



U.S. Department of Transportation  
Federal Transit Administration



# Roadway Worker Protection Secondary Warning Device and Employee in Charge Software System (EICSS)

## *Final Report*

### Background

Roadway worker protection is a number one priority throughout the railway industry. The Federal Transit Administration (FTA) and the Sacramento Regional Transit District (SacRT) conducted a demonstration test of a secondary warning device for roadway workers to provide a visual and audible advance warning alert to train operators of workers ahead and to track workers of a train approaching the work zone.

### Objectives

The goals of the project were to demonstrate the ability of the device to effectively warn track workers of approaching trains and warn train operators of the presence of track workers and allow them enough time to safely clear to a place of safety well in advance of train passage and to determine the effectiveness of the EICSS.

### Findings

*The roadway worker secondary protection system worked well in providing advance warnings to train operators and roadway workers when a train is approaching an occupied work zone.*

The roadway secondary protection system uses a combination of Train-Mounted Units (TMUs) and Personal Alert Devices (PADs) to provide advance warnings to train operators and roadway workers when a train is approaching an occupied work zone. The EICSS is an additional software for confirmation of the initiation and conclusion of established work zone protection. The secondary nature of the technology boosts value in additional protection provided as a redundant safety measure to reduce the possibility of a roadway worker incident or near-miss.

During the secondary system demonstration period, there were no reported injuries or near-miss events. Findings revealed that it worked well in most SacRT rail environments except for Downtown work zones, as intrusion alerts were affected by trains traveling in all directions, resulting in numerous alerts. There were no notable cost savings with the system, as its secondary nature and operation resulted in no reduced labor or audit times.

The EICSS uses smartphone cellular technology in connection with a common work station to authorize personnel on the rail right-of-way. Testing was conducted for development of online software and hardware at locations along SacRT's light rail line. The demonstration showed that the system does not provide enough benefit to roadway workers or the Control Center; as such, the EICSS will not advance into further use with SacRT.

The report includes demonstration data metrics and findings in several areas, including safety improvement, system effectiveness, return on investment, lessons learned, and technology transfer.

## Benefits

SacRT will continue to use the Personal Alert Devices for its frontline workers performing maintenance activities along the right-of-way, as the system proved to be extremely valuable in open track areas.

## Project Information

### FTA Report No. 0184

This research project was conducted by Michael Cormiae of Sacramento Regional Transit District. For more information, contact FTA Project Manager Roy Chen at (202) 366-0462 or RoyWei-Shun.Chen@dot.gov. All research reports can be found at <https://www.transit.dot.gov/about/research-innovation>.