

TxDOT Innovations and Technology Deployment Briefs

Real-Time Rail Crossing Monitoring System



PROBLEM

Highway-rail grade crossings can be a source of significant traffic delay to traffic operations and emergency response. Furthermore, the location of the two fire departments in this portion of the Houston District is on either side of the railroad tracks along the US 90A corridor. This separation results in the need for personnel from both fire stations to cross the railroad tracks when responding to an event. The emergency responders need to be aware of the optimal route to take, and which Department should respond during an emergency.

SOLUTION

TxDOT's goal to address this problem was to create a system that could alert both the City of Sugarland first responders and the Fire Department of blocked crossings when they respond to an emergency event. This real-time information could then be used to make routing decisions for emergency runs requiring the crossing of railroad tracks.

Doppler radar and Lidar systems were installed at 13 rail crossings along the 6.4-mile US 90A highway-rail corridor between Kirkwood and Grand Parkway. These systems monitor several parameters including presence of train and direction, speed of train, length of train, and gate closures. Using this information, the system could then monitor the status in real time and calculate projections for downstream crossing closings and clearance intervals.

The information is available to the emergency responders by kiosks at each of the two fire stations and police headquarters. The information is also available to the traveling public on the City of Sugarland website and the Houston TranStar website, as well as their mobile apps. The rail crossing monitoring map provides the train's location and speed.

BENEFITS

Operations and safety on the surface street system may also be improved if local agencies and travelers have information regarding the extent and duration of train crossing blockage. The rail crossing monitoring system helps emergency personnel quickly check the train traffic before responding to an emergency call.



PROJECT DELIVERY



CUSTOMER FOCUS



FOSTER STEWARDSHIP



PRESERVE ASSETS



OPTIMIZE PERFORMANCE



PROMOTE SAFETY



VALUE EMPLOYEES



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Emergency responders can use other crossings to reach emergency locations. This information enhances response time and safety for the public.

Doppler radar technology is common, reliable, and physically small and lightweight. It also works well in side or overhead installations, as well as consumes minimal power at minimal cost.

KEY TASKS

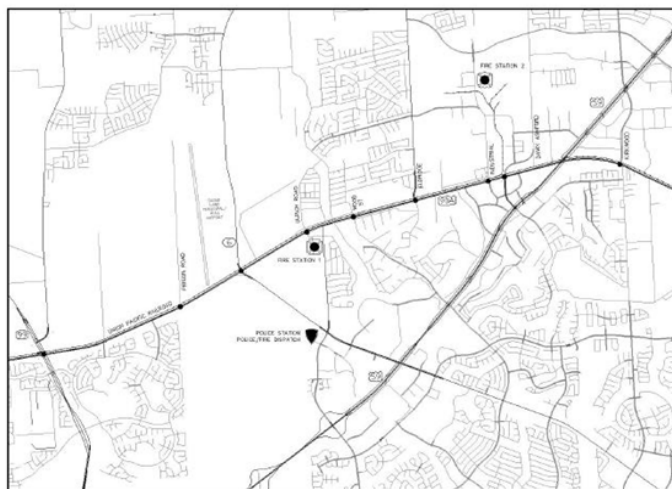
- Install and test different types of sensors using Doppler and Lidar systems.
- Integrate into Houston TranStar network.
- Install kiosks at fire stations for quick viewing and decision on emergency routes.

PROACTIVE APPROACH

TxDOT is working on implementing this real-time railroad monitoring system innovation for the City of Baytown.

ADDITIONAL NOTES

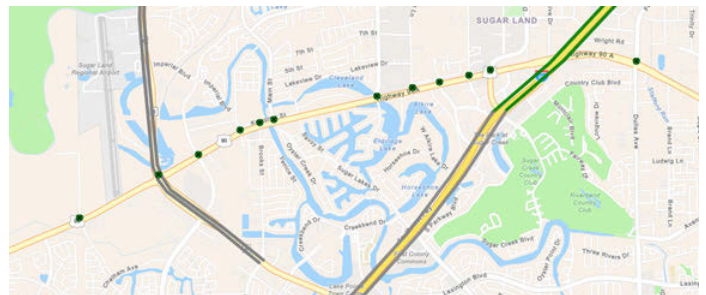
The goal is to alert the City of Sugarland first responders and fire department of blocked crossings when responding for service.



Project area and location of fire/police facilities.



Example of a crossing where the Monitoring System is installed.



Map of Rail Crossing Monitoring System locations. (Green indicates open).

Train Detected at 3:26 PM



Westbound Train Traveling 25 MPH (7500 feet long)

Grand Pkwy	Prison Rd	St Hwy 6	Ulrich	Wood	Elldridge	Dairy Ashford	Kirkwood
5:25	2:05	:20	Present	Present	Passed	Passed	Passed
8:45	5:25	3:40	1:45	:30			

Train Legend

Crossing
Estimated Arrival Time
Estimated Departure Time

Real time access by anyone on Houston's TranStar website. (Red signifies a blocked crossing and green is immediately available).



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