Gosforth Depot for Stadler
Completed 2024

Case Study 2024

GRIP 4 - 8

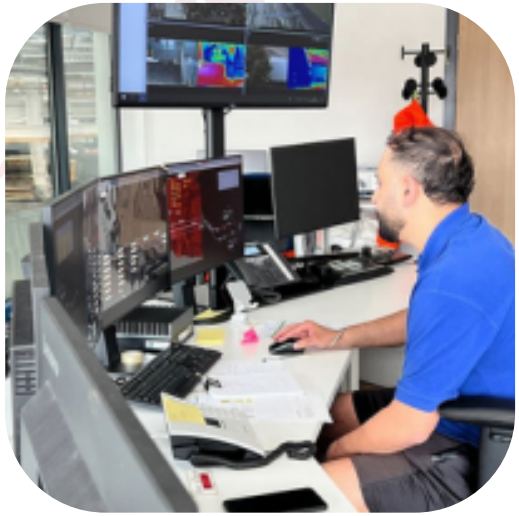
The Background

Gosforth Depot is currently operated by Stadler as part of the Tyne and Wear Metro Network, is situated just north of South Gosforth station, nestled between the Airport and Tyne Coastlines. Originally established in 1923 as South Gosforth Car Sheds by the London North-eastern Railway, its primary purpose was to maintain the Tyneside Electrics introduced by its predecessor, the North-eastern Railway. For four decades, it diligently serviced the Metro car fleet (class 599) from its base. Controlled by an antiquated NX control panel and relay interlocking system located in the Depot Control Room, the depot's operations were closely linked to the Nexus signaling control center at South Gosforth, which utilized an RTMS system.

With the introduction of the new Nexus Metro (Class 555) train fleet, the depot required extensive remodeling and the implementation of a cutting-edge train control system that could seamlessly integrate with the existing mainline interlocking system. The revamped facility now boasts inspection roads and pits, a dedicated wheel lathe building, a train exterior cleaning station, storage space for spare parts and materials, as well as office facilities for training and support functions. Notably, eight new electrified roads were added to the depot, enabling Stadler to maintain the existing trains while accommodating the new ones, slated to enter passenger service in 2023. Remarkably, this entire project was executed without interrupting Nexus train operations and the continuous provision of train services to the Newcastle Metro system.

The Mission

Fenix Rail Systems received an invitation from our clients, Stadler and Volker Fitzpatrick, to propose an efficient and cost-effective modern train control interlocking system. Consequently, Fenix was successfuly selected to provide cutting-edge technology that would play a pivotal role in overseeing train movements within their newly redeveloped train facility, a £70 million project. Fenix commitment to delivering innovative solutions that not only improved operational efficiency but also prioritized safety and operational flexibility. Our clients emphasized the importance of a system that could be easily modified and upgraded with minimal hardware or software adjustments, ensuring adaptability for the future. In response to this challenge, Fenix dedicated itself to the full spectrum of control system development, encompassing scheme development, detailed design, seamless interface integration, installation, rigorous testing, and successful commissioning. The result is a state-of-the-art train control interlocking system that meets our client's exacting requirements and elevates the functionality of the redeveloped train facility.



The Project

Our valued clients, Stadler and Volker Fitzpatrick, entrusted Fenix Rail Systems with the implementation of a state-of-the-art train control system. This project was particularly crucial as the existing depot was previously controlled by an NX control panel and relay interlocking system situated in the Depot Control Room. This system interfaced with the Nexus signaling control center at South Gosforth, which relied on an RTMS system. However, a significant change was on the horizon, as the control center was slated for demolition to make way for a modern train maintenance building. Consequently, Fenix had to execute the project in stages to ensure uninterrupted rail services during these critical works.

The control system selected is a SIL-2 equivalent safety CBI interlocking system, incorporating SIL 4 Pintsch axle counter wheel sensors, SIL 4 Pintsch point machines, and NR approved LED shunt signals equipped with Miniature Alphanumeric Route Indicators (MARI). Remarkably, a single operator has the capability to manage and oversee all train movement equipment within the depot control area through a Visual Display Unit (VDU). The new signaling system, along with its interconnected interface circuits to the South Gosforth Interlocking, found its home in a newly established REB positioned at the west end of the layout. Train movements in and out of the mainline are orchestrated via a carefully coordinated slotting arrangement between the mainline signaller and the depot controller. When a train needs access to the depot, the mainline signaller requests a slot from the depot controller. Once granted, the mainline signal, guarding the entrance to the depot, is cleared for the upcoming maneuver.

The depot control system, distinguished by its modular design philosophy crafted from high-grade industrial components, conducts continuous self-checks on the circuits. The project as a whole was selected as winner in the nation rail awards 2024. Which is a testament to the interdisciplinary teams and the efforts of the whole project to acheive this goal.

Scope of Works

- Developed the mainline scheme from GRIP 4 concept through to GRIP 8, including installation, testing, commissioning, and project close out.
- Cost effective solution, reducing maintenance costs and maximising efficient working of the depot.
- Control tables, interface specification and project specifications to enable the detailed design to commence.
- Conduct interdisciplinary design checks (IDC) with the principle contractor and associated disciplines.
- Produce full detailed signalling design as per the Network Rail (NR) GRIP process with cognisance to Nexus signalling principles.
- Detailed signalling interlocking modification to mainline circuitry to accommodate the new depot operational requirements.
- Integration of the new CBI with the existing interlocking using existing Nexus records.
- Full system design to accommodate bespoke client requirements.
- Centrally controlled route setting interlocking controlled using VDU heads up display
- 29 Trailable point machines including 4ft mount machines and 3 tandem 6ft mounted within the depot. 57 LED Signals, full Axle counter train detection and an REB containing the depot control interlocking.
- Bespoke client requirements include Train management facility, DPPS integration and on board user assistance.

Standard Equipment Types

- Trailable 400-volt 3 phase AC Point Machines
- REB (relocatable equipment building)
- Computer based interlocking CBI
- Points controllers
- Signal drivers
- Power supplies
- Axle counter evaluators
- Monitoring equipment
- Air conditioned cabinets

The Design Process

Grip 4 – Single Option Development
Fenix Rail Systems planned the core document requirements for the scheme, based off the Arcadis Scheme Plans (for NR).

Grip 5 – Detailed Designed
Fenix Rail Systems produced the detailed design, including the equipment layouts, calculations and wiring diagrams.

Grip 6 – Construction Testing and Commissioning
Fenix Rail Systems worked with the Principle Contractor VolkerFitzpatrick for their client Stadler to deliver the project, which was installed and commissioned successfully.

Grip 7 – Scheme Handback
Fenix Rail Systems completed full handback and training from all operatives including operator and maintenance staff over a 3-day period. The final records were updated and completed and returned to the client.

Grip 8 – Project Formal Close Out
Fenix Rail Systems formally closed out the project, returning the Health and Safety file and completing lessons learnt with our client VolkerFitzpatrick on behalf of Stadler.

The Results / Key Achievements

The Result

The installation and commissioning of the project took place within a multifaceted worksite and environment. Fenix Rail Systems executed this phase with remarkable success, minimizing disruptions to other concurrent disciplines operating on the site. This achievement was the result of meticulous planning and the execution of a robust strategy for site activities. During this implementation, the worksite was officially designated as a construction site, facilitating smooth access and enabling a steady-state progression of the installation. As a result, possessions of the main line were minimized, allowing normal service to seamlessly continue around the depot construction.

Key Achievements

- This highly intricate project presented its fair share of challenges, including global material shortages exacerbated by the Ukrainian War and the pandemic.
- Fenix demonstrated its ability to deliver a design and implementation that prioritized high quality and safety. Remarkably, no incidents, accidents, or close calls were reported during the site works.
- All design work was not only completed within budget but also successfully navigated the challenges posed by world events.
- Procurement and delivery of the signaling hardware were meticulously organized on a 'just in time' basis, reducing the need for extensive on-site storage and enhancing overall efficiency and productivity.
- Fenix forged strategic partnerships with multiple companies, which played a pivotal role in achieving a successful outcome.
- Fenix seamlessly integrated the new system into the existing infrastructure.

The Results / Key Achievements

Client Press Release (Rail Advent 30Th June 23)

Cathy Massarella, the Major Project Director at Nexus, shared her thoughts on this significant milestone:

"It's truly fantastic to witness the team at Gosforth depot transition to this modern new control suite, marking another significant step in our journey toward introducing the first new Metro trains into service."

"The digital systems represent a remarkable leap forward in the management of train movements in and out of Gosforth depot. The improved facilities for our staff are a marked improvement over our previous depot building and are sure to transform their work experiences."

"This move also sets the stage for the final phase of demolition work at the old depot. The depot controllers are the last group to relocate from the old building, but when you see the facility they are moving into, it's evident that the wait has been well worth it."

Click here for a short video on our New signalling control room at Gosforth Metro Depot

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https://youtu.be/metrodepot

Gosforth project wins at Rail Business Awards

As part of the contract to supply 46 METRO trains to UK client, Nexus, Stadler has built a brand new depot in Newcastle, which will soon become their home. We're thrilled that this construction project was named winner at the Rail Business Awards in the Infrastructure Project and Station Excellence category.

The new depot, which we've just finished, boasts unrivalled green credentials and a range of innovative features. We're delighted to see this project recognised at these prestigious awards held in Manchester, UK, and thank Nexus and our construction partner VolkerFitzpatrick Ltd for all their support along the way.

Click here for a video on our new Gosforth metro depot timelapse film

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https://youtu.be/timelapse

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