WEARABLE TRACK WORKER SAFETY

The Piper SecureTrack™ RWP Wearable is a low-power, lightweight and rechargeable unit that performs two primary functions: localizing the worker in the territory, and communicating the position of the worker to approaching trains in all directions.

Advanced Roadway Worker Protection

Piper SecureTrack™ is a dynamic wearable solution that detects track workers in the fouling area in real-time. The Roadway Worker Protection (RWP) system will provide the train operator with a visual and audible alert when it detects the presence of a worker within 500 yards of the forward movement of the train and should not respond to the presence of workers outside of the track fouling area to allow train movement to proceed unencumbered when no workers are detected.

More Robust than GPS-Only Systems

The most efficient technologies for elevated and ground-level moving trains include a combination of GPS localization radios that use 915MHz radios in the roadway worker's wearable device to communicate the location of workers to trains in the area. This provides location resolution of approximately 2 meters, enough for two-track coverage..

However, in below ground operations, the GPS is not available, and an alternative localization solution is required. For this reason, Piper adds Ultra-Wideband (UWB) radios in the wearable - a technology that uses time-of-flight communication to determine the distance between two radios with 10-centimeters precision.

The UWB radios operate at a frequency of 3.5GHz and can effectively communicate at distances up to 1km. Because UWB requires line-of-sight between radios, it is necessary to install UWB "repeaters" at the apex of curves in underground areas so that trains can detect the presence of workers in all operational scenarios.

How Piper SecureTrack™ Wearables Work

The wearable RWP device is attached to the helmet to ensure the most efficient radio communication in all work modes - though it can also be configured as an armband. It includes a long-life, rechargeable battery that powers three radios:

- **GPS** for localizing in elevated and ground-level areas,
- **UWB** for localizing in underground areas, and
- **915MHz** for long distance comms with approaching trains.

It includes a USB-C charging port, is IP-65 protected from water and dust, and will provide continuous operation for several shifts before requiring a charge. The devices are also encoded with unique IDs and are capable of securely storing telematic data for offline analysis.

Trains will be equipped with onboard UWB and 915MHz radios for communicating with UWB repeaters and RWP devices. They will also be equipped with a navigational computer to process the distance measurements and interface with the onboard TOD to deliver the advisory to the operator.

Benefits of Piper SecureTrack™ Wearables

- **USB-C rechargeable with multi-shift charge**
- **Small IP65 wearable form factor**
- **Three radios in each wearable**
- **Integrated with train TOD**
- **Works above and underground**
- **10cm accuracy with UWB**
- **Stores secure telemetry**
- **1km communication with train**

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