

# Tended's geofencing technology helping to put an end to preventable accidents

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*Leo Scott Smith, CEO and founder of award-winning safety technology startup, **Tended** explains how their pioneering geofencing technology protects track workers*

Working on or near open railway lines is among the most dangerous occupations in the industry. There is a focus on building bigger and better rail systems as well as continual maintenance and upgrade programmes that require trackside planning and work. The people who carry out these essential works to maintain and renew our railways face several safety risks, including moving trains, and exposure to high-voltage electricity.

Since being launched in 2019, Network Rail's Safety Task Force has been instrumental in transforming safety for track workers and reducing the number of fatalities and near misses on the railway. This has largely been down to their pivotal role in removing 98 per cent of all unassisted lookout working on the UK's rail network.

The introduction of additional worker protections continues to be an industry priority. A leading cause of many trackside incidents is due to diminishing worker situational awareness, which can contribute to

avoidable fatalities and near misses with trains. This is whereby workers, due to factors such as fatigue, time pressures or hindered visibility, can lose awareness of their surroundings and unintentionally step into a hazardous area, such as on or near an open line. To address this issue, the Safety Task Force continues to roll out additional protection measures for trackside workers, and geofencing technology is now at the forefront of this.

Geofences are virtual geographic boundaries, defined by digital coordinates. They can be created in any shape or location and there is no limit to how big a geofence can be, making them an incredibly flexible and useful tool for creating zones on a worksite. Certain devices can be assigned to a geofence, for example, something like a mobile phone, vehicle trackers, or a safety wearable. When programmed to do so, the assigned devices are triggered to give out a specific alert or push notification to workers if they enter or exit a geofence. By attaching such devices to track workers, alerts can notify them the moment they step out of the geofence (the safe zone) and into a potentially unsafe position, allowing them to self-correct and step back into safety.

A company pioneering the use of this technology to improve safety on the railway is Tended. For over two years, Tended has worked with the Safety Task Force to develop a geofencing safety solution, rigorously tested and trialled alongside Network Rail's trackside teams. Having worked towards receiving product acceptance in September 2022, Tended has been instrumental in bringing geofencing to the forefront of the railway industry, helping to revolutionise track worker safety and onsite operations. By bringing this innovation and first-of-its-kind technology into the safety-critical railway industry, Network Rail and Tended are helping organisations to decrease reliance solely on human factors, reduce the risk of human error and ultimately, bridge the gap between human vulnerability and safety.

The system uses geofencing technology to enable planners to define critical details on site before work starts. Using an online Planning Dashboard, planners can map out safe working zones with associated safe access points and plot where critical safety equipment needs to be placed. This means that in addition to defining safe zones, the technology can also be used to modernise site operations and allow planners to define the location of critical assets such as marker boards and possession limit boards, as well as easily pinpoint safe access points for workers.

Using this technology in high-risk and safety-critical environments, such as on the railway, means that a high level of precision is absolutely essential. Tended's system achieves an incredible accuracy of 1-2cm by using an existing network of beacons. Using a well-established network of 173 beacons allows Tended to achieve highly accurate positioning without the need to set anything up onsite. Not only does it provide fail-safe coverage for remote and rural areas, but it also enables users to get going with the technology in minutes, saving valuable project time.

The benefits of geofencing to improve track worker safety is heavily underpinned by behavioural science. In the short term, the benefit of using the technology is that it provides a timely 'tap on the shoulder' to track workers to increase their situational awareness and provides a proactive solution to preventable accidents, helping them stay away from hazards and ultimately, saving lives.

Over time, this tap on the shoulder automatically prompts a behavioural change by increasing hazard perception. These adjustments to behaviour are normalised over time, and habitual use of the device

nudges wearers into higher levels of situational awareness. These long-term behavioural changes mean that overall, workers will practise safer behaviours, not only contributing to their own workplace welfare but also helping organisations to create safer, more efficient worksites for everyone.

Tended has a dedicated in-house behavioural science team who have contributed significantly toward the development of the technology since its inception to instil long-term behavioural change. The team also supports customers from onboarding, implementation and deployment to ensure successful workforce participation and engagement with the solution.

With worker privacy a key consideration among organisations, it must be noted that the technology hasn't been developed to monitor, track or record a user's location at any point. The real-time whereabouts of a device are only used to alert the wearer when they are no longer safe, protecting the privacy of workers and helping to encourage engagement with the technology. Once works have been completed, analytics and data trends provide safety leaders with insights about the overall safety of their worksites to support its continued, proactive and long-term improvements.

While the rail industry has undergone a radical transformation in recent years, earning it a reputation as one of the safest and most reliable rail networks in the world, safety innovation to protect its trackside workers has been more modest. Each fatal incident is shocking, and deeply distressing and causes a significant emotional, societal and economic impact.

On 3rd September 2022, Network Rail issued their latest safety standard (NR/ L2/OHS/501 Module W4) which is a module that, for the first time, specifies the requirements for the use of geofencing on the railway. This new standard marks the start of a transformative era for track workers using wearable technology to keep them safe. By incorporating this technology into their Safe Systems of Work, organisations can better protect their workers and more effectively comply with safety standards. In doing so, we can pioneer the future of safety technology on the railway and lead the way for safer UK rail infrastructure for all.

Ken Lambert, Senior Programme Manager Safety Task Force at Network Rail, said: "It's exciting times in rail as we continue to support our front line with new safety solutions in keeping our staff safe.

"Working in partnership with our supply chain over the past two years I am pleased to announce that we have achieved Product Approval and are delighted to have commenced implementation. Throughout the testing, we have had very positive feedback from the teams on site as they can see the real benefits for themselves. There is still plenty to do and we continue to work with our teams and supply chain to further develop safety solutions."

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