

## 5-6960-01: Implementation of Enhancing Curve Advisory Speed and Curve Safety Assessment Practices

### Background

Over the past two decades, the Texas Department of Transportation (TxDOT) has sponsored several research projects to assist practitioners responsible for signing and marking horizontal curves on rural highways. Several of these projects have focused on procedures to set curve advisory speeds and to choose curve traffic control devices (such as chevrons) based on the determined advisory speeds. TxDOT has also sponsored several projects to develop guidance for analyzing the adequacy of pavement skid resistance on horizontal curves and determining the cost-effectiveness of a candidate pavement friction treatment.

These projects yielded several software tools to assist practitioners, including the Texas Roadway Analysis and Measurement Software (TRAMS) program to collect curve geometry data in the field and the Texas Curve Evaluation Suite (TCES) spreadsheet to post-process curve data collected by TRAMS. TRAMS was originally developed in Implementation Project 5-5439, was updated in Research Project 0-6960, and is mentioned in the *Procedures for Establishing Speed Zones* document as the program used to implement the global positioning system (GPS) Method for setting curve advisory speeds.

### What the Researchers Did

In this implementation project, researchers developed and presented a training workshop

for TxDOT practitioners. Ten workshops were presented, reaching 113 practitioners from 21 districts and several consultant firms. The workshop comprised about six hours of instruction, consisting of classroom presentations and discussions, hands-on training sessions in the field to demonstrate application of the GPS Method on rural highway curves, and a review of the field data to demonstrate how to analyze the curves and determine curve signing needs, especially setting advisory speeds.

Researchers also provided technical support for practitioners using the TRAMS and TCES programs to implement the GPS Method. About 40 technical support requests were received and processed between July 2019 and June 2020. Most support requests focused on procedures to use the programs and data collection equipment to implement the GPS Method. Several updates to the programs were also made to fix bugs or improve features following feedback received through technical support requests.

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## What They Found

The updated TRAMS program offers several improvements over the original version. The workshop participants provided positive feedback about the updated TRAMS and TCES programs. They particularly liked the ability to activate the TRAMS program once at the beginning of a continuous stretch of highway instead of having to activate it at every curve. They also liked the ability to batch-process a large number of curves in the TCES program, and they appreciated the inclusion of the Analysis worksheet from the Texas Curve Advisory Speed spreadsheet that preceded TCES.

The workshop participants suggested further improvements that the researchers then added into the programs. Most of these suggested improvements were for the TCES spreadsheet program. The researchers noted the questions and discussion topics that were most often raised in the workshop discussions, and compiled the key points into several quick-reference checklists that were added into the *Horizontal Curve Evaluation Handbook*.

## What This Means

Researchers provided training to engineers and technicians in most TxDOT districts to facilitate the ongoing efforts to check and update curve advisory speeds. By providing technical support, researchers also answered questions that arose while the data collection efforts were ongoing, and they made improvements to both the software programs and the *Horizontal Curve Evaluation Handbook* used in curve signing and evaluation efforts.

### For More Information

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