Texas A&M Transportation Institute

PROJECT SUMMARY

Texas Department of Transportation

0-6773: Warrants and Sunset Requirements for ITS Equipment Installations on Texas Highways

Background

Intelligent transportation system (ITS) devices are one tool in the Texas Department of Transportation's (TxDOT's) toolbox for improving safety and operations on the state's highways. TxDOT routinely installs ITS devices, such as closed-circuit television (CCTV) cameras, vehicle detection systems, and dynamic message signs (DMSs), to better manage operations, improve safety, and reduce the effects of incidents on Texas highways. Although these can be valuable assets in managing traffic and improving safety, they need to be managed as an asset just like any other part of the transportation infrastructure.

As with many types of advanced technologies (e.g., cellular phone or communications), these technologies tend to have a short product life—a new, better, faster device always seems to be right around the corner. Once new ITS devices or systems are installed, TxDOT is making a long-term commitment, and as resources become tighter, operating and maintaining these devices and systems at a high level of functionality also become more difficult. In reality, ITS devices and systems, and their associated communications infrastructure, can be viewed as infrastructure assets.

What the Researchers Did

This project developed guidelines, criteria, and procedures for installing, repairing, and/or removing ITS field devices and systems. The research team:

- Developed warrant conditions and criteria for assessing when and where to install new ITS devices and systems.
- Provided sunset requirements and criteria for determining when to no longer support deployed ITS devices and systems.
- Developed an analytical framework for identifying and prioritizing mission-critical devices and systems for upgrade and maintenance.

The research team examined strategies, criteria, and tools that TxDOT could potentially use to help manage its ITS deployments as an asset.

The research team also developed a framework that applies the risk management principles for conducting a risk-based analysis for prioritizing TxDOT's ITS assets. The framework involves developing a risk matrix in order to group various ITS assets into priority categories. The intent of the framework is to give TxDOT an easy-to-use tool where individual districts can rank their ITS assets based on the criticality of a device to the district's ability to manage traffic

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operations and the likelihood that the device will fail. The process involves gathering critical information related to the performance, age, and maintenance of the district's ITS assets and assessing the impacts of their failures on overall traffic management capabilities in a district. A ranking system that combines the likelihood and consequences of failure for the identified ITS assets can then be applied to the devices. These assets can be prioritized based on risk scores and reduction in risk score per unit cost.

What They Found

Several states have developed warrants for determining when and where to install particular ITS devices, such as CCTV cameras, DMSs, and traffic sensor stations. These warrants were developed through an ENTERPRISE pooled fund, of which TxDOT is a partner. The research team provided recommendations to TxDOT on how these warrants can be adapted to meet its needs and reasons why TxDOT installs these devices on Texas highways.

Managing ITS devices through an asset management approach allows for better and more consistent decision making throughout the state. The team found that a number of tools are commercially available and could be used by TxDOT in implementing an asset management approach to managing its ITS devices. The research team provided guidance on assessing various asset management tools for ITS applications.

What This Means

Managing ITS devices as assets will allow TxDOT and other regional stakeholders to become more strategic and fiscally responsible in the use of their limited ITS deployment and maintenance funds. TxDOT should consider adopting the warrant criteria developed through the pooled fund project and fine-tuned in this research. Having warrants will promote the consistent application of ITS devices, specifically CCTV cameras, vehicle detection stations, and DMSs across the state.

Furthermore, TxDOT should adopt a risk assessment/risk management approach for determining when and where to repair versus replace malfunctioning ITS devices. The risk assessment process is designed to assist in making decisions, based on the outcomes of risk analysis, about which risks need treatment and the priority for treatment implementation.

Finally, TxDOT should routinely examine its use of ITS devices and consider removing those devices that are no longer functional and not serving or providing the functions for which they were originally installed. The policies, practices, and procedures developed during this research effort should permit TxDOT districts to prioritize their deployments and ensure that deployed systems are maintained to their highest potential.

For More Information

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