



Project Number
BDV25-977-73

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Development of Crash Modification Factors for Speed Management of Traffic Signal Progression

October 2022

Current Situation

FDOT is committed to eliminating pedestrian fatalities and serious injuries on Florida public roadways. Speeding vehicles are a major cause of severe pedestrian crashes.

Basically, slowing vehicles can save pedestrian lives. That said, traffic operators must also facilitate the movement of vehicles consistently. One approach to do this is called traffic signal progression.

Traffic signal progression links traffic signals along a corridor to let platoons of vehicles pass through multiple intersections without stopping at a red light. This is good for vehicles but, because the platoon doesn't have to stop as often, it tends to speed up.



The average risk of death for a pedestrian at impact raises as speed increases. Researchers at the University of South Florida studied how traffic signal progression may reduce speeding.

Research Objectives

This project sought to understand the relationship between traffic signal progression and pedestrian and bicycle crash frequency and severity. The goal was to evaluate the effectiveness of modifying signal progression design to improve pedestrian and bicycle safety.

Project Activities

After an extensive literature review, the Center for Urban Transportation Research (CUTR) team, based out of the University of South Florida, assessed the effectiveness of using traffic signal progression for speed management to improve pedestrian and bicycle safety. From that analysis, the team developed pedestrian and bicycle crash modification factors (CMFs) to evaluate the effect of various modifications to signal progressions on the safety of bicyclists and pedestrians. These modifications included improving the average speed management of progressions from a "poor" rating, where drivers may need to drive faster on some sections than on others resulting in inconsistent speeds, to a "good-to-great" rating with more consistent speeds.

The team also identified benefits for managing signal progressions such that drivers don't see too many green signals ahead of them. These reduces the likelihood of speeding and aggressive driving to make the green light, resulting in safer conditions for pedestrians and bicyclists. These techniques were demonstrated in several case studies from across the state.

Project Conclusions and Benefits

The team concluded that improving progression speed management can reduce pedestrian and bicycle crash frequency by 55% and severe pedestrian and bicycle crash frequency by 75%. By effectively retiming traffic signals, both driver mobility and pedestrian and bicycle safety can be achieved simultaneously. Higher progression speeds can be safe for pedestrians and bicyclists if appropriate signal progression designs are used with good speed management and good progression quality.

For more information, please see fdot.gov/research.