

## **0-6960: Enhancing Curve Advisory Speed and Curve Safety Assessment Practices**

### **Background**

The Texas Department of Transportation (TxDOT) is in the process of conducting several parallel efforts to evaluate rural highway horizontal curves. Following the adoption of the 2011 *Texas Manual on Uniform Traffic Control Devices*, district personnel are checking and updating posted curve advisory speeds and other curve traffic control devices (e.g., chevrons) in response to the December 31, 2019, compliance date. Recent legislation has allowed regulatory speed limits to be increased to 75 mph on some rural highways, resulting in a need to check and evaluate curves that had not previously been signed with advisory speeds. There is also renewed interest in implementing pavement friction treatments through the Highway Safety Improvement Program.

### **What the Researchers Did**

In this research project, researchers collected and analyzed data to extend TxDOT's curve advisory speed-setting procedures to rural multilane highways and freeways as well as two-lane rural highways with speed limits of 75 mph.

This effort built on earlier research to develop guidelines for setting curve advisory speeds on two-lane rural highways based on the criterion of average truck speed.

Researchers also improved TxDOT's global positioning system (GPS)-based curve measurement system's capabilities to measure grade. The key improvements include adding the capability to measure roadway grade and an option to conduct a continuous test run of a highway section including multiple curves.

Finally, researchers drafted a *Horizontal Curve Evaluation Handbook* to aid TxDOT's practitioners in using the GPS-based system for evaluating curves. This handbook combines guidance from several sources to facilitate comprehensive analysis of rural highway curves.

#### **Research Performed by:**

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#### **Project Completed:**

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## What They Found

Vehicle speeds on rural highway curves are strongly influenced by curve radius and approach tangent speed. Drivers choose lower speeds if the curve is sharper or is located on a highway with lower speeds overall. These trends are consistent across several different types of rural highways—two-lane undivided, four-lane undivided, four-lane divided, and four-lane freeway.

Roadway grade can be measured and computed within an error range of 2 percent using GPS-measured elevation data. Though GPS-measured elevation is not as precise as horizontal position data, this error range is adequate to support the calculations needed to conduct a margin-of-safety analysis of curve pavement treatments.

## What This Means

Researchers developed enhanced tools that allow practitioners to conduct a single pass to evaluate rural highway curves for several purposes. These purposes include checking and updating curve advisory speeds, determining the need for supplemental traffic control devices such as chevrons, and assessing the margin of safety to determine if a pavement friction treatment on the curve would be cost beneficial.

### For More Information

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