

Automatic Incident Detection for Strategic UK Tunnel

Case study - Hindhead Tunnel, Surrey, United Kingdom

Hindhead tunnel opened in 2011 to relieve congestion on a key strategic road linking London to the South. In the tunnel, ClearWay's Automatic Incident Detection reports incidents within 10 seconds enabling efficient tunnel operation and increasing safety.



The Challenge

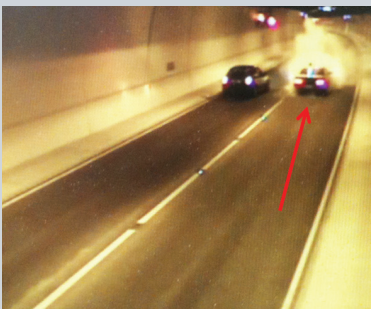
Keeping Traffic Flowing

Hindhead Tunnel

Hindhead twin-bore tunnel under the Devil's Punch Bowl has removed a major source of congestion between Portsmouth and London. The new six-kilometre road includes a two-kilometre stretch of tunnels. It was paramount that these tunnels remain operational 24 hours a day as the road is the major link connecting London to the south.

During the planning phase, the highways agency identified that an advanced level of safety was needed in the tunnel area. A system was required to detect traffic incidents as they occurred. This was for two reasons, firstly to ensure a timely response to assist people and vehicles stranded in the tunnel. Secondly, to avoid slow or stopped vehicle events escalating into major incidents as other road users become involved.

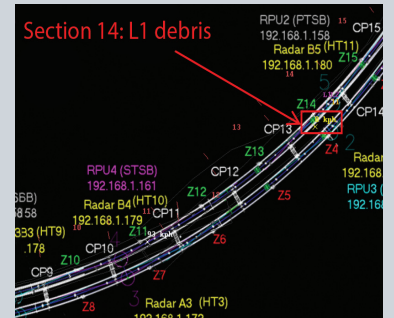
Hindhead needed complete awareness of traffic flow and incidents in the tunnel at all times. It was important that the solution provided both high detection and low false alarm rates as this would keep the operator vigilant. The main issues that needed to be detected in the tunnel to maintain road users' safety were stopped or slow vehicles, pedestrians in unauthorised areas and debris. A further requirement was that detection performance should not be limited by environmental conditions and the on-going performance of the system should not be dependent on regular, expensive routine maintenance, a feature video analytic solutions is notorious for. Navtech Radar's ClearWay solution offered an unrivalled performance in all requirements.



ClearWay detects and tracks the two vehicles despite the thick smoke in the tunnel. The whole event was recorded automatically for ease of post-event analysis.



The radar sensor detected debris in the tunnel. A metal culvert had come loose and was lying on the road, endangering road users.



In the control room, the operator received an alert of debris on the road, pointing to the exact location of the debris. The operator was able to provide the response team with vital information to manage the incident effectively.

The Solution

An advanced level of safety

Deploying a reliable solution

After a successful trial, Navtech Radar's ClearWay solution was installed as the automatic incident detection system for Hindhead tunnel. The trial demonstrated ClearWay's ability to function effectively within a tunnel bore, as all artificially generated incidents were recorded and the system had a low false alarm rate of less than one per day.

Navtech installed 12 radar sensors between Hindhead's two 1.8km bore tunnels. The radars had overlapping coverage for maximum resilience. If there was a power cut or radar fault, the area of detection would still be covered by the adjacent radars. An Ethernet network was installed through the length of the tunnel and the data collected was reported.

The data collected by the radar sensors is displayed to the operators as a schematic view of the tunnel on a SCADA screen. The system automatically provides video footage of any incidents detected as it redirects the closest CCTV camera to focus on the event.

ClearWay automatically detects incidents and raises alerts to operators in as little as 10 seconds giving them maximum time to manage the situation effectively and coordinate a response with emergency services. The system is not affected by changing weather or light in the tunnel and is able to see through smoke in a fire.



Automatic Detection

Intelligent analysis

ClearWay's rules-based software detects an incident as early as 10 seconds after taking place.



Low false Alarm

High accuracy

ClearWay has an unrivalled low false alarm rate of less than one per day.



All Weather Solution

Reliable detection

ClearWay's performance remains unaffected by changes in weather conditions.



Summary

Due to the confined nature of tunnels, many complications associated with ordinary traffic incidents are magnified in the enclosed space. ClearWay's ability to track, detect, monitor and provide alerts for an unlimited number of targets, enables operators to make faster decisions that will prevent more serious accidents.

The solution provides the exact location of people and vehicles in

a tunnel in real-time and displays their position on an overhead map. ClearWay automatically detects incidents and raises alerts to operators in as little as 10 seconds, giving them maximum time to manage the situation effectively and coordinate a response with emergency services.

The system is not affected by extreme temperature or light conditions and can still work effectively during tunnel fires to

provide the operator with real-time information when they need it most.

ClearWay can also be used to control lighting and ventilation in the tunnel which will help with reducing the impact of tunnel fires. The system has traffic counting and classification capabilities as it can detect the exact location, direction, speed and type of vehicle.

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