



Caltrans Division of Research,  
Innovation and System Information

# Research



# Notes



Maintenance

SEPTEMBER 2020

Project Title:  
Work Zone Intrusion Alarms Project

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## EVALUATION OF WORK ZONE INTRUSION ALARMS

The research tests and evaluates Work Zone Intrusion Alarm (WZIA) systems with the intention of increasing highway worker safety.

### WHAT IS THE NEED?

Maintaining worker safety in work zones remains of paramount concern to the California Department of Transportation (Caltrans), as well as other highway agencies throughout the United States. Some ways to ensure highway worker safety in work zones includes using safe work practices and additional safety measures such as Portable Changeable Message Signs and automated flagging assistance.

Caltrans employees set up highway lane closures to create work zones for workers to conduct highway maintenance activities. Even with proper equipment and standard layouts, unauthorized vehicles still enter these work zones, compromising the safety and well-being of workers and traveling motorists. Minimizing the significant risks to workers associated with vehicles entering work zones motivates the need for the research.

### WHAT ARE WE DOING?

This research includes examining, testing, and evaluating Work Zone Intrusion Alarm (WZIA) systems in various work zone conditions. A WZIA system is an impact-activated device that warns workers of errant vehicles entering work zones to give them advance warning to take evasive action. Caltrans previously completed a Preliminary Investigation (PI) of commercially available WZIA systems. Information from this PI report will be analyzed to assess the need for any additional research pertaining to existing literature or available technologies.



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Under the Project Panel's (Panel) direction, this analysis will prompt the selection and procurement of different WZIA systems. With the panel's guidance, the researchers will develop a preliminary set of testing protocols to evaluate the performance and implementation of the selected WZIA systems. Next, the research team will conduct initial pilot tests on the WZIA systems in a controlled environment to gain an understanding of the deployment, practical implementation, system capabilities, and limitations.

In addition, the researchers will guide and train maintenance staff on the usage and deployment of WZIAs. Caltrans maintenance staff will test and deploy the WZIA systems while the researchers collect video, worker crew surveys, and usage data. The researchers will also provide a cost-benefit analysis of the tested WZIA systems to help determine the worthiness of implementing these systems.

## WHAT IS OUR GOAL?

The goal includes determining if WZIA equipment increases safety in temporary work zones by giving workers advance notice when unauthorized vehicles enter the work area. Contingent on the WZIAs' effectiveness, Caltrans will utilize WZIA equipment to augment current Caltrans Standard Plans.

## WHAT IS THE BENEFIT?

WZIA equipment implementation would support Caltrans' efforts towards enhancing worker safety in highway work zones. Although Caltrans is the immediate beneficiary of the proposed research, any organization could adopt the developments from the proposed research into their work zone practices.

## WHAT IS THE PROGRESS TO DATE?

The researchers conducted literature and market reviews on a variety of work zone safety-related devices and performed detailed evaluations and tests on three specific devices.

Caltrans received recommendations on the three systems' effectiveness and practicality of implementing into Caltrans work zone operations and potential augmentation of Caltrans standard traffic control plans. The technology shows promise, and future pilot testing is in the planning stage.

The research team completed the research, and now the research task is in the official closeout process. No further updates to these research notes are planned.