traffic conditions. Safety analysis also required collection of crash data before and after the implementation of the new policies.

METHODOLOGY

In the study, the traffic data of both right lane and left lane at four sites on the Atchafalaya segment of I-10 were collected. Based on the collected data, the travel behavior of trucks was investigated, and their effect on the traffic speed was analyzed individually and jointly with variables "Zone" and "Lane" at different conditions. In addition, the speed of trucks in mixed traffic conditions was calculated and compared with the speed under cars only and trucks only conditions and speed limits as well. Two surveys were conducted to obtain the opinions

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of truck drivers on the current lane and speed policies over the Atchafalaya Swamp Freeway. The sample group that was surveyed consisted of truck drivers who are employees of the trucking companies located in the United States and who have driven over the Atchafalaya Swamp Freeway since the lane restriction and 55/60-mph differential speed limit practice began in 2003. In order to find this specific group, two approaches were taken. The first mail-in survey was conducted using a sample group selected from a list of trucking companies obtained from the weigh station at Butte La Rose. The list contains the trucking companies that violated the weight limit since 2003. The second survey was later conducted online using the DOTD Web site. For safety analysis, crash data were collected after the two restriction policies were implemented, and they were compared with crash data before the implementation to assess the safety impacts of the newly applied policies.

CONCLUSIONS

The basic statistical analyses of the traffic data showed that the speed in the left lane was much higher than the right lane as a result of the imposed differential speed limit. In terms of the compliance of trucks to the lane restriction, the results showed more trucks in the right lane than in the left lane, with a compliance rate in the range of 60 percent to 80 percent most of the time. The compliance rate, however, was slightly lower at the first site encountered by vehicles in each direction. A possible explanation to the relatively high presence of trucks in the left lane is that trucks may also occupy the left lane for overtaking maneuvers in order to pass slower vehicles in the right lane. It is, however, impossible to distinguish between trucks occupying the left lane for passing maneuvers and those in violation of the lane restriction policy. As such, the actual violation rate may be less than that observed by the percentage of trucks in the left lane. To further evaluate more detailed aspects of the compliance of trucks to the differential speed limit policy, linear regression models were applied to determine the variables with the most significant effect on speed. The models showed significant differences in speed between the right lane and left lane at each site. Speed was also negatively affected by the truck volume as well as the total traffic volume.

The results showed that the traffic speed decreased as the percentage of trucks in the traffic stream increased. This implies that the truck speeds were generally lower than the rest of the vehicles because of their reduced speed limit. The compliance to the truck speed limit was further examined

using pairwise comparisons between observations with no trucks, mixed traffic composition, and trucks only. The results showed that trucks tended to increase their speed when no other vehicles were present. The crash data analysis for the study section clearly showed a reduction in the number of crashes, particularly the number of truck crashes, despite the steady increase in the traffic volume over the Atchafalaya section of I-10 in the past 7 years. It should be noted, however, that in addition to the imposed restriction policies there were other improvements made such as shot abrasion and raised pavement markers. Therefore, the safety impact identified in this study could also be attributed to the other pavement improvements.

The mail-out survey and the online web survey yielded many expected and some not-so-expected results. Overall, it was obvious that truckers were not in favor of the restrictions imposed on their driving. It was also clear that they did not perceive a significant safety benefit was being experienced from the restrictions; rather they tended to view them as an inconvenience to their driving task. Among the most useful findings, particularly from a design and control standpoint, was that the vast majority of drivers were well-aware of the restrictions along this segment and did not feel an overwhelming need to add more features like incident warnings, current speed displays, or even night-time illumination.

RECOMMENDATIONS

Base on the results of this study, the applied differential speed limits and truck lane restriction are effective to some extent on the Atchafalaya segment of I-10. While the truck compliance to both policies seems somewhat acceptable, higher compliance rates could likely be achieved by increasing the level of enforcement along the study segment. It is recommended that a brief study be conducted after a few years to examine the safety impact in terms of crash rates over a longer period of time.