

# CASE STUDY



## EUXTON ASC

**Fault finding with  
CableGuardian**



THE QUEEN'S AWARDS  
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2016



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# CableGuardian

**The first platform to offer proactive monitoring, detection and location of both insulation and conductor faults on live low voltage ungrounded power distribution systems.**

Developed in collaboration with Network Rail, **CableGuardian** supports the ambitions to reduce maintenance costs and time-related infrastructure failures, to reduce the frequency and duration of service affecting failures and to improve the overall asset management process.

The **CableGuardian** system consists of multiple sensor units distributed across principal supply points (PSPs) and functional supply points (FSPs) each measuring multiple electrical parameters and communicating via a secure internet connection to a cloud-hosted data storage and analytics system. This system analyses the sensor data, providing continuous monitoring of the live signalling system and indicating the location of any cable or conductor faults without the need to down-power the signals, reducing the frequency and duration of trackside fault finding campaigns.

**CableGuardian** provides monitoring at a cable section level, as defined in NR/L2/SIGELP/27725, breaking away from the traditional limitations of insulation monitoring devices which offer only a single insulation resistance measurement for the complete circuit or, at best, feeder level monitoring. Additionally **CableGuardian** is the technological alternative to the 5 yearly manual cable testing requirements in NR/L2/SIGELP/50000. Empowering the rail industry to move from the uncertainty of periodic electrical network testing, to a real-time condition based approach.

**CableGuardian** is the only Tier 1 cable monitoring system with full Network Rail product approval, for proactive monitoring, detection and location of both insulation and conductor faults on live Signalling Power Supply systems (SPS) as specified in Network Rail specification NR/L2/SIGELP/27725.



# CABLEGUARDIAN ENABLES SWIFT REPAIR AND AVOIDS COSTLY TRAIN DELAYS FOR NETWORK RAIL.

## Overview

How **CableGuardian** was used to quickly identify fault locations on the West Coast Main Line Signalling Power System at Euxton ASC, enabling a swift repair and avoidance of costly train delays



Image from Network Rail

## Problem

On 7th August 2019, Viper Innovations received a request for assistance from Network Rail London North Western as they were experiencing extremely low Insulation Resistance (IR) on the West Coast Main Line at Euxton ASC, which consists of 6 feeders across 11 miles.

A sudden drop of the signaling system Insulation Resistance caused an alarm to be raised to Network Rail by their Intelligent Infrastructure. Low IR means that the signaling system was at risk of failure and, therefore, it was critical to locate the fault and make repairs as soon as possible in order to avoid costly train delays.

Network Rail had subsequently attempted to locate the fault using an existing IR fault detection system. However, the equipment had proved to be highly ineffective at determining the location and, in fact, had pointed the Network Rail team to the wrong feeder and cable sections which wasted crucial time.

## Solution

The Viper team mobilised on the morning of 10th August 2019 and, using CableGuardian in a Tier 2 configuration temporarily connected to the 650V SPS, the fault was isolated to 2 suspect Feeders within only 1.5 hours. Additional testing was then conducted on the 2 suspect Feeders by temporarily connecting CableGuardian units to a number of location cases forming a Tier 1 configuration.

This resulted in the fault being isolated to a 1 mile long Sub-Network Section within 3 further hours. Due to Network Rail time constraints, it was not possible to conduct more tests to isolate the fault to an even smaller section of the SPS on the day. However, CableGuardian had significantly reduced the fault location down from 11 miles across 6 Feeders to just 1 mile on 1 Feeder allowing Network Rail teams to focus their efforts.



The above picture shows the 650V Feeder supply equipment in the Euxton ASC with a **CableGuardian** unit connection harness clipped to one set of Feeder terminals. The white wire is connected to the Main Earth Terminal Busbar within the ASC which provides a "Functional Earth" electrical reference for the **CableGuardian** Insulation Resistance measurements.

On the night of 10th August, Network Rail conducted a 'Megger test' on each of the suspect cables and location cases in the 1 mile section of the North Feed identified by CableGuardian earlier that day.

Two sections of cable exhibited a Low IR between at least one of the cores to earth. It was also reported that there was a location case with a low primary to earth reading on the transformer. Network Rail's findings confirmed 3 faults were present within this 1 mile section of the SPS.



## Outcome

By assembling all kit required to respond to the request for help and mobilising to the affected ASC, Viper Innovations were able to ensure a swift repair and avoid costly train delays for Network Rail.

Using **CableGuardian**, the Viper team were able to narrow down the fault to within approximately 10% of the electrical network very quickly (within 6 hours from arrival).

**CableGuardian** was able to provide Network Rail with information that changed their faultfinding strategy and therefore allowed them to find the fault very quickly.

Network Rail personnel commented on the ease with which the **CableGuardian** equipment could be installed and used for this type of testing. The use of good safety and engineering practices, alongside appropriate Personal Protective Equipment (PPE), ensured that there were no safety concerns or issues as a result of the methods used to temporarily connect the **CableGuardian** equipment to the SPS.

Therefore, this Case Study has demonstrated that **CableGuardian** can provide a reliable and trustworthy system for reactive fault finding in addition to the proactive benefits **CableGuardian** is becoming known for in its permanently installed monitoring system configuration.



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