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Caltrans Division of Research, Innovation and System Information

Research Results

Work Zone Motorist Intrusion

In this report, Texas Transportation Institute researchers documented the efforts undertaken to investigate and categorize the different types of work zone intrusion crashes that occur on California roadways

Maintenance

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Project Title:
Work Zone Motorist Intrusion

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WHAT WAS THE NEED?

Vehicle intrusions into highway work zones are a major safety problem facing both construction workers and motorists. While different strategies and technologies have been deployed to raise the awareness of drivers approaching a work zone, the effectiveness of these strategies vary depending on the characteristics of the intrusion crashes targeted. Research was needed to investigate and categorize the different types of work zone intrusion crashes. Additionally, a detailed comparative critique of how each of the various countermeasures available may mitigate those types of work zone intrusions for a given set of roadway conditions and work zone activities.

WHAT WAS OUR GOAL?

Researchers examined the narratives of the various intrusion crashes to try to identify the main categories of crash scenarios that occurred. Prototypical crash sequences were developed around four basic work zone operations categories: lane and shoulder closure operations, flagging operations, mobile operations, and traffic control set-up and removal operations. Within each of these basic work zone situations, several different sequences leading to work zone intrusion crashes were defined. These sequences were differentiated on whether the action taken appeared to be a deliberate decision on the part of the driver, then on the primary contributing actions or factors leading to the intrusion.

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WHAT DID WE DO?

In this report, Texas Transportation Institute researchers documented the efforts undertaken to investigate and categorize the different types of work zone intrusion crashes. They conducted a detailed comparative critique of how each of the various countermeasures may mitigate work zone intrusions. Researchers used the both the New York State Department of Transportation work zone incident database and telephone surveys of California Department of Transportation and highway contractor personnel to gain insights into the frequency, characteristics, and crash sequences that comprise vehicle intrusion crashes at work zones. Intrusion crashes make
up a relatively small portion of crashes at work zones. They also comprise a greater proportion of nighttime crashes than daytime crashes, although most intrusion crashes happen during daytime work operations. The biggest share of vehicle intrusion crashes occurs during lane closure operations. Intrusion crashes also occur at mobile operations, flagging operations, and during traffic control set-up and removal activities. When intrusion crashes occur, they most often involve collisions with work vehicles /equipment or work materials/debris rather than with a highway worker.

Several countermeasures were identified to address intrusion crashes. Some emphasize increased attention to current procedures or possible expansion of procedures and are low cost to implement. Others were technological countermeasures and can have significant costs associated with them. An assessment of implementation costs to possible reduction in work zone intrusion crash costs was performed and is documented in the report. Based on these findings, researchers developed guidance on which work zone intrusion countermeasures are most appropriate for a given set of roadway conditions and planned work zone activities.

WHAT WAS THE OUTCOME?

Several procedural and technological countermeasures were identified as viable for addressing work zone intrusions crashes. Countermeasures that emphasis increased attention to current procedures or possible expansion of procedures were identified. Countermeasures that met cost effectiveness criteria once traffic volumes reach moderate levels and high-volume levels were identified separately. The research also provides guidance on which work zone intrusion countermeasures are appropriate for a given set of roadway conditions and planned work activities.

WHAT IS THE BENEFIT?

The findings from this Work Zone Intrusion study may be beneficial for Caltrans as well as for contractors. The countermeasure assessment and implementation guidelines are very useful in planning and conducting work zone activities.