

# Putting Passengers First

Tickets

Signalling Power Supply Resilience  
Strategic Support



# Our Commitment

## Putting Passengers First

- To support the achievement of routes strategic business plans through a robust collaborative working partnership. This is supported with an in-depth plan focusing on stakeholder priorities and aspirations that can be fully supported with a survey, design, manufacture and installation turnkey delivery. This level of strategic working supports routes efficiency commitments in delivering a right first time delivery.
- Helping you achieve your targeted improvements in LTIFR, SAFs, CRI and CSI.
- A key focus on minimising infrastructure failures with the introduction of new technologies and the upgrade of existing problematic assets.
- Minimal project management requirement - ideally suited to route focused works delivery management. This will allow for less money spent on excessive project management and greater funding to invest in the infrastructure to improve asset reliability.
- Working in partnership, iLECSYS Rail, Andromeda and Amaro are able to fully support Network Rail's route teams in ensuring an optimised delivery programme.



# Sussex FSP Remedial Works Phase II

## Conversion of 650V Locations to Class II Equipment

### Brighton - ELR: BLI1 - Insulation Tests

#### Class II Retrofit Carried Out

Install Date: 21/01/2018

#### BN206

##### CABLE FROM BN60 TO BN206

	Pre-Install	Post Install
Loop	0.6 $\Omega$	1.2 $\Omega$
Core to Core	1.96 M $\Omega$	>100 M $\Omega$
Core to Earth	3.49 M $\Omega$	>100 M $\Omega$



##### CABLE FROM BN206 TO BN210

	Pre-Install	Post Install
Loop	0.6 $\Omega$	0.6 $\Omega$
Core to Core	>1 M $\Omega$	>1 M $\Omega$
Core to Earth	>1 M $\Omega$	>1 M $\Omega$

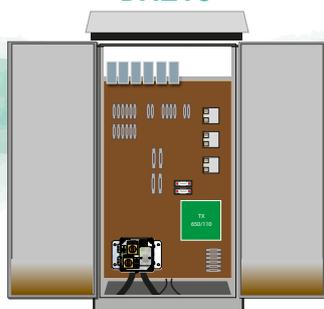
#### Class II Retrofit Carried Out

Install Date: 03/09/2018

#### BN210

##### CABLE FROM BN206 TO BN210

	Pre-Install	Post Install
Loop	0.67 $\Omega$	0.65 $\Omega$
Core to Core	52 M $\Omega$	2200 M $\Omega$
Core to Earth	30 M $\Omega$	2200 M $\Omega$

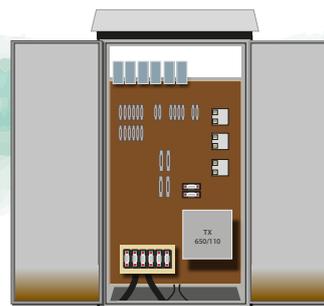


##### CABLE FROM BN210 TO BN211

	Pre-Install	Post Install
Loop	0.75 $\Omega$	0.64 $\Omega$
Core to Core	65 M $\Omega$	100 M $\Omega$
Core to Earth	38 M $\Omega$	100 M $\Omega$

#### BN211

Legacy Equipment Still Present  
Install Date: TBA



##### CABLE FROM BN210

## Predict and Prevent

These examples demonstrate the difference in cable insulation following a simple Class II retrofit. When we focus on location BN210 you can see a significant improvement on both the incoming and outgoing feeder cable. The core to core and core to earth measurements were taken before install and after install with no changes to the existing legacy cable. The improvement on the incoming feeder cable from BN206 is believed to be a direct result of upgrade of switchgear in BN206. A clean connection on the cable between BN206 and BN210 has resulted in clear readings showing no issues with the cable with previous issues down to cable terminations in the legacy switchgear.

# Case Study

## Class II Retrofits - SPC1

“Class II switchgear is generally thought of as an option only to deliver against SIN119 and for use in new installations on signalling power networks. By retrofitting existing FSP's, it can provide a real measurable benefit to the safety and performance of the asset, and in turn provides reliability benefits to the operator and maintainer.



Previous control periods have seen high levels of investment into cable renewals across the national network with very little improvement on the readings from the Insulation Resistance Monitor (IRM). The IRM was introduced primarily for safety, in recent times these results have also been used to trend the performance and reliability of the asset. With intrusive testing and inspection it was discovered that the circa 1980's FSP switchgear had deteriorated past its asset technical life.

I arranged to renew the FSP switchgear to provide a safety, reliability and performance benefit. iLECSYS Rail have supported the implementation of this by providing training to the maintainer and delivery teams. They have also provided on-site support and guidance with surveying and installation. iLECSYS are seen on East Midlands as a “one stop shop” providing services including surveying, design (Form A/B G110) and installation support. They have developed a way to easily load the site requirements into a database and then iLECSYS provide a complete list of requirements per location.

Next steps are to develop and implement improved 'predict and prevent' monitoring that will provide fault location technology and remote monitoring through Network Rail Intelligent Infrastructure. I am also in the process of installing a Distribution Interface Transformer Assembly (DITA) at some sites, which will improve feeder management and monitoring.

Retrofitting existing FSP's is simple as long as a joined up approach is taken between operations; the Route Asset Management, Maintenance and the Supply Chain. Collaboration is key to success that will in turn provide benefits to the passenger - Putting Passengers First.

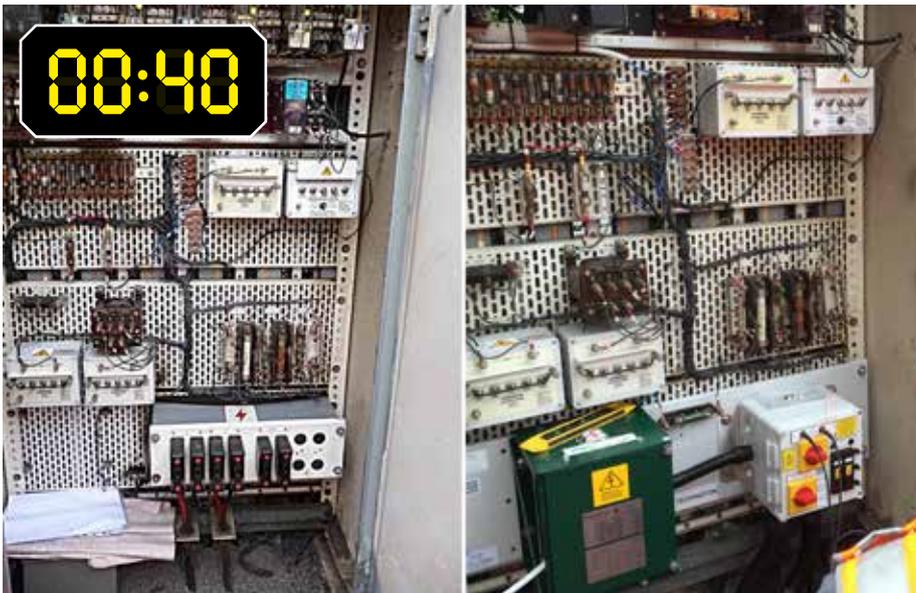
I would urge all key teams in Network Rail to review their plans and commence Class II retrofitting”.

**Paul Walker**  
**Senior Asset Engineer (Support) E&P**



## Infrastructure Resilience

- It has been proven that the introduction of Class II signalling power supplies have improved 'on time' train performance targets. In troublesome areas this has resulted in a dramatic improvement in insulation monitoring readings that were previously poor. Improvements have been identified to be a direct result of 650V signalling power supply switchgear upgrades with no additional cable replacements taking place.
- These upgrades have delivered significant improvements in infrastructure performance by reducing the number of 'Service Affecting Failures' (SAFs) and improving the 'Composite Reliability Index' (CRI). Low impact installations allow for access to critical locations without the requirement for possessions. Asset failures at these locations have a huge impact on passengers and consequently, the CRI scorecard measurement.
- The introduction of Tier 1 fault location technology compliments Network Rail's Intelligent Infrastructure programme and supports each routes journey towards a 'predict and prevent' maintenance strategy.



### TEDDINGTON

A pre-wired backplate assembly achieved compliance and a significant improvement to the local insulation reading and reliability. White working preparatory works were carried out allowing for an impressive 40 minute installation.

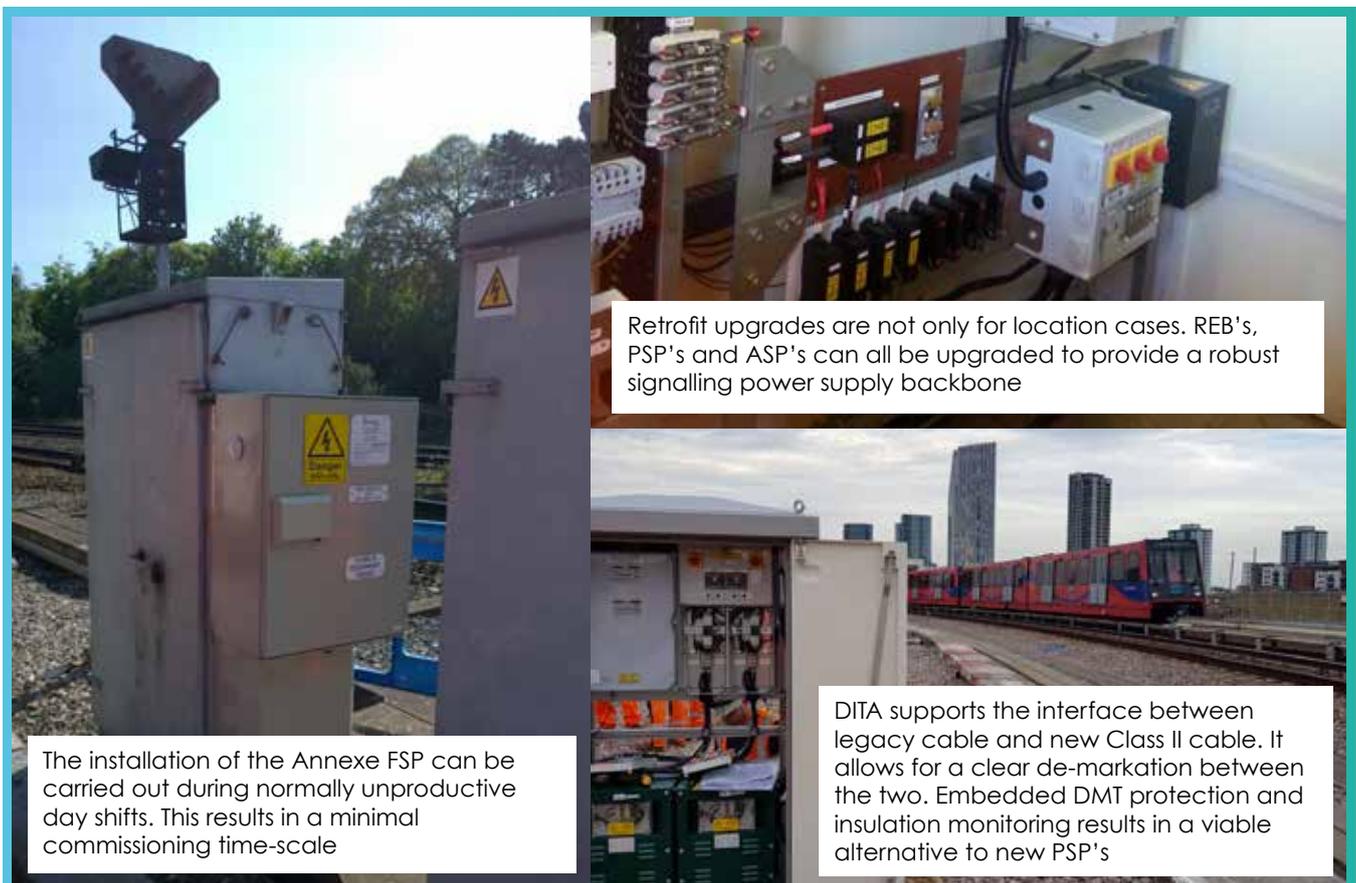


### NORWOOD JUNCTION

Multiple transformers and additional 650V sub-distribution was not an issue when upgrading this location. In-depth survey interrogation allowed for a robust installation plan to be implemented. Preparatory works and measurements ensured the installation of new equipment could be carried out in very limited time scales.

## Efficiency

- To support each routes 'Challenging Efficiency' CP6 outputs, our proposal reduces the spend on management and puts a larger percentage of each £1 spent into the infrastructure. This is partially achieved by targeting defect renewals in white periods avoiding disruptive possessions and working closely with route delivery teams. Together we can reduce the schedule 8 costs and deliver greater volumes with the available funding.
- Extending 'remaining asset life' of signalling power supply systems through targeted renewals of location cases and the installation of Tier 1 fault location & insulation monitoring technologies thus leaving the existing legacy cable, with many years of serviceable life, in situ. **“Maximising asset life will inevitably reduce reliability and pose an increased performance risk if uncontrolled - ‘Predict and prevent’ management of emerging defects and an increased reactive funding provision will largely control this risk”** (Extract from LNW SBP). Condition of existing cables can be tracked over time enabling a targeted and predictive maintenance programme to be implemented rather than waiting for it to fail and reacting.
- The partnership between Andromeda, Amaro and iLECSYS Rail sets out to ensure targeted CP6 spend and funding can be fully optimised by delivering a turnkey design, manufacture and installation package. In support of routes SBP objectives, project spend can be focused on achieving a right first time delivery.
- A programme of signalling power defect removals is required across the network. We offer support in developing the solution to maximise reliability, future proofing and digital ready (Tier 1 fault location - a whole life cost solution, predict and prevent instead of react and repair) - design of the end to end system, supply of the entire range of products, experienced installation team complimented by a targeted training offering for RAM and Maintenance teams.
- Simplicity in delivery - no need for complex project management. Robust Works Delivery supported packages.



## Safety

- The introduction of Class II equipment supports electrical life-saving rules. Reasonable opportunity can be taken to design and install front end protection to achieve compliance to BS7671. Full electrical calculations can be undertaken to determine existing non-compliances and offer compliant solutions.
- Safer working environment for staff - supporting reduction in LTIFR.
- Use of Tier 1 solutions removes the requirement for cable testing thus reducing the 'boots on ballast' time, associated driving to and from site and potential slips, trips and falls.
- Dealing with low insulation readings by replacing non-compliant (to EWR) switchgear with retrofittable Class II equipment. In the vast majority of low insulation readings on feeders it is the switchgear and transformers that causes the issues. Replacement of these as an alternative to full cable replacement programmes.
- Aligns to SIN and PAN safety notices and instructions.





## Working in Collaboration

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