TN TDOT Department of Transportation

Research Summary

Addressing Traffic Safety to Reduce Pedestrian Injuries and Fatalities in Tennessee

WHAT WAS THE RESEARCH NEED?

Pedestrian safety has declined significantly during the last decade. According to the Fatality Analysis Reporting System (FARS) database, pedestrian deaths on roads in the United States (US) increased by 51 percent from 2009 – 2019. This increase is unique to the US, as the pedestrian fatality trend in other developed countries is either constant or has declined over similar periods. Tennessee also exhibits a similar but worse trend, with a 117 percent increase in pedestrian deaths from 2009 - 2019. In the context of pedestrian safety in Tennessee, this research set out to answer the causes of increasing pedestrian deaths over the last decade.

WHAT WERE THE RESEARCH OBJECTIVES?

The objectives of this research were to look at the overall growth of pedestrian crashes in the last decade and determine the factors causing it, classify and investigate the trends from the perspective of diverse variables, and utilize home-based approaches to explain the causes of the rise further and implement a quantitative decision framework for selecting countermeasures.

WHAT WAS THE RESEARCH APPROACH?

This study utilized Tennessee Integrated Traffic Analysis Network (TITAN) database, which contains critical information about all police recorded crashes in Tennessee, including pedestrian crashes. This research further supplemented TITAN data by linking the socio-

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economic data from the US Census and determining pedestrians' home location coordinates after geocoding the pedestrians' address information included with the TITAN database. The data helped determine the critical variables associated with the severity increase, with the help of a frequency table and after performing trend analyses on total pedestrian involvement in crashes, total pedestrian fatality, and pedestrian fatality rate (PFR). The study also incorporated injury severity modeling using simple binomial logistic regressions to compare the severity disparity among variables in two time periods. The study compared the groups with the help of average discrete changes (ADC) for both periods and their difference to determine if the change was statistically significant. Other methods include home-based approaches and spatial visualization to enhance the findings from trend analyses. It also provides a tool to reduce pedestrian risks, which helps determine an optimal set of countermeasures in terms of budget and efficacy.

WHAT WERE THE FINDINGS?

The substantial causes that lead to the current condition of pedestrian safety in the US mirror Tennessee. Pedestrian crashes are more severe in the urban areas of Tennessee, and the roadway design bears a large burden. The research team found that most fatal crashes happened on straight high-speed roads with speeds of more than 35 mph and multiple lanes (typically the characteristics of urban arterials in Tennessee) during the nighttime and significantly far from the residential areas (pedestrians' homes). The findings conform with the most recent US pedestrian safety research, which associates the urban pedestrian safety crisis in the US with the functional classification of the roadways. Other variables that also accounted for the disproportionate increase were the male pedestrians, middle-aged older adults (51 – 65), female drivers, DUIs, driving on the weekends, and being struck by newer vehicle models.

IMPLEMENTATION AT TDOT

The research team has six recommendations to TDOT:

1) Adopt a Safe Systems approach that holistically evaluates pedestrian safety
2) Reform TDOT standard designs and drawings to mandate pedestrian friendly designs
3) Reduce speed limits to a maximum of 35 mph in urban commercial corridors
4) Implement quick-build traffic calming interventions on high-speed urban streets
5) Focus on improving mid-block crossings with proven interventions
6) Work with transit agencies to ensure transit corridors are safe for pedestrians.

MORE INFORMATION

Find the final report here: https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2021-final-reports/RES2021-11_Final_Report_Approved.pdf.

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