



**PROTRAN**

TECHNOLOGY

A Harsco Rail Company

Innovative Technology for Track Worker Safety

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# Innovative Technology Solutions

- Visit The following YouTube channel for system operation videos:  
<https://www.youtube.com/channel/UC7p6PxVbL20RlUHqxUjV2pw/videos>
- Visit [www.Protrantech.com](http://www.Protrantech.com) for additional product information and contact info

# The Problem

## Railroad Worker Safety is a Global Concern

- Railroad workers have an important role in keeping the railroads safe for freight and passenger trains through rail system inspections, maintenance, and repairs on the right of way
- While performing these duties to help provide safe railroad tracks for the industry, the track workers themselves are faced with safety risks unique to their line of work

# The Problem

Traditional railroad worker protections depend mainly on other workers, aka “lookouts”, which leads to a wide array of potential dangerous situations caused by human error



# The Problem

## Common safety risks with traditional railroad worker protection

- Relying on a lookout or watchman provides a single point of failure
- Worker complacency, boredom, inattention, and fatigue
- Workers being given more responsibilities with less time to complete tasks
- No advanced warning to train operators of workers ahead
- No advanced warning to track workers of an approaching train
- Increased equipment/convoy movements on tracks

# The Problem

Human error causes the majority of railway accidents for both equipment collisions and worker injuries or fatalities



# The Problem

In addition to the emotional hardship of a track worker injury or fatality, accidents also effect the business:

- Accidents can cause millions of dollars in damage and compensation payouts, which can damage the business and restrict or adversely impact revenue
- Accidents and injuries are not only financially costly, but can seriously tarnish the reputation and public perception of a transit agency or company

# The Solution

## Innovative Railroad Worker Safety Technology Solutions

There are several types of innovative technology driven safety systems available on the market today for the railroad industry that are designed to help mitigate accidents and save lives





# The Solution

## Innovative Technology for Roadway Worker Protection

Some of the various deployment types of safety systems include:

- Vehicle Mounted Device - to - Worker Device
- Wayside Mounted Device - to - Worker Device
- Portable Zone Device - to - Worker Device
- Vehicle - to - Vehicle Mounted Devices for Collision Avoidance

# The Solution

## Vehicle Mounted Device - to - Worker Device Safety System

- This type of system includes a device that is permanently mounted on the rail vehicle which communicates with a device worn and/or carried by the worker on the tracks
- This type of system provides an alert to the vehicle operator of track workers ahead and an advanced warning of the train approaching to the workers
- Easy to use with minimal set up and minimal maintenance
- Includes information data logging and time based or distance based alerts with redundant dual radio signaling

# The Solution

## Vehicle Mounted Device - to - Worker Device Safety System



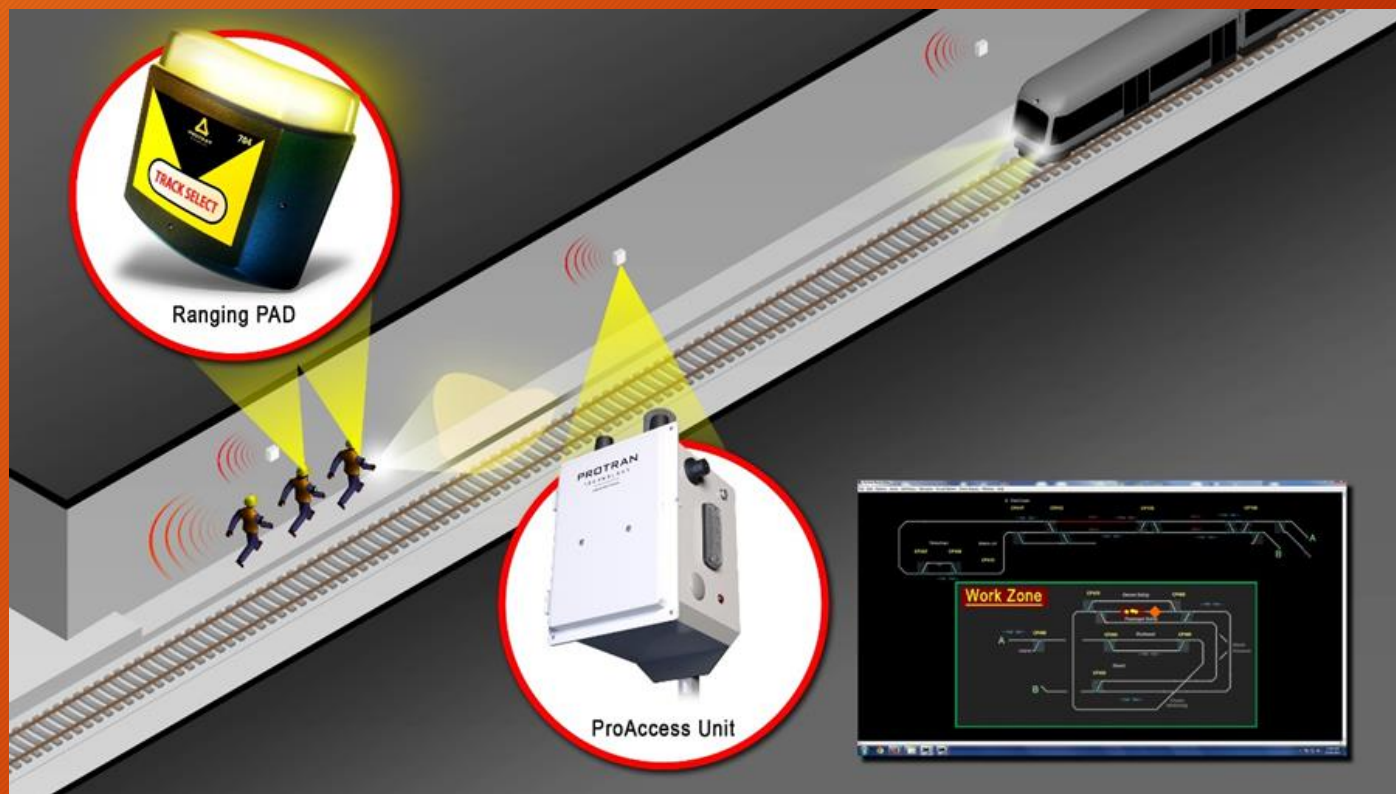
# The Solution

## Wayside Mounted Device - to - Worker Device Safety System

- This type of system includes a device that is permanently mounted on the Wayside which communicates with a device worn and/or carried by the worker on the tracks
- This type of system provides an advanced warning of the train approaching to the workers on the tracks and provides the vehicle operator a wayside visual notification of the worker ahead
- This type of system provides track worker location awareness information to the control center in real-time and data logs the info for operations efficiency metrics

# The Solution

## Wayside Mounted Device - to - Worker Device Safety System



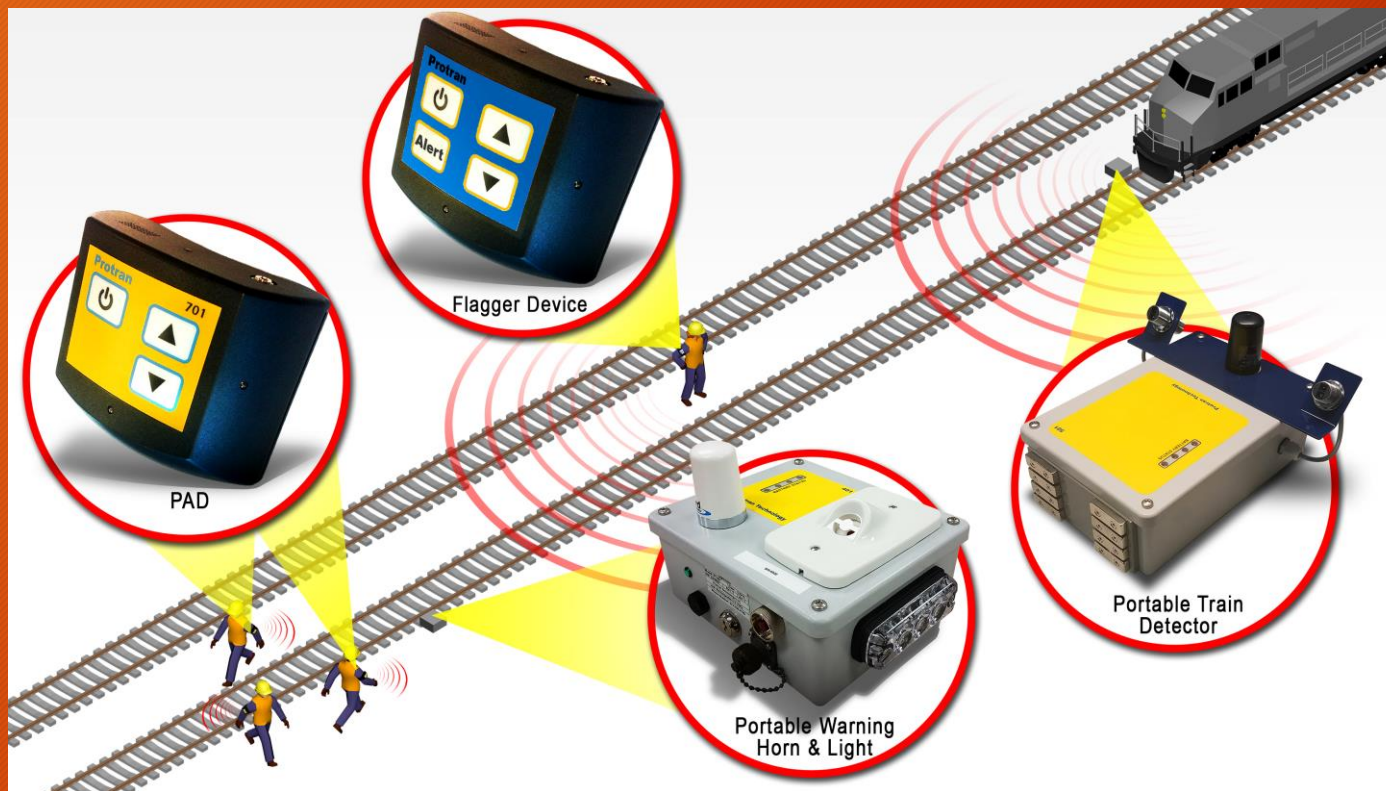
# The Solution

## Portable Zone Device - to - Worker Device Safety System

- This type of system includes a device that is non-permanently affixed to the rail or tri-pod near the rail which communicates with a device worn and/or carried by the worker on the tracks
- This type of system detects a train as it passes the portable device and provides an advanced warning of the train approaching to the workers on the tracks
- This type of system can be used on shared corridor tracks and can be used in conjunction with a vehicle mounted system to provide total safety coverage from all approaching on-track vehicles

# The Solution

## Portable Zone Device - to - Worker Device Safety System



# The Solution

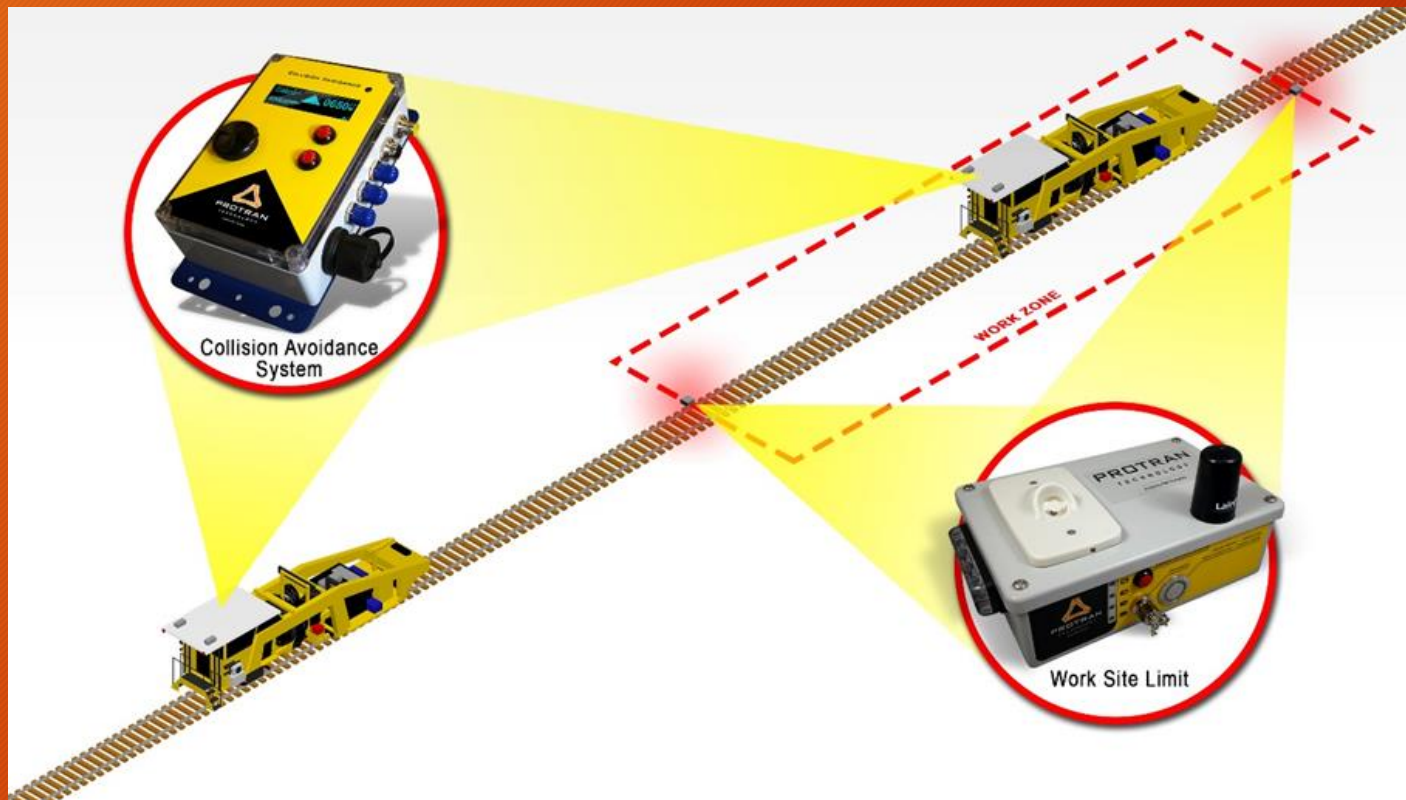
## Vehicle - to - Vehicle Mounted Collision Avoidance System

- This type of system includes a device that is permanently mounted on maintenance equipment which communicates with other vehicle mounted devices and alerts the machine operators of potential collisions providing ample time for the operator to react and avoid the accident
- This type of system can also provide a warning to workers by alerting the worker device if they come to close to the on-track equipment
- This type of system provides adjacent vehicle ranging information to the machine operator and has multiple alert settings for both “work mode” and “travel mode”



# The Solution

## Vehicle - to - Vehicle Mounted Collision Avoidance System



# The Solution

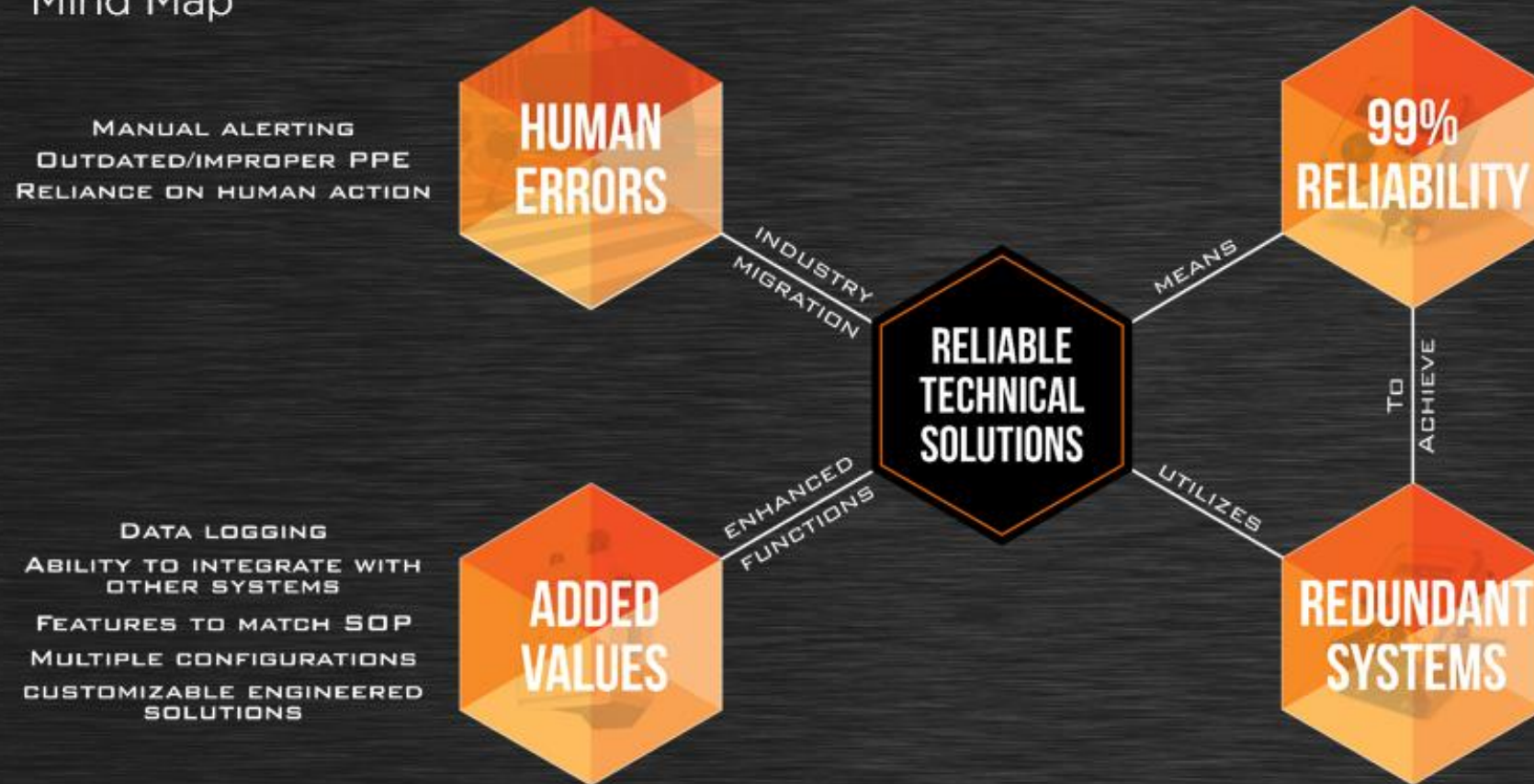
## Innovative Railroad Worker Safety Technology Solutions

These examples of roadway worker protection systems are 99% effective and offer redundant protections when implemented with the agency's standard safety protocols to provide an additional layer of protection to the track worker and vehicle operator



# Innovative Technology solutions

## Mind Map



# Innovative technology solutions

## Implementation

What does that require?

# Implementation

Implementing innovative technology safety systems can be successful with the help of:

- experienced technology suppliers
- support of the agency management

With those two key factors, measured success is attainable



# Implementation

Case Sample: 2016, US transit agency deployed an innovative Roadway Worker Protection System with the following features:

- vehicle mounted system: train to track worker communication
- provides advanced warning to the track workers of an approaching train
- provides notification to the train operator of workers ahead
- train unit displays the range or distance the workers are away from the train
- confirms the workers have acknowledged their train approach warning signal and are in a place of safety
- time-based or distance-based alert settings
- event trigger data logging

# Implementation

## The first Step: the Procurement Process

- RFP Period

In the USA, the transits are government supported agencies which means the procurement for a new system must go out for bid through the Request For Proposal (RFP) process / Tender.

This process tends to present challenges for both the suppliers and the agency

# Implementation

## The first challenge: the Procurement Process

- The RFP process limits the amount of communication allowed between the agency and the suppliers to allow for an unbiased bid
- The agency may not be fully aware of all the systems available on the market
- The RFP is often a mixture of features from different supplier systems that are not always available in one overall system
- A benefit of this process is that new RFP's often drive technology advancements so that suppliers are able to offer system with the specified agency requirements





# Implementation

## The first Step: the Procurement Process

- Demonstration Period

This is the suppliers opportunity to “show & tell” the system they have to offer and ideally, for both supplier and agency, perform on-track system testing

# Implementation

## The second Step: System Installation

- The installation process for the systems available on the market are varied depending on the type of system deployed
- Depending on the size of the agency, the number of systems installed may range from 100 - 1000+ trains, on both A & B operating cars

# Implementation

## The second Step: System Installation

### 2016 Case Sample:

- Deployed a vehicle mounted system utilizing train to track worker communication
- Installed the system on 200 LRV's, A & B Cars totaling 400 system installations
- This installation included the operator train unit and the external antenna kit on the roof of the train
- With limited resources, this installation took a total of 8 weeks to install, working regular 10 hour shifts



# Implementation

## The third Step: System Training

Implementing a new system requires training of personnel in all different departments



# Implementation

## The third Step: System Training

- Vehicle Operator training
- Railroad Worker training
- Operations Control training
- Mechanical and Maintenance training
- Contractor training



# Implementation

## The third Step: System Training

Depending on the size of the agency, training can take a matter of weeks or even months to fully train all staff and supervisors that will be using the system on a regular basis

2016 Case Sample: The full system wide training required multiple sessions with each department and was completed in approximately 6 weeks

# Implementation

## The fourth & final Step: System Go-Live

Go-Live is the final step in the implementation process

Go-Live It is the moment that the system is considered ready for full deployment

### Case Study:

- Go-Live System Implementation officially kicked off in November 2017
- End-User full system acceptance & adoption was achieved within the first year across the entire agency recognizing the enhanced safety benefits provided to track workers and vehicle operators

# Innovative Technology Solutions

- Case Study System Statistics recordable incidents:

For the year 2017, RTD had 49 recorded incidents prior to implementing the safety system

After implementation, the recorded incidents significantly decreased to 19 in 2018.

As of June of 2019, a record low of only 3 incidents were recorded thus verifying the significant safety improvements provided by the system.



# Innovative Technology Solutions

Innovative Railroad Worker Safety Technology Solutions  
help mitigate accidents and save lives



# Innovative Technology Solutions

In addition to Railway Worker Protection Systems there are other technology driven safety devices available such as:

- Trespasser Warning Systems
- Pedestrian Warning Systems for Grade Crossings
- Platform Track Intrusion Detection & Warning Systems
- Flood Detection Systems
- Speed Restriction Warning Devices
- Track Geometry Measurement Products
- Telematics Systems for Maintenance Vehicle Location Awareness & System Integration
- Safe Turn Alert Pedestrian Warning System for Buses

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