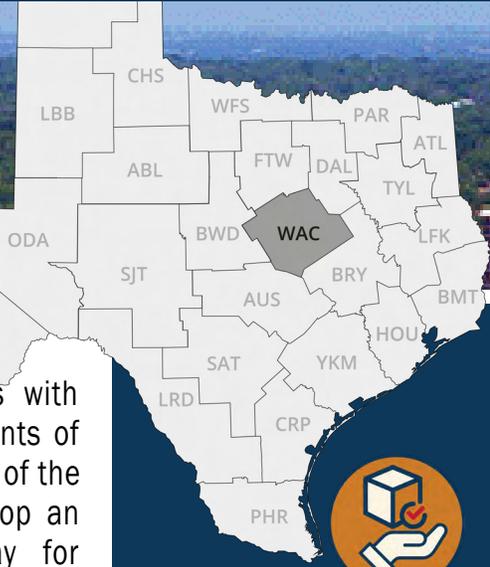


TxDOT Innovations and Technology Deployment Briefs

Tools and Strategies to Mitigate End-of-Queue Crashes



PROBLEM

Work zones can create queues. On I-35, there were four main issues with lane closures and the resulting queues: (1) drivers along the rural segments of I-35 do not expect traffic queues, especially at night, (2) the dynamic nature of the closures (necessity and locations) do not allow nightly travelers to develop an expectation of queues, (3) contractors use all available right-of-way for construction activities, making it difficult to position and leave end-of-queue (EOQ) warning equipment in place until needed, and (4) the I-35 corridor is the most heavily traveled freight roadway in the state, thereby increasing the severity and risk of work zone crashes.

SOLUTION

Deployment of an EOQ warning system for frequent, temporary nighttime work provides the opportunity to mitigate the risk and potential severity of crashes. The Waco District developed an innovative application of existing EOQ systems by assessing anticipated queues based on location, day-of-week, and traffic volume, including heavy vehicles. This methodology produced recommendations for the mobile, nightly deployment of multiple individual EOQ systems across the 100-mile I-35 corridor in the Waco District.

The automated system consists of sensors that measure traffic speeds at multiple locations within the area of a potential queue communicates. The system then assesses if the speeds indicate that a traffic queue has formed, determines an appropriate warning message to display to motorists approaching the queue, and communicates that message to one or more portable changeable message signs (PCMS) deployed as part of the system. These messages provide travelers with accurate and comprehensive real-time information about current conditions. The information also provides recommendations to TxDOT about contractors' equipment placement and staffing needs.

BENEFITS

- Queue warning systems have been shown to reduce crashes that typically occur when queues are present by 55 percent. More importantly, the majority of the crashes that are avoided would likely have involved injuries or fatalities.



PROJECT DELIVERY



CUSTOMER FOCUS



FOSTER STEWARDSHIP



PRESERVE ASSETS



OPTIMIZE PERFORMANCE



PROMOTE SAFETY



VALUE EMPLOYEES



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- More than 500 nights of mobile, nightly deployments. This was the first application nationwide of mobile, nightly deployments.
- Developed specifications for TxDOT, which were used for bidding and subsequently copied by at least eight other states.

KEY TASKS

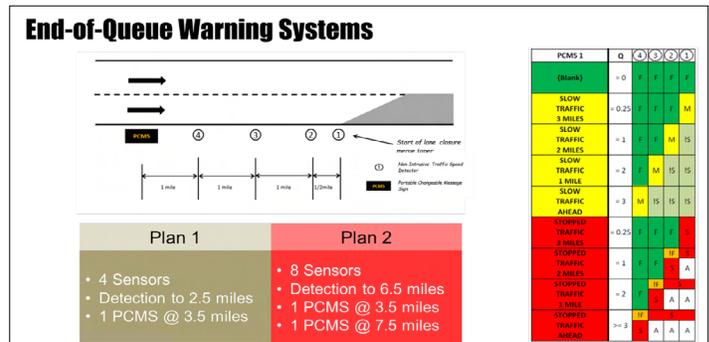
- Develop a robust and automated data collection methodology for required volume information.
- Develop a comprehensive reporting and database mechanism for all corridor lane closures.
- Develop automated assessment and recommendation process for all main-lane lane closures.
- Develop automated reporting to TxDOT, contractors, and traffic control subcontractors for equipment utilization and placement.

DATA SOURCES

Data consumption is a key element of this innovation. Knowledge of all lane closures, including detailed location and timing information is necessary, as are traffic volumes, classifications, and speeds. These systems typically update on a 5-minute or less period, ensuring that changes in traffic conditions are detected quickly. Data is pushed in real-time to PCMS on the roadway for travelers and can be utilized in numerous other mechanisms including social media, coordination with Traffic Management Centers, and after-action performance measurement reporting.

PROACTIVE APPROACH

The EOQ Warning System is a prime example of innovation leading to valuable, practical tools. Travelers using I-35 can stay informed with accurate and comprehensive real-time information about current conditions. TxDOT and contractors can use the same data to assist in the allocation of equipment and personnel.



Layout and message logic for EOQ Warning System.



EOQ Warning System in operation on I-35.

3-DAY OUTLOOK, SUNDAY, SEPTEMBER 20, 2018						
ID	PROJECT	ON HOLD?	CONDITION	ROADWAY	START LOCATION	PLAN
9500	5A	No	Maintenance	I-35 Mainlanes (starting at MM 340.0)	Meyers Ln to N Loop 340, Lacy-Lakeview	Rumble strips
9949	3A-1	No	Construction	I-35 Mainlanes (starting at MM 305.0)	Hart/Berger Rd to FM 935/Main St, Temple	1
10022	4	No	Maintenance	I-35 Mainlanes (starting at MM 334.0)	12th St to Martin Luther King Jr Blvd, Waco	1

Automated Contractor Staffing and Deployment Report.



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