Signet

Cable Theft Case Study, West Coast Mainline

camlin rail

NetworkRail

Signet

Cable Theft Case Study

Signet automatically re-configures signalling power supply following cable theft incident

Location:
Nuneaton South
to Attleborough,
West Coast Main Line

At Camlin Rail, we're protecting network and maximising availability by driving sustainable efficiencies and performance success for railway networks and operators. Our innovative solutions are closely aligned with the objectives of the Digital Railway initiative that will bring dramatic enhancements in efficiency, capacity, safety and sustainability to tomorrow's network.

Signet is our Network Rail approved Reconfigurable Signalling Power system, allowing rail operators to maintain supply continuity during extreme fault conditions. Since 2005, we have installed and commissioned over 2500 Signets on major UK rail projects, supported by an extensive range of Service Level Agreements, thereby ensuring Signet performs to predefined targets.

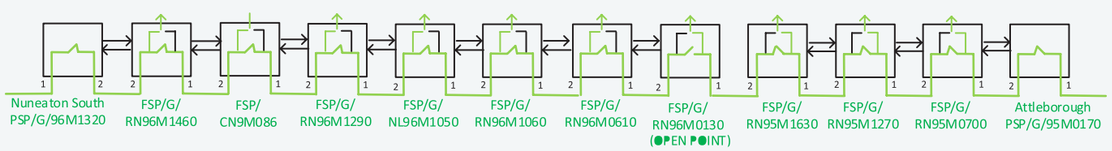


Figure 1: Feeder from Nuneaton South PSP to Attleborough PSP

Background

The West Coast Main Line is one of the busiest main lines in the UK, linking London with Glasgow and also with Birmingham, Liverpool and Manchester.

As a key strategic railway line in the UK with key hubs for commuting passengers, Camlin Rail have installed over 1000 Signets to automatically isolate faults and reduce down time, aligned with Network Rail's Digital Railway Strategy to ensure safety of staff and enhancing availability.

The Nuneaton South to Attleborough feeder has ten Functional Signalling Point (FSP) Signets located between Nuneaton South PSP and Attleborough PSP. FSP/G/RN96M0130 was the designated open point.

Attempted Cable Theft causes Signet feeder to re-configure

Each Signet is considered a protection device which operates when an abnormal voltage or current reading is detected. During an attempted cable theft on 06/10/22 (22:42:45), an overcurrent of approximately 800A was detected by Signets located in FSP/G/RN96M1290, FSP/CN9M086, FSP/G/RN96M1460 and Nuneaton South PSP/G/96M1320. This caused the Signet feeder to commence its re-configuration process and send notification alarms to Network Rail maintenance teams.

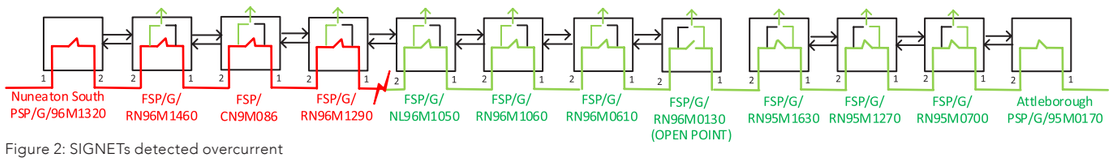


Figure 2: SIGNETs detected overcurrent

Distributed protection minimises disruption

The Signet system utilises distributed protection which means only signals local to the fault are affected by a cable event. The Signet at FSP/G/RN96N1290 tripped its Vacuum Circuit Breaker (VCB) isolating the cable fault and the feeder reconfigured from the OPEN POINT (FSP/G/RN96M0130). Both FSP/RN96M1290 (Side 1) and FSP/NL96M1050 (Side 2) tripped and locked out isolating the cable fault. Figure 4d shows the cable cut which caused the feeder to re-configure.

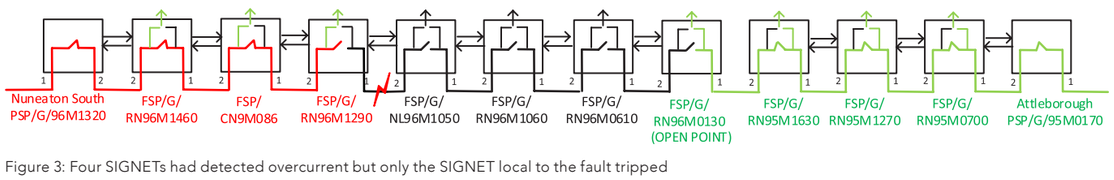


Figure 3: Four SIGNETs had detected overcurrent but only the SIGNET local to the fault tripped

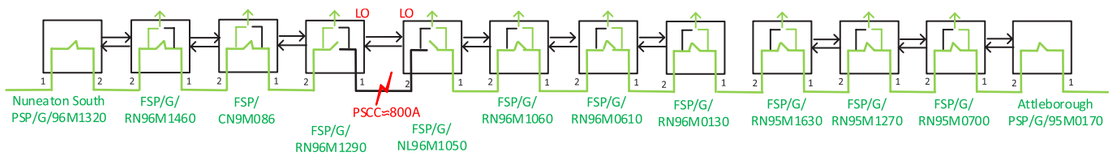


Figure 4a: SIGNET LOCKOUT (LO) at FSP/G/RN96M1290 and FSP/G/NL96M1050 isolating the cable fault

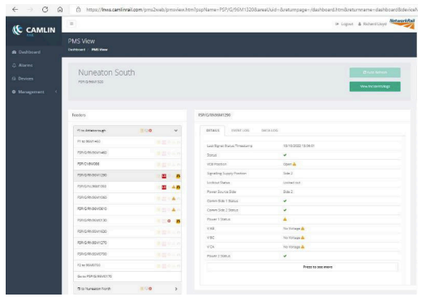


Figure 4b: Camlin RCM reports LOCKOUTs Condition Status

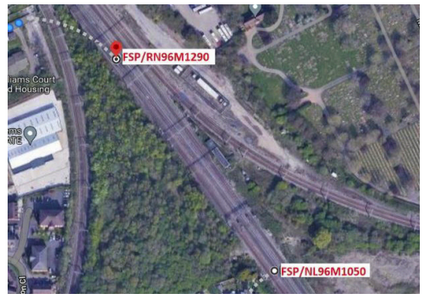


Figure 4c: Location of the Attempted Cable Theft

Figure 4d: Damaged cable

Discrimination Curves in Figure 5 shows that the Signet at FSP/G/ RN96N1290 measured approx. 800A overcurrent condition first resulting in a protection trip at approx. 26ms isolating the cable fault.

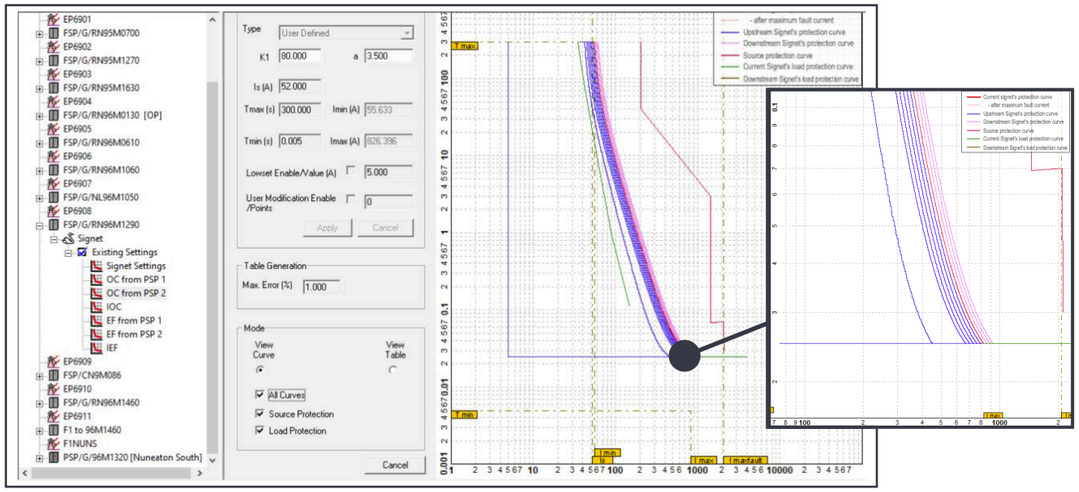
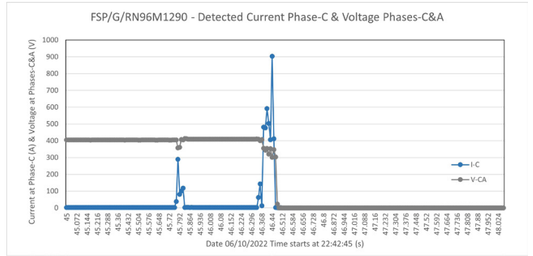
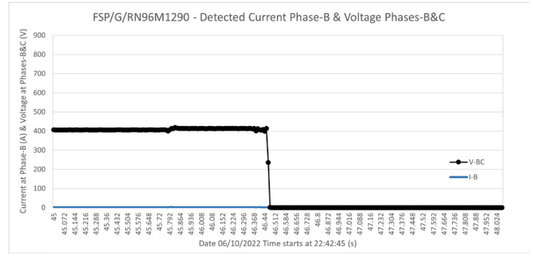
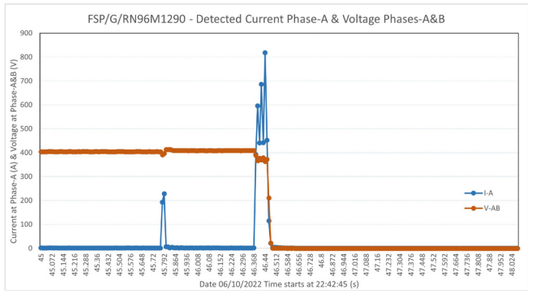


Figure 5: SIGNET discrimination curves from Nuneaton South PSP to Attleborough PSP.

The voltage and current activities recorded for Signet FSP/G/ RN96N1290 on 06/10/2022 at time 22:42:45 can be seen below:







"…The Camlin system detects the fault, makes the system safe and reports back to the team an issue has developed. The time of this system compared to a manual/non-auto reconfiguration system, say at Nuneaton is initially 2 hours of lost mobilisation and travel time. You then have the actual fault diagnosis and pinpointing the fault on site, then the additional time to set up safe systems and actually walk to manually switch the system to make an open point. You could be talking upwards of 2 additional hours, so a maximum time of some 4 hours to do what the Camlin system does in a few minutes, is a massive cost saving.

As for money saved on that particular day, it is hard to quantify. However, we have had manual/non-auto reconfiguration systems fail in the past and the cost in delay minutes can but upwards of £300k"

— Karl Weller, Section Manager, Stafford Delivery Unit Network Rail

Fault detected in minutes

Automated alarms sent to maintenance teams

Cost savings upwards of £300k

Camlin Rail works closely with Network Rail in delivering maximum signalling network availability, safety, and reliability, which are crucial in making rail transportation more attractive to both passengers and businesses.

This is a great example of how our advance automated reconfigurable signalling power system, Signet, helps our partner Network Rail improve the signalling system efficiency by safely maintaining supply continuity during fault conditions and preventing train delays or service cancellation.

Contributors:

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To find out more about Camlin Rail and Signet, get in touch with the team or visit: camlingroup.com/rail today to take the journey further.

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