Texas A&M Transportation Institute

Texas Department of Transportation

PROJECT SUMMARY REPORT

0-7220: Investigation of Speed Countermeasures for Arterial Streets

Background

Vehicle speed is among the key attributes that make a difference in the injury severity outcome of a crash. Lower speeds tend to come with lower crash severities, while more severe crashes are much more likely at higher speeds. Considering that fact, traffic safety researchers and practitioners have developed and applied several countermeasures to lower vehicle speeds. The applications and effectiveness of such countermeasures vary greatly.

What the Researchers Did

Texas Department of Transportation Project 0-7220 investigated the effectiveness of arterial-focused speed management countermeasures for application across Texas. The research team considered roadway design, traffic control devices, vehicle design, operations, enforcement, and other countermeasure types across a range of settings for uncontrolled-access arterials under different traffic, road type, road context, and land-use conditions.

The research generated two documents:

- *Investigation of Speed Countermeasures for Arterial Streets* (FHWA/TX-27/0-7220-R1).
- *Speed Countermeasures for Arterial Streets Guide* (FHWA/TX-27/0-7220-P1).

What They Found

The research started with a comprehensive review of the literature and practice to identify available knowledge regarding speed countermeasures being used on arterials. Those countermeasures with the largest knowledge gaps were selected for additional investigation as part of this research project and included rest in red (RIR), roadway lighting, sidewalks, roundabout corridors, and reallocation of the cross section within a corridor.

For the RIR countermeasure, the finding indicates the possibility of a reduction in crash rates and a slight increase in operating speed during nighttime conditions; however, the findings were not statistically significant, perhaps due to the small sample size.

For roadway lighting, a small increase in nighttime speed was indicated, which was not statistically significant. In contrast, the analysis

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indicates a statistically significant reduction in nighttime crash rates at sites treated with roadway lighting relative to control locations.

On lower-speed corridors, sidewalk implementation is associated with a slight reduction in operating speeds, suggesting a modest traffic-calming effect. In contrast, higher-speed corridors exhibit increases in operating speeds relative to comparison corridors after implementation, indicating that sidewalks alone do not substantially influence driver behavior in roadway environments that continue to support higher-speed travel. Sidewalk installation was associated with a reduction in fatal and injury crashes, suggesting potential safety benefits at the corridor level.

Implementing a series of roundabouts is associated with a statistically significant reduction in operating speeds. For safety outcomes, treated corridors exhibit lower crash frequencies compared to control corridors; however, the estimated treatment effects for both total and pedestrian crashes are not statistically significant.

The case study of the corridor reconfiguration found statistically significant measurable changes in operating speeds, with the magnitude of change varying across land-use contexts. Three of the four zones had a speed reduction (business section 3.2 mph, park section 8.5 mph, and residential section 4.3 mph), and the fourth zone had a nominal speed increase of 0.4 mph. Countermeasures implemented included adding raised median, widening (or adding) sidewalk, adding a buffer between the sidewalk and travel way, and reducing lane width by 1 ft. In the park section, those countermeasures previously listed were implemented, plus a shoulder was removed and roundabouts, pedestrian hybrid beacons, and a traffic control signal were added.

This research produced a guide of speed countermeasures on non-freeway arterials to better protect vulnerable road users (VRUs), like pedestrians and cyclists. Findings include estimates of speed reductions for various measures, with roundabouts, raised crosswalks, and speed feedback signs considered the most impactful for speed. Existing safety evaluations show that pedestrian hybrid beacons, roundabouts, and refuge islands have the greatest decreases in crashes.

What This Means

The guide documents current knowledge on speed and crash reductions by countermeasure. Its intent is to facilitate faster implementation of life-saving design, technology, and policy interventions to protect VRUs.

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