



Project Summary

Texas Department of Transportation

0-5544: Development of High Speed Roadway Design Criteria and Evaluation of Roadside Safety Features

Background

The Texas Department of Transportation (TxDOT) is embarking on a multi-decade effort to expand the state's transportation system. This expansion includes the multiple, high-speed corridors of the Trans-Texas Corridor, as well as other facilities. To accomplish this expansion, TxDOT has expressed an interest in using very high design speeds (above 80 mph) to promote faster and more efficient travel within the state. Current state and national roadway design guidance does not provide criteria for design speeds above 80 mph, so roadway designers do not have design values for facilities with very high speeds.

The purpose of TxDOT Project 0-5544, *Development of High Speed Roadway Design Criteria and Evaluation of Roadside Safety Features*, was to expand upon existing design guidance and identify new criteria for design speeds up to 100 mph. The technical report developed as part of this project presents issues and concerns and shows potential values generated for design speeds of 85 to 100 mph in relation to controlling criteria, ramp design elements, and roadside items.

What the Researchers Did

The research efforts on this project began with a thorough search of the literature to determine existing knowledge. The search included reviews of current American Association of State Highway and Transportation Officials (AASHTO), international, and Texas practices, together with historical policies. A traditional search of research studies and related literature was also conducted. Investigations into each topic began by documenting existing knowledge, which was then used to begin the process of determining appropriate criteria for the higher speeds. Within the process of developing the higher speed criteria, gaps in knowledge were identified, together with concerns about and limitations of the current knowledge base. These gaps or concerns were documented together with a list of research needs. These efforts revealed limited existing knowledge regarding driver performance at very high speeds. Therefore, determination of preliminary criteria required extrapolation of existing equations together with the use of engineering judgment.

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To obtain practicing engineers' opinions and views on the methodology used to determine the criteria and on the specific values for the criteria, a roundtable discussion group was assembled. The roundtable discussion group included representatives from TxDOT's Design Division, districts, and Turnpike Authority; representatives from the Federal Highway Administration; and representatives from the project team. In general, most of the criteria suggested by the research team were endorsed by the roundtable participants. In a few cases, participants suggested additional investigations, which the research team conducted and forwarded to the TxDOT Design Division when completed.

What They Found

Team members developed preliminary criteria on the following topics for use on very-high-speed roadways:

- Stopping sight distance
- Grades
- Vertical alignment
- Lane width
- Shoulder width
- Cross slope
- Horizontal alignment and superelevation
- Ramp design speed
- Ramp grades and profiles
- Cross section and cross slope
- Distance between successive ramps
- Ramp lane and shoulder widths
- Acceleration and deceleration lengths
- Roadside clear zones
- Median width
- Roadside slopes and ditches
- Crash testing
- Roadside safety devices

The criteria developed in the project were provided to TxDOT, who will decide on which criteria will be included in revisions to the TxDOT *Roadway Design Manual*. The project's technical report discusses issues and concerns associated with each topic and shows potential guidance values.

What This Means

As TxDOT enters into a new era of roadway expansion, one in which higher speeds are expected, planners and designers will need guidance for addressing these higher design speeds. Criteria recommended as a result of this project provide a basis for this guidance and are currently being considered by the TxDOT administration for incorporation into the TxDOT *Roadway Design Manual* or other guidance documentation.

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