FTA RESEARCH

FEDERAL TRANSIT ADMINISTRATION

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

Final Report

FEBRUARY 2021

FTA Report No. 0184
Federal Transit Administration

PREPARED BY

Michael Cormiae
Sacramento Regional Transit District

U.S. Department of Transportation
Federal Transit Administration

COVER PHOTO

Courtesy of Sacramento Regional Transit District.

DISCLAIMER

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SPONSORED BY

Federal Transit Administration
Office of Research, Demonstration and Innovation
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

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Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liter	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

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14. ABSTRACT

This final report covers the project performance and results on the use and validation of a secondary warning device for roadway workers. The system provides a visual and audible advance warning alert to train operators of workers ahead and a visual and audible advance warning to track workers of a train approaching the work zone. Sacramento Regional Transit District partnered with Protran Technology for a demonstration of the Employee in Charge Software System (EICSS) that uses smartphone technology to issue and track roadway workers along the trackway alignment.

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This final report covers the project performance and results on the use and validation of a secondary warning device for roadway workers. The system provides a visual and audible advance warning alert to train operators of workers ahead and a visual and audible advance warning to track workers of a train approaching the work zone. Sacramento Regional Transit District partnered with Protran Technology for a demonstration of the Employee in Charge Software System (EICSS) that uses smartphone technology to issue and track roadway workers along the trackway alignment.

EXECUTIVE SUMMARY

Roadway worker protection is a number one priority throughout the railway industry. As part of a cooperative agreement with the Federal Transit Administration (FTA) and the Sacramento Regional Transit District (SacRT), a demonstration test of a secondary warning device for roadway workers was conducted. This system provides a visual and audible advance warning alert to train operators of workers ahead and a visual and audible advance warning to track workers of a train approaching the work zone. In parallel with the implementation of the Personal Alert Devices, SacRT partnered with Protran Technology for a demonstration of the Employee in Charge Software System (EICSS).

This report provides the details associated with the demonstration and evaluation of the commercially-available secondary advance warning system selected by the SacRT. The California Public Utilities Commission (CPUC) released General Order 175-A in 2016 that required all state transit agencies to implement a secondary warning system for all roadway workers present in the established track zone.

The goals of the demonstration and evaluation included the following:

- Demonstrate the ability of the device to effectively warn track workers of approaching trains.
- Demonstrate the ability of the device to effectively warn train operators of the presence of track workers.
- Demonstrate the ability to warn both train operators and track workers in enough time to safely clear to a place of safety well in advance of train passage.
- Determine the effectiveness of the EICSS.

SECTION

1

System Design and Operation

Protran Technology's innovative Protracker Roadway Worker Protection (RWP) system includes a vehicle-mounted device that transmits an alert to a Personal Alert Device (PAD) worn by a roadway worker. This secondary RWP system design provides a visual and audible advance warning alert to train operators of workers ahead and a visual and audible advance warning to track workers of a train approaching the work zone. The system uses FCC-certified radios and meets National Transportation Safety Board (NTSB) R-08-04, which recommends prompt implementation of appropriate technology that will automatically alert wayside workers of approaching trains and will automatically alert train operators when approaching areas with workers on or near the tracks. This action by the NTSB was the result of a fatal accident involving a roadway worker at WMATA in 2006.

Operation

Prior to track access, PADs worn by roadway workers are powered up and ready for communication. During a work activity, approaching trains will send an alert to the PAD units advising the workers of an approaching train. At the same time, the train's mounted detection device will sound an alert communicating the presence of a roadway worker.

The second part of the system uses smartphone technology to validate and authorize roadway worker access to a section of track. This access is controlled by a dispatcher and has acknowledgment features and tracking abilities.

SECTION

2

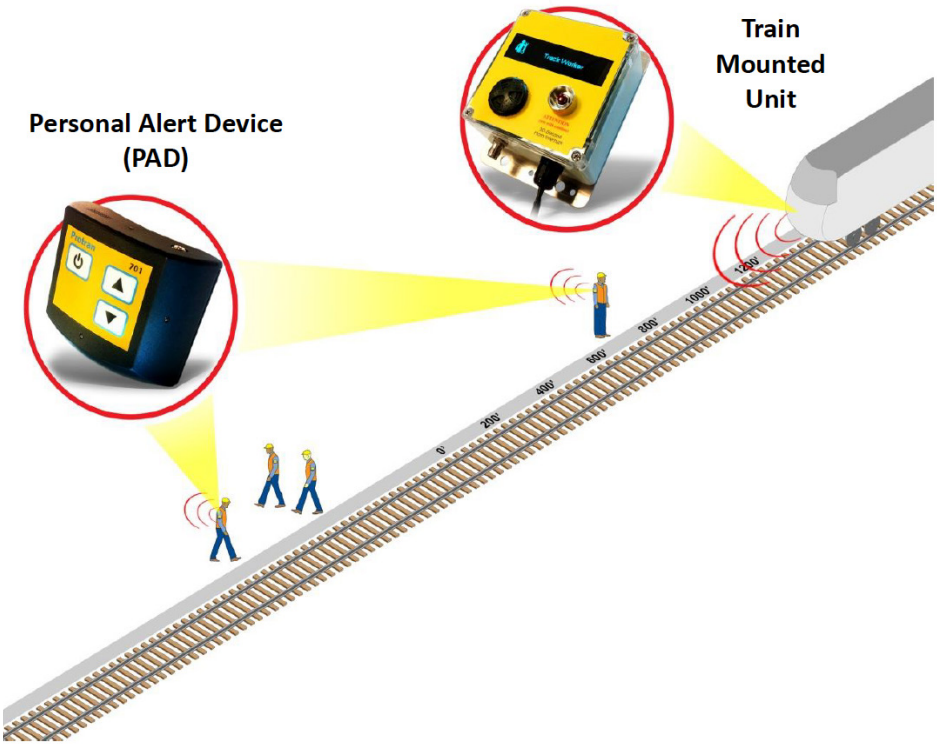
System Hardware Components

The Protran secondary warning system transmits and receives using a specific frequency that enables direct communication between devices. The range of the system is 800–1200 feet depending on terrain. Once a signal from the Train Mounted Unit (TMU) is received, the PAD will transmit a signal back to the TMU.

Protran systems are used for secondary warnings and do not replace any Standard Operating Procedures.

Figure 2-1

Protran technology



Train Mounted Unit

The TMU is permanently installed inside the rail vehicle and transmits a constant alert signal to any PAD within range. An operator can silence the audible alarm for 30 seconds with a mute button. If the PAD is still within range after 30 seconds, the audible alarm will reactivate. Each roadway worker is issued a PAD, which is activated while the employee is on the rail right-of-way.

Figure 2-2

Protran Train Mounted Unit (TMU)

Figure 2-3

TMU mounted on train dashboard

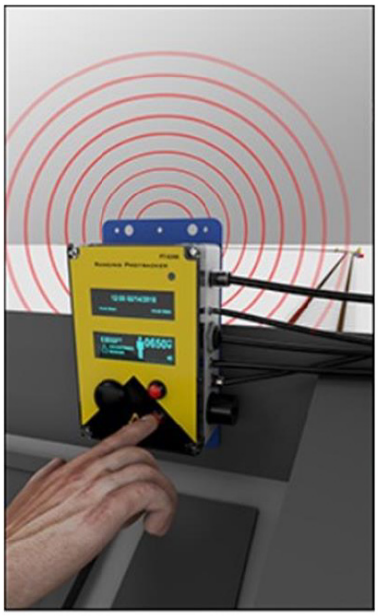


Figure 2-4

Protran Personal Alert Device (PAD)

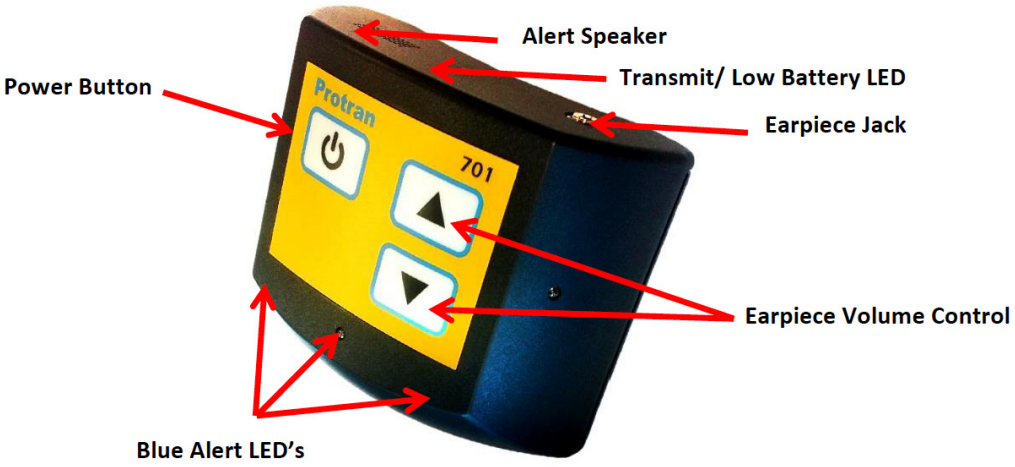


Figure 2-5

Different locations to wear and not wear PAD

SECTION

3

System Software

Employee in Charge Software System

An additional layer of roadway worker safety is the Employee in Charge Software System (EICSS). The system uses smartphone cellular technology in connection with a common workstation to authorize personnel on the rail right-of-away.

Figure 3-1

Protran EICESS components

Dispatcher Workstation (SacRT)

Tablet Computer (Protran)

Smart Phone (Protran)

Testing of the EICSS was the primary focus of this research project. The test was for the development of both application online software and hardware for the EICSS. Project deliverables were the software and equipment required to test the EICSS at locations along SacRT's light rail line provided by Protran.

Test System Operation

SacRT current operation uses a radio-based system between roadway workers and dispatching staff. Authority is granted if system operation is normal, and requests are made via radio to the dispatching center that include a verbal acknowledgment from each train operator of the work and location.

The scope of the EICSS was to develop a method for tracking roadway workers using today's technology. In today's technology environment, most individuals have a smartphone that can run applications that are also GPS-driven. This

research was to determine if this would be feasible and applicable with roadway workers and control centers. The overall need was an attempt to track each roadway worker's access and their geographical parameters along the alignment of a rail system's trackway.

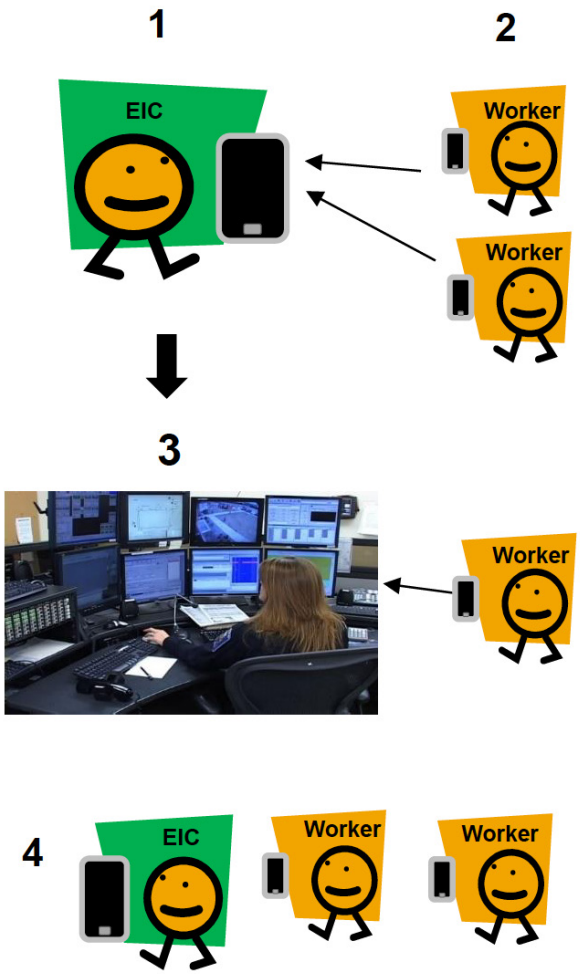
During the testing stages, the SacRT existing system was overlapped with the current test program to avoid disruption of safety measures already in use. Procedures were developed for this testing process to ensure consistency with safety protocols.

Operational Steps

1. Employee in Charge (EIC) Initiates request with location details.
2. EIC adds all other employees equipped with smartphones to the group.
3. Track access request sent to dispatcher.
4. Dispatcher reviews request, looks for conflicts, validates employee group, sends request code to EIC for acknowledgment.

Figure 3-2

Protran EIC task flow



SECTION 4

Testing, Training, and Demonstration

Training and Testing

PAD and TMU

Roadway workers were trained on the PAD via a PowerPoint presentation by Protran detailing its use and care in a classroom environment. Product demonstrations included unit activation, alert sounds during train approach, proper ways to attach the equipment, low battery indications, powering on and off, and PAD unit charging. Demonstration of proficiency with the PAD system is included in annual exams for all employees who perform work along the right-of-way.

Train operators were trained on the TMU, including activation to demonstrate the alert sounds during roadway worker detection scenarios and the acknowledgement feature that mutes the alarm for 30 seconds.

Both roadway workers and train operators were trained on the newly-published procedures and field equipment applications.

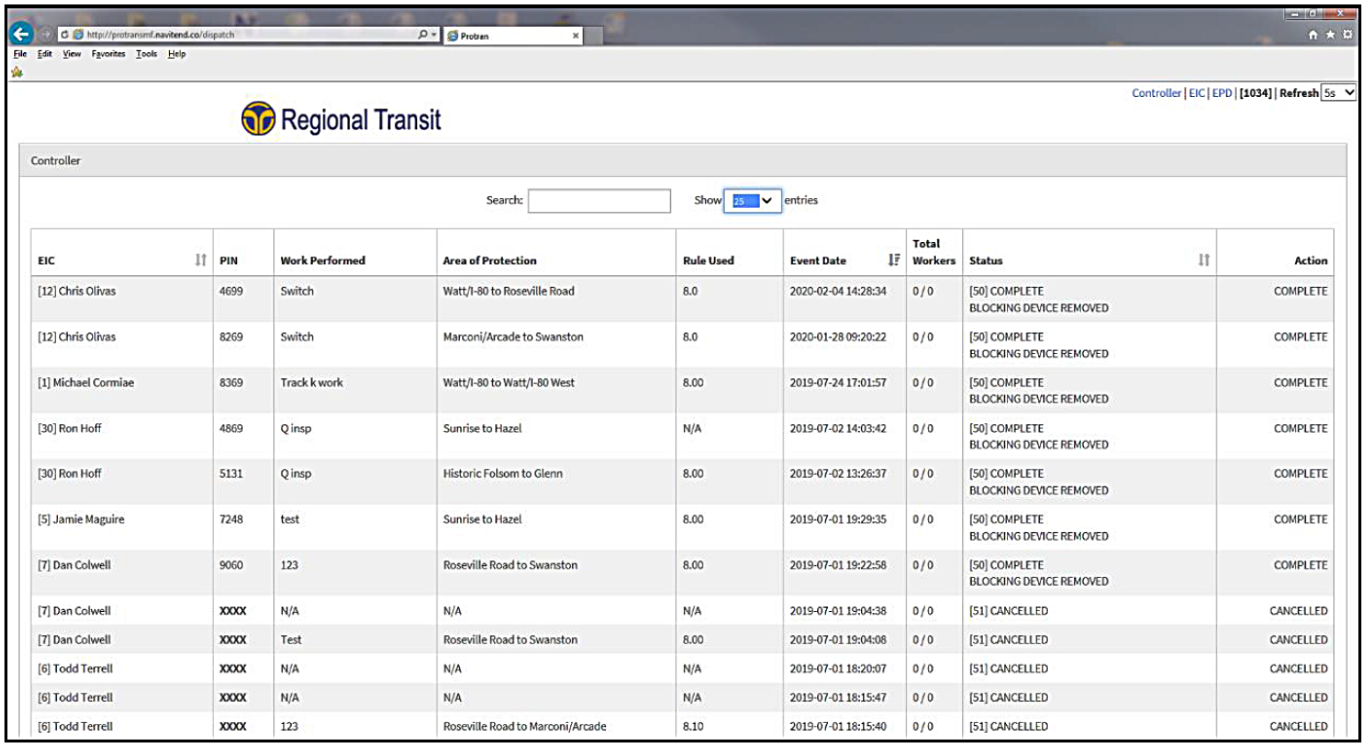
EICSS

Selected roadway workers were trained on the EICSS. Application demonstrations included launching the application, programming location, acceptance of other roadway workers to the group, and initial requests to enter the trackway.

Control Center employees were trained on the EICSS desktop browser software linked to each requesting unit. Application demonstrations included validating the requested location and accepting the request for access and removing that authority and noting the clearance on the control log once access was granted. Data capture included each request using the EICSS and each procedure that used the secondary warning system. Conflicts were published in the daily control log.

Figure 4-1

Protran EIC access screenshot



Regional Transit

Controller | EIC | EPD | [1034] | Refresh 5s

Controller

Search: Show 25 entries

EIC	PIN	Work Performed	Area of Protection	Rule Used	Event Date	Total Workers	Status	Action
[12] Chris Olivas	4699	Switch	Watt/I-80 to Roseville Road	8.0	2020-02-04 14:28:34	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[12] Chris Olivas	8269	Switch	Marconi/Arcade to Swanston	8.0	2020-01-28 09:20:22	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[1] Michael Cormiae	8369	Track k work	Watt/I-80 to Watt/I-80 West	8.00	2019-07-24 17:01:57	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[30] Ron Hoff	4869	Q insp	Sunrise to Hazel	N/A	2019-07-02 14:03:42	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[30] Ron Hoff	5131	Q insp	Historic Folsom to Glenn	8.00	2019-07-02 13:26:37	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[5] Jamie Maguire	7248	test	Sunrise to Hazel	8.00	2019-07-01 19:29:35	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[7] Dan Colwell	9060	123	Roseville Road to Swanston	8.00	2019-07-01 19:22:58	0 / 0	[50] COMPLETE BLOCKING DEVICE REMOVED	COMPLETE
[7] Dan Colwell	XXXX	N/A	N/A	N/A	2019-07-01 19:04:38	0 / 0	[51] CANCELLED	CANCELLED
[7] Dan Colwell	XXXX	Test	Roseville Road to Swanston	8.00	2019-07-01 19:04:08	0 / 0	[51] CANCELLED	CANCELLED
[6] Todd Terrell	XXXX	N/A	N/A	N/A	2019-07-01 18:20:07	0 / 0	[51] CANCELLED	CANCELLED
[6] Todd Terrell	XXXX	N/A	N/A	N/A	2019-07-01 18:15:47	0 / 0	[51] CANCELLED	CANCELLED
[6] Todd Terrell	XXXX	123	Roseville Road to Marconi/Arcade	8.10	2019-07-01 18:15:40	0 / 0	[51] CANCELLED	CANCELLED

Monitoring

Dispatchers and roadway workers were tasked with noting any unusual occurrences related to the secondary warning devices.

Figure 4-2

Soft Start Report Log

Alert Device 30 Day Soft Start

DATE	LOCATION	EMP#	COMMENTS
11/1/18	CRC SW, FRANKLIN SW		NO ISSUES REPORTED
11/2/18	Blue Line		NO ISSUES REPORTED
11/3/18	Blue Line		NO ISSUES REPORTED
11/4/18	No Test		
11/5/18	Blue Line		NO ISSUES REPORTED
11/6/18	Blue Line		NO ISSUES REPORTED
11/7/18	CRC SW, FRANKLIN SW		NO ISSUES REPORTED
11/8/18	CRC SW, FRANKLIN SW		NO ISSUES REPORTED
11/9/18	CRC SW, FRANKLIN SW		NO ISSUES REPORTED
11/10/18	No Test		
11/11/18	No Test		
11/12/18	Blue Line		NO ISSUES REPORTED
11/13/18	SW 61, 71		Missed a OB train move AT SW61 01:30. LRV303
11/14/18	Gold		NO ISSUES REPORTED
11/15/18	Staff Ordered "Clear of tracks"		Smokey Day, no testing
11/16/18	Staff Ordered "Clear of tracks"		Smokey Day, no testing
11/17/18	No Test		
11/18/18	No Test		
11/19/18	CBD		Alert Continiously
11/20/18	CBD		Alert Continiously
11/21/18	CBD		Alert Continiously
11/22/18	No Test		
11/23/18	No Test		
11/24/18	No Test		
11/25/18	No Test		
11/26/18	CBD		Alert Continiously
11/27/18	CBD		Alert Continiously
11/28/18	No Test		
11/29/18	No Test		
11/30/18	No Test		

SECTION

5

Demonstration Data Metrics

Metrics for the demonstration included evaluation measures, data sources, and findings in the areas of Safety Improvement (injuries, fatalities, work zone intrusions), System Effectiveness (unusual occurrences/comments, system acceptance), and Return on Investment (lifecycle cost, cost avoidance). Also documented were lessons learned and takeaways from the demonstration and technology transfer activities (demonstration, presentations, and webinars).

Safety Improvement

Injuries

- **Evaluation Measures** – Number of injuries and rate per work deployment and per 1,000 vehicle miles
- **Data Sources** – Injury reports from agency National Transit Database (NTD) Safety & Security (S&S) reporting during demonstration and dating back five years
- **Findings**
  - Historical injury rate: 0 injuries, 0 near-miss events reported
  - Demonstration period injury rate: 0 injuries, 0 near-miss events for any work zone intrusion

Fatalities

- **Evaluation Measures** – Number of fatalities and rate per worker deployment and per 1,000 vehicle miles
- **Data Sources** – Fatality reports from agency NTD S&S reporting during demonstration and dating back five years
- **Findings**
  - Historical fatality rate: 1 fatality (per Blueline 2008), 0 fatalities during demonstration period
  - Demonstration period fatality rate: 0 fatalities

Work Zone Intrusions

- **Evaluation Measures** – Number of work zone intrusions per 1,000 vehicle miles
- **Data Sources** – Paper-based field form entries, summary of survey responses over vehicle miles throughout demonstration

- **Findings**
  - Work zone intrusion rate over life of project – 0; 74 work zone intrusions per day in Downtown area prior to waiver, 0 outside Downtown area

System Effectiveness

Unusual Occurrences/Comments

- **Evaluation Measures** – Conflicts or other issues defined through alert device monitoring
- **Data Sources** – SacRT daily control log and related dispatcher or roadway worker reports
- **Findings**
  - When system in use outside Central Business District (CBD) area, no issues reported, system reacted as designed
  - When system in use inside CBD area, issues reported 95% of time due to inability of system to differentiate between adjacent tracks; issues reported included blanket alerts from all directions and incessant alerts.
  - Work zone intrusion rate over life of project – 0; 74 work zone intrusions per day in Downtown area prior to waiver, 0 outside Downtown area

System Acceptance

- **Evaluation Measures** – Perceptions and acceptance of use by train operators, right-of-way workers, other stakeholders
- **Data Sources** – Surveys to determine system acceptance from perspective of each user type; EICSS and PAD survey responses resulted in 19 responses; surveys conducted on one day.
- **Findings**
  - 53% of wayside workers perceived PAD was effective in providing secondary roadway worker protection
  - 83% felt PAD made it safer for roadway workers, 26% felt there was no change
  - 35% felt PAD provided false sense of security, 65% did not
  - 11% found alerts too loud, 23% not loud enough
  - 19% felt alerts were too early, 13% felt they were too late, 44% felt alerts were timed correctly, 24% felt alerts were too early or too late only at some locations or skipped question
  - 35% received at least one false activation when no train was approaching; occurred when working on mainline near a yard, trains powering up in yard would activate mainline PAD units
  - 11% indicated they experienced at least one occasion when PAD failed to activate alert when train approaching; investigations revealed failed TMU not broadcasting on one train

Return on Investment

Lifecycle Costs

- **Evaluation Measures** – Detailed unit costs of all components for each module in Protran system and expected life of system components, unit labor costs of installation, configuration, and maintenance
- **Data Sources** – Protran and SacRT records relating to system deployment
- **Findings**
  - Total system cost: $861,592
  - Unit costs: 195 TMUs at $4,100 each; 60 PADs at $2,450 each plus unit testing stations
  - Labor cost of installation: $1,533 per vehicle to install equipment
  - Configuration costs: $5,500 for review of installation requirements and completion of configuration drawings
  - Maintenance costs: $15 replacement of rechargeable batteries on PAD units every 3–5 years.

Cost Avoidance

- **Evaluation Measures** – Oversight of wayside workers, potential saved costs
- **Data Sources** – Details of cost savings, including soft costs such as reduced time necessary to complete an audit, improved training efficiency, reduced labor hours due to increased efficiency in work zone establishment, other numerical or anecdotal costs that demonstrate value of system
- **Findings**
  - No notable cost savings with system; parallels current On Track Safety plan and considered secondary (additional) system for roadway worker safety
  - System use increased training time annually during familiarity and use training
  - No reduced audit time
  - No reduced labor costs; may represent increase in event of failed or missing unit; jobs may be stopped on some occasions due to lack of Protran equipment for key personnel.

Lessons Learned

Lessons Learned and Takeaways from Project

- **Evaluation Measures** – Conflicts or issues that arise due to unrepeatable lesson
- **Data Sources** – General task notes, comments, data
- **Findings**
  - Lessons learned shared with industry, takeaways from project:
    - Use of electronic devices in active trackway could be distraction to frontline workers; also has parallel element that generally has conflict with

CPUC General Order 172 (Personal Electronic Devices) that offers goal to eliminate distractions while on right-of-way.

- System tested as secondary safety system, features redundant procedures that match current procedure.
- System limits communication to two individuals (controller, frontline employee); current process deletes communication between controller, operator, and frontline employee.
- SacRT had noticeable difficulties in collecting measurable assessments through PAD usage data collection; in early testing stages, frontline workers had difficulty understanding where signal was coming from in Downtown areas
- Frontline workers experienced alert fatigue within days of use, as train indications became a nuisance and could not be silenced, leading to waiver to halt use in Downtown area where close track configurations did not suit technology.
- Lessons learned and limitations for current secondary warning product:
- Need to test/validate/understand intended benefits and known limitations before deploying system when possible.
- System may not discern between adjacent tracks, warning all track workers in proximity of approaching train and not just workers on occupied track.
- System had difficulties working in city centers or in small area with multiple tracks due constant alarms of incoming train(s).
- Inability to use certain products required by local safety oversights may be in conflict and could require waiver or exemption.

Technology Transfer

Demonstrations, Presentations, Webinars

- **Evaluation Measures** – Number of outreach events; number and agency/ institution of attendees
- **Data Sources** – Tabletop meetings with event attendees
- **Findings**
  - Opportunities for knowledge-sharing interaction was with other partners, including:
    - Bay Area Rapid Transit (BART)
    - Valley Transportation Authority (VTA)
    - FTA/USF Center for Urban Transportation Research (CUTR)
  - Product knowledge and experience shared with CPUC related to compliance with adopted General Order.
  - Product-sharing at bi-annual statewide transit property meetings (ROAR); outreach proved to be beneficial as other properties test their own secondary warning products.

SECTION

6

Conclusions and Lessons Learned

SacRT, with its technology vendor Protran, developed detailed plans to research, develop, and demonstrate a project with two phases—a roadway worker secondary protection system and an Employee in Charge Software System (EICSS)—at two locations on its light rail line. The roadway worker secondary protection system uses a combination of Train-Mounted Units (TMUs) and Personal Alert Devices (PADs) to provide advance warnings to both 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.

In terms of safety improvement, there were no reported injuries or near-miss events related to roadway worker protection prior to the deployment of the technology, and this remained unchanged throughout the demonstration period. 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.

System effectiveness was measured in terms of work zone intrusion rates and employee survey responses. The technology system worked well in most SacRT rail environments except for Downtown work zones. The work zone intrusion rate remained at zero in all areas except for the Downtown CBD. Initially, Downtown CBD workers received an average of 74 work zone intrusion alerts per day, which ultimately resulted in elimination of use of the secondary system in the Downtown CBD. This required SacRT to obtain a waiver approval from the CPUC, which was approved due to continued alerts initiated from trains traveling from all directions. In general, most roadway workers felt the PAD improved their safety.

Return on investment calculations revealed no notable cost savings with the system, as the secondary nature of the system and the nature of the operation of the technology resulted in no reduced labor or audit times.

In terms of knowledge transfer, SacRT shared its experiences and lessons learned with BART, Valley Transportation Authority (VTA), CPUC, FTA, and CUTR and at statewide transit property meetings.

There were several lessons learned throughout the demonstration project, which may be beneficial to other transit industry peers considering implementing similar technologies:

- First-generation technology deployments often expose unknown equipment limitations. SacRT encountered challenges associated with the capabilities of the first generation of the technology deployed, including difficulties with triggering of alerts and false positive alerts due to the operating environment. The realization of these limitations led Protran to develop newer versions of the piloted technology, which are now available on the market. (These new technologies were not the subject of this research demonstration project.) It is important for grantees to understand which version of the technology they will be testing and deploying and the limitations of that generation of the technology.
- Tracking software revisions with a change report would help streamline the validation and approval process associated with revisions.

Agencies deploying technologies should consider local regulatory requirements in all phases to reduce or remove the lengthy delays associated with testing and validation. SacRT and CPUC conducted a review of the EICSS and found compliance concerns with the abilities of the operating system on the devices. While activated, the software allowed access to all programs and applications on the smart devices. This differed from the original version of the software that blocked access to all other applications on handheld devices. The software failure caused testing concerns due to direct conflict with CPUC General Orders 172 and 175-A, which govern the use of personal electronic devices by employees of rail transit agencies and govern roadway worker protection provided by rail transit agencies, respectively.

At the conclusion of this project, SacRT will continue to use the PAD secondary warning system for its frontline workers who are performing maintenance activities along the active right-of-way. The system has proven to be extremely valuable in open track areas where employees are able to get an advance warning and be in the clear of an approaching train. Likewise, the train operator also receives an audio indication that roadway workers are in the vicinity.

The EICSS will not advance into further use with SacRT, as it was determined that the system does not provide enough benefit to roadway workers or the Control Center.

APPENDIX

A

SacRT Department Notice

LIGHT RAIL

DEPARTMENT NOTICE

DATE: **July 17, 2019**

TO: **Transportation and Wayside Personnel**

RE: **Employee in Charge Software Program (EICSP)**

APPLICABLE TO: TRANSPORTATION, WAYSIDE

Employee in Charge Software System (EICSP)

This Notice is to provide guidance for utilizing the Employee in Charge Software Program (EICSP).

RESPONSIBILITIES

- Metro Control – Utilize the EICSP to track employees on the Right of Way, and have the EICSP running on their work station.
- Employee in Charge (EIC) - EICSP to obtain access to District's Right of Way.
- Employees - Utilize the EICSP to access to District's Right of Way.

PROCEDURE

Obtaining Authorization:

1. The EIC will contact Metro Control by radio to notify that the EICSP will be used as part of the track access procedure for establishing a work zone.
2. Clear of the track zone, the EIC will obtain permission through the EICSP utilizing the EIC tablet acknowledging and adding all the employees who will be working in that work zone.
3. Clear of the track zone, employees will acknowledge acceptance into that work group utilizing the EICSP.
4. Metro Control will receive the requests and select "Generate Pin" to confirm the request from their work station.
5. Once the work order is filled out by the EIC, the Controller will either "Confirm" or "Deny" the request.
6. Once confirmed, the EIS, EPD, and Metro Control will receive an acknowledgement indicating "Blocking Device Applied".
7. The EIC will then obtain track access through the normal radio procedures.

Releasing Access:

1. The EIC will ensure all employees are clear of the track zone.
2. Utilizing their tablet, the EIC will select "Exit Track" to clear the access.
3. All employee's EPD's shall annunciate the release of the access with an indication that needs to be acknowledged.
4. The employee with the EPD will select "Confirm" to verify they have cleared the track zone.
5. The EIC will then select "Track Safe" to confirm the track zone is clear.
6. Through the EICSP, Metro Control shall receive an indication of the release of access and select "Remove Blocking Device" on the screen.
7. The EIC, EPD, and Metro Control will receive "Blocking Device Removed" in turn closing the work order.
8. General notes may be added to the work order by the EIC. Any EICSP issues or malfunctions shall be noted in the "Note" section for performance tracking.
9. The EIC will then release track access through the normal radio procedures.

Supplemental Emergency Alerts:

1. In the event of an emergency, the EIC and/or track worker with the EPD can press the "Emergency Alert" to issue an emergency notification.
2. The EIC and all track workers shall clear the tracks immediately follow all established emergency notification procedures.
3. Once emergency is over and "Confirmed" by all EPD's, the alert can be cleared by the EIC by selecting "Clear Emergency".
4. After the EIC has cleared the emergency, the work order will return to active status.
5. A note shall be entered stating the details of the emergency.

SAFETY REQUIREMENTS

All existing On Track Safety rules and regulations shall be utilized during the use of the EICSP.

At no time shall the EICSP be utilized inside the track zone unless used for an emergency alert.

Signature	Notice Number	Duration of Notice	Removal Date
Director of Maintenance - LR	LR-20-001 TW	Temporary	Oct 31, 2020

APPENDIX

B

SacRT Standard Operating Procedure

Sacramento Regional Transit District
STANDARD OPERATING PROCEDURE (Departmental)

Division(s)	Department(s)	Unit(s)	Procedure No.
OPERATIONS	LIGHTRAIL	WAYSIDE	LR-SOP-18-430

Date	Revision No.	Director Approval	EMT Approval	Page
09/15/18	091518-A			Page 1 of 3

Secondary Personal Alert Devices (PAD)

PURPOSE

Personal Alert Devices (PAD) are designed to alert wayside workers on the right-of-way of an approaching train and simultaneously alert train operators of the presence of work crews along the right-of-way.

POLICY

Personal Alert Devices (PAD) are a secondary enhancement to SacRT On Track Safety rules and procedures AND MUST NEVER REPLACE THE RULES AND PROCEDURES REQUIRED FOR WAYSIDE WORKER PROTECTION. PAD equipment is not a replacement for vigilance when on or about the right-of way.

Employees certified in SacRT On Track Safety and who utilize procedures to gain access to trackway, shall properly utilize a PAD during OTS Procedures.

RESPONSIBILITIES

All Personnel

Prior to departing the shop, employees shall use the test unit to verify operation and inspect their assigned PAD for cracks, loose items, battery life, or defects.

Do not use defective equipment. If PAD equipment is unavailable, inoperable, or malfunctions, notify your Supervisor.

Supervisors

- Validate usage and operation plan during the pre-shift job briefing;
- Audit proper PAD usage in the field;
- Track inoperable PADs, schedule repairs.
- Verify charging station is operating properly
- Verify PADs all are accounted for

CROSS REFERENCE

CPUC General Order 175-A (6.3) (f), FRA 214.319 (b) (1)

PROCEDURE

Utilizing the wall tester, employees shall test their PAD prior to departing the shop.

Prior to ROW access and during the job briefing, all PADs shall be powered up and ready for communication.

1. 8.00 – The EIC (or designee) and the Look-out shall have an active PAD within that work zone.

2. 8.10 – The vehicle operator and EIC shall have an active PAD when adjacent track is active.

3. 8.20 - The EIC shall have an active PAD.

During the work activity with approaching trains, employees shall monitor their own PAD to ensure that it activates consistent with other PAD worn by other employees. At any time the PAD malfunctions, the employees shall notify the EIC or Supervisor to remedy the equipment failure immediately.

PADs shall be turned off whenever a procedure is cancelled, a break is taken, or an employee departs the active procedure.

All PADs shall be returned to the designated charging location at the end of each shift.

Employees are responsible for the care of their assigned PAD and the operating status of the PAD at all times during the workday.

Employees must take care as to not trigger false roadway worker indications to trains when not fouling the track(s).

SAFETY REQUIREMENTS

- Employees shall conduct a thorough on site job briefing. This briefing shall be free from challenges and acknowledged by all employees involved.

- Establish communications with Metro Control, and obtain the proper OTS procedure.

- All personnel shall comply with SRTD's Personal Electronic Device (PED) policy, and CPUC General Order 172.

- All personnel shall comply with SRTD's On Track Safety program, and CPUC General Order 175-A when fouling any tracks.

- Specific tasks may require the use of tools, and equipment. Utilize all tools and equipment per procedures, manufacturer's instructions, and/or regulatory requirements.

- Employees are required to wear the required PPE as mandated in SA-SOP-18-010. PPE will include, but not limited to, safety shoes, hardhats, reflective vests, safety glasses (when required by job task), and drinking water along the ROW. If hearing protection is required, careful consideration must be given to an employee's ability to hear approaching trains, equipment, or audio from secondary protection device.

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Federal Transit Administration

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