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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION
TRANSFORMING IDEAS INTO SOLUTIONS

Research Results

Field Trials of the Truck-Mounted Attenuator Accessory (TMAA) Package

Field evaluation of accessories and equipment for Truck-Mounted Attenuators (TMA) trucks that can improve safety and the function of TMA truck operations.

Maintenance

MAY 2025

Project Title:
Review of Truck Mounted Attenuator Accessories

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WHAT WAS THE NEED?

The California Department of Transportation (Caltrans) often performs highway maintenance operations in work zones with temporary lane closures adjacent to high-speed traffic. The high-speed traffic provides a significant safety hazard to highway maintenance personnel. To shield the work zones from errant vehicle impacts, Caltrans routinely deploys shadow trucks with TMAs. The TMAs are designed to decelerate lighter vehicles but impacts of high-speed heavy vehicles can exceed TMA dynamic absorption force limits. The impact risk with physical injury for the shadow truck driver is significant. Since the shadow truck TMAs are mobile and cannot be physically scaled up, the best mitigation strategy for impacts is to influence driver behavior.

WHAT WAS OUR GOAL?

We are testing up to three TMAA packages for approximately one year in the field during normal Caltrans operations on the highway. Operator feedback will be analyzed. The results of the field testing and operator feedback will inform us if the TMAA package is suited to regular Caltrans operations and this technology package is ready for broad deployment.

WHAT DID WE DO?

Over the course of a one-year field study, three TMAA packages were deployed and tested in real-world highway maintenance operations. The package included four key subsystems: a radar speed feedback display, a Mobile Digital Video Recorder (mDVR) system, a panic/warning light system, and iCone technology for public alerts via mobile

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applications. The researchers at UC Davis procured, installed, and refined the equipment, provided training to Caltrans personnel, and collected extensive feedback through surveys, interviews, and video analysis.

WHAT WAS THE OUTCOME?

Key findings indicate that the panic light system had the most noticeable effect on driver behavior, prompting motorists to slow down and respond to work zone warnings. The mDVR system successfully recorded critical incidents, including a TMA truck strike, and allowed for remote footage retrieval, enhancing incident documentation. The iCone technology functioned as intended, providing mobile alerts to drivers, with its effectiveness expected to increase as more systems integrate this data. The radar speed feedback sign also showed promise, though further study is needed to quantify its impact on vehicle speeds.

WHAT IS THE BENEFIT?

This research supports Caltrans' core goals of improving safety, strengthening operational efficiency, and enhancing stewardship. The successful evaluation of the TMAA package demonstrates its potential for broader deployment, with further research recommended to optimize and expand its implementation in Caltrans highway operations. The results of this study provide significant improvements of safety of shadow truck operators and the traveling public. They improve Caltrans' ability to safely perform moving closure operations.

IMAGES

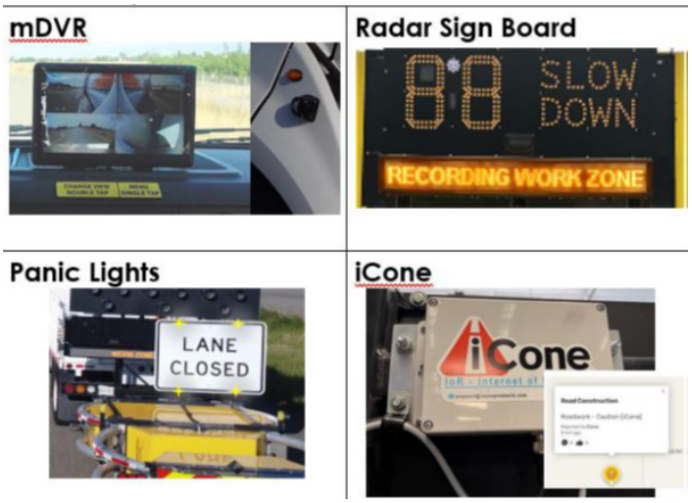

Image 1: Truck-Mounted Attenuator Accessories (TMAA).

LEARN MORE

The final report will be posted on the website below:
https://dot.ca.gov/programs/research-innovation-system-information/research-final-reports