Texas Department of Transportation

Texas A&M Transportation Institute

PROJECT SUMMARY REPORT

0-7156-01: Using Vehicle Probe Data to Evaluate Speed Limits, Year 3

Background

The *Texas Manual on Uniform Traffic Control Devices* and the Texas Department of Transportation's (TxDOT's) *Procedures for Establishing Speed Zones* manual (Speed Zone Manual) contain TxDOT's policies for setting regulatory speed limits. Regulatory speed limits are set based on the 85th percentile speed of free-flowing passenger cars and various site-specific considerations, particularly geometry, access, and crash history. This research project investigated how to make speed zone studies and speed limit decisions more effective and efficient. This report reflects work done in year 3 of the research project.

What the Researchers Did

The research included:

- Exploring the thresholds for speed zone factors via interviews with TxDOT staff and the research team's judgment.
- Applying the previously developed suggested speed limit based on a probe data (SSL-Probe) protocol to multiple corridors to determine if improvements are needed to the protocol.

The findings from these efforts were used to refine the guidelines on how to use probe data within a speed zone study. The SSL-Probe protocol was used to estimate the 85th percentile speed needed for a speed zone study for 32 freeway corridors and 246 non-freeway corridors. The refined guidelines are included in the updated guide.

What They Found

Table 1 provides the list of factors suggested by the research team for inclusion in a revised Speed Zone Manual based on the results of the interviews, along with the research team's engineering judgment. In some cases, existing factors are combined. In other cases, new factors are suggested. The factors are now sensitive to whether the roadway segment speed zone is in a rural or urban (or rural town) context. In general, if one factor is present, consider a 5-mph reduction. If two or more factors are present, consider a 10-mph reduction. A deviation of up to 12 mph can be used when crash history is a factor within the speed zone. Other suggestions for changes to the TxDOT Speed Zone Manual appear in Appendix D of *Speed Limits in Texas* (Report 0-7049-R1).

The SSL-Probe protocol shows how probe speed data can be used within prediction equations to estimate the 85th percentile speed needed for a speed zone study. When used in the TxDOT speed zone method, the calculated predicted speeds resulted in suggested speed limits that were similar to the suggested speed limit

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identified using on-site speed data or generally within 5 mph.

What This Means

While TxDOT's Speed Zone Manual would need to be revised prior to being able to use probe data in a speed zone study, the use of these predicted 85th percentile speeds can provide a quick check on the need for a speed zone study. Based on discussions with TxDOT staff, reviews of other recent research studies, and the research team's engineering judgment, new factors for use in a speed zone study are suggested.

Table 1. Roadway Factors Suggested for Setting Regulatory Speed Limits.

Factor	Urban or Rural Town	Rural	Comments
Crash history	X	X	Consider the statewide average crash rate for similar facilities.
Narrow roadway pavement or lane width	X	X	Consider the driving surface area. For example, narrow roadway pavements include roads without striped shoulders or a total surface width < 24 ft (or 20 ft, depending on region). For lane width, an average lane width of 10 ft or less could be considered a narrow lane width.
Horizontal and vertical curves	X	X	Consider possible limited sight distance; for example, driveways or other developments could be hidden from the driver.
High access density	X	X	Consider that the higher the number of access points (e.g., driveways and unsignalized intersections), the higher the potential for encountering entering and turning vehicles. The *Access Management Manual* (Table 2-2) provides driveway spacing criteria. Using those criteria, the following access densities were generated for consideration: • 26 points/mile for ≤ 30 mph • 21 points/mile for 35 mph • 17 points/mile for 40 mph • 15 points/mile for 45 mph • 12 points/mile for ≥ 50 mph
Public transit	X	—	Consider the volume and location or frequency of stops.
On-street parking	X	—	Consider that the presence of on-street parking is associated with additional vehicle stops and maneuvers.
Pedestrian and bicycle facilities and activity/ residential or developed areas	X	X	Consider the potential for higher pedestrian and bicycle traffic. For example, in rural areas pedestrian and bicycle activity could be present in recreational areas.
Transition design	X	X	Consider schools, intersections, city limits, jurisdictional boundaries, changes in area type or development, or speed limit for nearby segments.

Notes: An X denotes the factor is suggested. A dash denotes the factor is not suggested.

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