

CUSTOMER

Network Rail

SECTOR

Infrastructure - rail

Level Crossing Obstacle Detection Systems – Network Rail

LBFoster®



Since implementing our first obstacle detection solution for Network Rail (NWR) in 2010, we have developed a set of products which provide the rail infrastructure managers with the reliability and flexibility in their challenging environments. The system has had full Network Rail approval since 2011.

In 2016-2017 L.B. Foster supplied Network Rail with all the parts for eighty level crossings, which are in the process of being installed across the Network. These will be in addition to the one hundred and forty-five systems that have already been installed.

The systems provide the red-light violation cctv monitoring, number plate recognition, video analytics and data recording facilities. The installation of the systems has prevented many potential collisions on level crossings. The red-light violation camera system has also led to thousands of dangerous driving prosecutions.

Requirement

The requirement to detect a 9 year old child whilst lying down on the crossing deck proved to be a challenge. This translated into a remit to detect any object of 115mm in size.

The technology chosen to meet this specification was a LIDAR detector which after 3 months of ground testing proved that

it would be possible to detect an object of this size following modifications.

Integrating the system into the typical signaling circuits also proved a challenging prospect with many relay circuits to consider, not just for obstacle detection but for all failure modes, etc.

Specification

- > The system operates on 12 volt dc supply which is fused at 10 amps
- > The system can be designed to either be installed in a REB/ location case or in a wall mounting IP65 enclosure
- > There is a DVR for recording the CCTV signals
- > There will be the required number of LIDAR heads to monitor the danger area to the required level which will be determined by the site survey
- > There will be a router installed which will allow for remote actuation of the system
- > There are a number of programable outputs which can be utilized
- > Tested for compliance with EMC regulations as specified by NWR
- > The interface for the LIDAR will be by CAT 5e.
- > REDSCAN is an area sensor that configures a fan-like detection area of 30 m (Approx.100 ft.) radius over 190 degrees arc. using laser beams.
- > REDSCAN detects target objects by emitting laser beams at the target and measuring the time required for the emitted beams to be reflected and returned to the detector.



TECHNICAL SPECIFICATIONS

Detection range & detectable width	Assured detection: 0.1 to 30m, Max. detectable distance: 100m (limitation of data output) Black (diffuse reflectance 10%), 500 mmx500 mm Min. detectable width: 65mm (5m), 130mm(10m), 400mm(30m)
Accuracy	Under 3,000lx : ±50mm (Black diffuse reflectance 10% at 10m, White Kent Sheet at 30m) Under 100,000lx : ±100mm (Black diffuse reflectance 10% at 10m, White Kent Sheet at 30m)
Measurement resolution	1mm
Scanning angle	190°
Angular resolution	0.25° (360°/1440)
Scanning speed	50 ms (Motor speed: 1200rpm)
Ambient condition (Temperature, Humidity)	Operating: -10°C to +50°C 85%RH (Without condensation and frost)
Environmental resistance	Measured distance will be shorter than actual distance under rain, snow and direct sunlight working environment
Vibration resistance	10 to 55Hz double amplitude of 1.5mm in X, Y, Z direction for 2 hrs. 55 to 200Hz 19.6m/s ² sweep 2 min, in X, Y, Z direction , 1hr for each direction
Shock resistance	196m/s ² 10 times each in X, Y, Z directions
Protection structure	IP67

Our Solution

Following further design stages the system went into trial at Filey Crossing for 12 months before extensive testing proved the circuit design and reliability of the LIDAR.

A complete CCTV monitoring system was also developed alongside the LIDAR in order to provide retrospective visual verification of any obstacles detected, this required specific design in order to utilize the existing infrastructure as much as possible.

All components and systems required full product approval which was completed successfully prior to the first scheme roll-out which has now been commissioned for more than 12 months.



The Result

- > A highly technical design and build solution created to meet a very detailed safety specification.
- > Reduction in signaling head count.
- > Maintaining a 100% safety record of no accidents or incidents.
- > Adherence to the strict budget, programme milestones, and compliance to rail operational signaling standards.

What they said

“L.B. Foster, worked extremely hard, mostly at their own expense, in order to meet the very onerous specification and reliability requirements of this solution.”

Dave Jones
Network Rail

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