Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6969: Traffic Control Device Analysis, Testing, and Evaluation Program

Background

Evaluating the numerous types of traffic control devices (TCDs) newly available and installed across Texas roadways is a key for the Texas Department of Transportation (TxDOT) to maintain roadway safety and proper performance of TCDs. Evaluations are also needed in order to cost-effectively implement new devices and technologies for continual improvement of the system. Wet-weather, work-zone, and 6-inch pavement markings, as well as pedestrian crossing signs and treatments, are just several of the subject areas targeted for examination and development during the course of this project. This project team conducted high-priority, short-term evaluations of TCDs, including human performance, safety effects, practices, policies, and specifications. The TCD issues evaluated represented new devices or technologies, new applications of an existing device or technology, TCD material performance, changes in practices regarding a TCD, or other TCD-related needs.

What the Researchers Did

During the first year, the project team hosted a half-day Wrong Way Driving Forum with about 50 people representing TxDOT, other departments of transportation, research organizations, federal agencies, various consulting firms, and technology manufacturers attending. Over the course of the project, researchers reviewed current and best practices, assessed effectiveness, and made further research recommendations about the following devices:

- Embedded light-emitting diodes (LEDs) in signs in Texas.
- Lane control signs on frontage roads.
- Optical speed bars on horizontal curves.
- Traffic signal head backplates in Texas and other states.

- Intersection conflict warning systems.
- Work zone signing.
- Safety corridors.

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A variety of pavement marking topics were also examined:

- Safety of wet-weather pavement markings.
- Effective work zone pavement marking removal techniques.
- Guidance for pavement marking removal.
- Guidance for the application of 6-inch pavement markings.
- Raised retroreflective pavement marker practices in Texas and other states.

In addition, the team examined guidance and assessed the effectiveness of the following pedestrian safety-related practices and devices:

- Pedestrian crashes on high-speed roads.
- Selection of appropriate treatment for a particular pedestrian crossing location.
- Pedestrian crossing signs with embedded LEDs during the day.
- Pedestrian crossing treatments at night

What They Found

Detailed findings for each of these research areas and activities can be found in the published research reports. Selected highlights are summarized as follows:

- Evaluation results lend support to the positive safety effects of wet-weather pavement markings for wet-night crashes.
- Increased implementation of 6-inch-wide markings should be a goal of TxDOT. The overall safety improvement, positive benefit-to-cost ratio, improved driver satisfaction, and getting ahead of possible changes to the *Manual on Uniform Traffic Control Devices* are all reasons to increase usage of 6-inch-wide markings.
- Researchers recommended improvements to TxDOT's pavement marking removal for work zone applications and produced a stand-alone guidance document for pavement marking and marker removal, which was developed in conjunction with recommended updates *to Standard Specification Item 677* and the *Pavement Marking Handbook*.
- More districts are implementing LED-embedded pedestrian crossing signs (LED-Em). Two studies were conducted to compare the driver yielding rates of the LED-Em with the rectangular rapid-flashing beacon (RRFB) and pedestrian hybrid beacon (PHB). The initial daytime study gathered data for the LED-Em so that their driver yielding rates could be compared to findings for PHBs and RRFBs available from previous studies. Recent evaluation of pedestrian crash data clearly shows that the majority of pedestrian fatalities (79 percent) occur at night; therefore, the second study gathered driver yielding data for both daytime and nighttime conditions at a sample of LED-Em, PHB, and RRFB sites. The findings from both studies demonstrated that the PHBs have the highest driver yielding rates followed by the RRFBs. The studies also showed that LED-Ems do not perform as well as the other treatments, especially for roadways with wider crossing distances and higher posted speed limits.

What This Means

Based on the research findings, the research team developed implementable recommendations, specifications, test methods, training materials, and policy decision materials pertaining to a wide range of TCD issues and topics. Published technical reports contain details.

For More Information

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Technical reports when published are available at **http://library.ctr.utexas.edu.**

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