



Project Summary

Texas Department of Transportation

0-6408: Development of a Statewide Sign Maintenance Program

Background

Though most driving occurs during daylight hours, nighttime fatality rates are three times the rate of daytime fatalities. Improving visibility of traffic sign retroreflectivity will help drivers better navigate the roads at night and promote safety and mobility. It also supports TxDOT's efforts to be responsive to the needs of the growing population of older drivers. The revised Texas Manual on Uniform Traffic Control Devices (TMUTCD) calls for minimum sign retroreflectivity levels. TxDOT will need to implement sign maintenance that incorporates minimum retroreflectivity levels to provide for nighttime visibility of signs.

What the Researchers Did

In order to ensure TxDOT is in compliance with the TMUTCD (the specifications for which go into effect in January 2012), researchers evaluated TxDOT's current sign retroreflectivity maintenance practices and measured the retroreflectivity of almost 1,400 signs across the state.

The researchers evaluated the Mandli Collection Vehicle, the only mobile sign retroreflectivity measurement technology available at the time this study was initiated (see Figure 1). The vehicle measures sign retroreflectivity during daytime hours by collecting data via top-mounted equipment operated by computer from within the vehicle.

The researchers also:

- Visited district and maintenance offices across the state.
- Studied the effectiveness of using the calibrated sign and comparison panel procedures of the visual nighttime sign inspection maintenance method.
- Developed a standardized form for conducting and documenting nighttime inspection.

What They Found

The researcher's statewide inspection of in-service signs revealed that almost all were above the MUTCD minimum retroreflectivity levels, meaning that TxDOT's current maintenance practices are quite effective compared to the minimum levels in the 2011 TMUTCD. A sign analysis showed that 87 percent of all in-service signs were less than 10 years old and 95 percent were compliant with the minimum requirements.

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Also, the researchers conducted sign counts along various stretches of highway to determine a statewide estimate of TxDOT's sign inventory. Study findings indicate that TxDOT has about 2.1 million traffic signs along its system. However, the maintenance and documentation practices vary across the state, and none of the current practices would meet the intent outlined by the FHWA in terms of the three available procedures for conducting nighttime visual inspections. Also, researchers determined that TxDOT inspectors were not trained in retroreflectivity procedures, which is required by the new MUTCD standards.

After an evaluation of the Mandli Collection Vehicle (which was designed to eliminate the tedious and time consuming by-hand data collection), researchers determined that the results were not accurate enough to recommend its use as a way to remove the subjective nature of visual nighttime inspections.



Figure 1. Mandli Collection Vehicle.

What This Means

The researchers recommend that TxDOT:

1. Begin using calibration signs prior to nighttime inspections. The calibration signs can be mostly made with ASTM D4956 Type I beaded materials except for guide signs, which should be made with a combination of ASTM D4956 Type I beaded materials (for the backgrounds) and ASTM D4956 Type II beaded materials (for the legends).
2. Implement a standardized inspection form to document activities and help facilitate safe inspection procedures.
3. Establish a training program for all inspectors that should include, at a minimum, how to use and care for calibration signs, how to conduct safe nighttime visual inspections, and how to use the standardized inspection forms.

These recommendations will bring TxDOT's current practices into compliance with the 2011 TMUTCD. Although the testing of the Mandli Collection Vehicle resulted in disappointing results, it is likely that this technology will continue to evolve. In addition to evaluating future mobile sign retroreflectivity technologies, the researchers also see a possible need to develop a specification and establish a certification program for such technologies.

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