Fenix Rail Systems offers a wide spectrum of signalling design, installation, testing, commissioning and consultancy services across the UK, Southeast Asia and Australasia on both main line and mass transit systems. Through our partners we can provide full systems services including telecommunications, permanent way and power.

We specialise in the timely and cost-effective delivery of brownfield projects with complicated stageworks and can also deliver green field works where the opportunity arises.

Our mission – to deliver a turnkey signalling solution which is safe, cost effective and non-disruptive through knowledge, experience and collaboration to our international clients – has always been priority.

Fenix Rail Systems delivers turnkey solutions for the railway industry from project definition/scope requirements through to detailed signalling design, procurement of signalling equipment, signalling installation, testing and commissioning. We are the sole delivery partner in Australia, the UK and Southeast Asia for Tiefenbach Depot Control Systems and Wolber Trailable Point Machines.

Fenix has the capability and experience to support sponsors with a systems engineering approach, with the ability to provide independent review and checking of client scope and sponsor requirements, thus providing an independent engineering perspective on behalf of the client whilst protecting the client’s interest.

Our clients recognise the value Fenix Rail Systems provides. We can deliver a full turnkey solution for the signalling elements of railway engineering projects as well as providing training and/or mentoring. All our signalling engineers are IRSE licensed and can carry out competence assessments, including IRSE.

As an example these works could include:

**Pre-project:**
definition of signalling system requirements including standards and delivery methodology

**Project:**
managing the implementation of the signalling system

**Post-project:**
managing handback, O&M training, reviewing and monitoring reliability, availability, maintainability and safety
Fenix Rail Systems is made up of three distinct group companies, undertaking a wide range of signalling and telecoms projects in the UK, Southeast Asia and Australasia.

**Fenix UK & Ireland**
Fenix has firmly established a reputation for building a strong professional-to-contractor relationship in signalling and telecoms projects across the UK. In a professional consultancy role, the Fenix team has also assisted clients through delicate and detailed technical aspects of works to wider rail infrastructure and civil engineering projects. The company delivers innovative products and solutions on projects across the UK, such as at Banbury depot, where it provided a technical interface to the mainline signalling system – the first time that this has ever been done.

**Fenix South East Asia**
Fenix Southeast Asia provides this region with a one-stop shop of rail systems services for clients at every stage of the infrastructure assets lifecycle, from concept to operations and maintenance. Partners in the delivery of projects include Promelectronica and Tiefenbach, with an existing client base that includes Hitachi, Ansaldo STS, George Kent (Malaysia) and Rail Systems Australia.

**Fenix Australasia**
In an exciting time for Australasian infrastructure, Fenix Australasia will have a significant impact on the huge range of rail projects that will be delivered in the coming years. In Australia specifically, there is a high level of political and financial support for the development of the country’s rail network. We will also establish local partners for signalling and communications installation activities.
Awards

Award shortlisting: ‘Most Interesting Thing We Saw’ award at the Most Interesting Awards 2016, Rail Exec Gala

Awards Shortlisting: ‘Excellence in Technology’ award at the National Transport Awards 2017

Awards Shortlisting: ‘Signalling & Telecommunications Person or Team of the Year’ award at RailStaff Awards 2017

Awards shortlisting: ‘Excellence in Technology and Innovation’ award at the Scottish Transport Awards 2017

Awards shortlisting: ‘Signalling & Telecommunications’ award at the UK Rail Industry Awards 2018
Fenix provides a fully integrated control system for depots, ports, shunting yards and maintenance facilities.

Partnering with Pintsch Tiefenbach, we provide a fully integrated control system which is locally controlled by one operator.

- Known to be a reliable and cost-effective solution
- Over 1,000 systems worldwide since 1984
- Fully scalable from simple locally operated power points through to large complex depots with 100+ points
- Trailable, low-maintenance point machines
- Additional functions including Call-on and Car Counting
- Developed & compliant with EN standards
- Operates in harsh environments

OPTIONS

1. Large – Centralised Dispatcher-Operator for 100+ points
2. Medium-Large – Centralised operation by DOS for 15-100 points
3. Small – Local operation by Drivers-Operations Staff for up to 15 points
4. Hybrid – mix of all or some of the above

COST BENEFITS

1. No/reduced need for hand shunters – labour cost savings
2. Reduced capital cost vs mainline systems
3. Minimal maintenance – low life cycle cost
4. Long service life, 30 years +
Fenix's point machine is equipped with an internal mechanical locking system, therefore common external maintenance locking systems such as clamp locks are no longer required.

Due to its short height, the point machine is installable between the rails without adaptation to existing track system, increasing on-site safety by reducing trip hazards. It can be installed on a gap-free ballast ground and therefore ensures proper track conditions and reduces the strain on the points.

The point machine has a robust and compact construction which is perfectly suited to rough conditions for industrial rail traffic.

· Trailable and non-trailable versions available
· Internal mechanical locking system
· Modular construction
· Available with various throw strokes, throw times and throw forces
· Various power supply options available
· Compatible interface to existing controls and systems
· Highly robust, reliable and easy to maintain
Fenix can develop and manage customised requirements management databases for the rail systems requirements of any rail project, solving many of the problems with other ‘off-the-shelf’ products.

Our products are developed in four stages:

**Stage 1 – Requirements identification**
- Agree project requirements

**Stage 2 – Configuration**
- Customise and populate database

**Stage 3 – Verification and validation**
- Nominate and review compliance evidence

**Stage 4 – Reports**

Other information

- Web-based application
- Can be hosted on Client or off-site web servers
  - O.S. Windows Server 2008 or later
  - Internet Information Services 7 or later
  - Microsoft .Net framework 4.5 or later
  - Database: MS SQL Server 2008 or later
- Configurable User Rights
- Delete and Supersede Requirements
- Software can be used with several browsers
Our services include, but are not limited to:

- System definition
- System requirements
- System (scheme) design
- Detailed design
- Procurement
- Construction/installation
- Testing & commissioning
- Management/supervision of factory assembly and pre-wiring
- Management/supervision of site construction and installation
- Turnkey signalling solutions
- Training
- Project engineering
- Project management
- Signal sighting
- Technical Gap Analyses

### Implementation (construction and installation)

- Receipt of materials and delivery to site
- Management/supervision of factory assembly and pre-wiring
- Management/supervision of site construction and installation
- System verification and validation
- System requirements and architecture

- Condition survey and correlation reports
- Outline project specification (OPS)
- Signalling scheme plan
- Draft control tables and route lists
- Detail of control and interlocking assumptions
- Identification of non-compliances and ways to manage them
- Option selection report
- Scheme plan risk assessment
- Signal sighting chair, forms, sighting and reports
- Signal spacing charts and calculations
- Testing and commissioning strategy
- Rolling stock signalling system (ATP/ATO) fitment
- System design reviews
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<th>Detailed design</th>
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<td>Correlation of equipment and wiring</td>
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<td>Signalling design specification</td>
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<td>Stage plans</td>
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<td>HAZID (signalling system only)</td>
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<td>Signal sighting forms, sighting and reports</td>
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<td>Location area plans</td>
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<td>Bonding plans</td>
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<td>Cable plans (main and detailed)</td>
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<td>Control tables/ mechanical locking charts</td>
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<td>Relay interlocking (free-wired and geographical) relay room/location case circuit design</td>
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<td>SSI/CBI application data and associated architecture/ circuit design</td>
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<td>SCC/panel modifications</td>
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<td>Detailed signalling design</td>
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<td>ATP and TPWS design</td>
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<td>Axle counter design</td>
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<td>System integration</td>
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<td>Bill of materials</td>
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<td>As-built records</td>
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<td>Rolling stock signalling system (ATP/ATO) fitment</td>
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System handback/O&M training and project close out

As-built records
O&M manuals
O&M training
Commercial and technical project close-out

Integration test and verification

Management of pre-testing – Mod 1 Tester in Charge
Mod 2 Principles Testing for RRI and CBI systems
Mod 3B Function Testing – Interlocking
Mod 3C Verification Testing – Interlocking
Mod 4 Function Resting – Wayside Equipment
Mod 5 Test Assistant
Consultancy Services

Fenix Rail Systems provides consultancy services and railway signalling training for both signalling engineers and non-signalling engineers. Here our consultancy services are tailored to support organisations with no or limited signalling engineering experience, such as large civil engineering companies whose railway civil engineering projects have a component/interface to the signalling system(s).

In a similar vein, we can provide regular reviews of standards to non-signalling railway engineering companies, analysing the impact of changes to signalling standards on their business/projects.

Signalling training for non-signalling engineers is designed staff such as railway civil engineering managers/supervisors whose work comes into contact with signalling, enabling them to understand and manage the interface more effectively. This training adds value particularly when bidding for railway works as there are usually signalling elements within project scope that are not obvious when first presented to the untrained eye.
Our clients
Fenix has successfully completed the final stages of the Banbury Depot project. The operation involved the design the first Pintsch Tiefenbach interface of its kind in the UK. The unique interface enables the depot control system to link directly to the NR infrastructure and allows the Tiefenbach System to interface with any type of UK interlocking, saving the requirement for NR-type approval.

The project overcame significant challenges throughout the lifecycle of the project, including wildlife, scope changes, inclement weather and multiple stages which were incredibly complex.

Using the Tiefenbach interlocking technology and Conventional Dorman signals, Banbury Depot now utilises a number of firsts for signalling technology in the UK.

Fenix developed a unique system design that interfaces the Zone Green DPPS with the Tiefenbach System, providing complete integrity between the two separate systems. Banbury Depot now boasts trailable four-foot point machines – German technology which is another UK first.

Craig Purcell, Group CEO of Fenix Rail Systems, said: "I am delighted to see the outcome of our team’s hard work on the Banbury Depot signalling system. It has led to a plethora of expressions of interest, underpinning the system as a must-have signalling solution for depot control in the 21st Century."

Key Facts...

1 INDUSTRY FIRST

1 COMPLEX SYSTEM INTEGRATION

1 INTERNATIONAL RELATIONSHIPS AND TRAINING

9 DAY BLOCKADE
Fenix was responsible for carrying out a Technical Gap analysis for one of the European ERTMS/ETCS product suppliers. The scope was to identify the gaps between the Network Rail technical requirements and the requirements satisfied by the product supplier’s current products. The gap analysis was carried out for the two major ERTMS/ETCS Level 2 subsystems of Interlocking and Radio Block Centre.

Following this, the European ERTMS/ETCS product supplier issued a sample proposal to upgrade one of the routes with their system and Fenix was responsible for providing advice and checking the proposal.

As a result of the consultancy from Fenix, the European ERTMS/ETCS product supplier has now been invited to participate in the Digital Railway Early Contractor Involvement Programme.

The consultancy work was carried out at Fenix HQ in Stratford upon Avon and in the premises of the European ERTMS/ETCS product supplier where discussions were held with their product experts.

Key Facts...

- Multi-Site
- Consultancy
- Gap Analysis
Fenix was responsible for TIC activities for the following project: GOBE - Gospel Oak to Barking Electrification

Network Rail identified that introducing a 25KV overhead line electrification to run electric trains between Gospel Oak and Barking would provide the opportunity to enhance performance, efficiency and reliability of passenger services. Fenix provided Testing services to the project throughout its life cycle, Fenix providing our TIC and Signalling Installation Head to manage the Testing and commissioning elements for our client.
Fenix delivered the first part of a major RETB (radio electronic token block) upgrade project in the West Highlands of Scotland. The upgrade was made necessary by OFCOM’s decision to reallocate the operating frequency in this region for digital TV throughout Europe. The project, commissioned by Network Rail and led by telent (telecoms services), required changes to be made to the frequency of the base stations. However, the wider implications included the development, modification and renewal of depot, engineering and trackside equipment to provide a fully operational communications system.

Fenix was responsible for all the signalling and testing works in the project. The company initially completed trials at two sites. Subsequently, work was completed at 19 sites on the West Highlands Line, totalling 165 miles. This included modifications to the TPWS (Train Protection Warning System) power supplies to enable the change of frequency.

Various challenges needed to be overcome along the way. Many of the locations were extremely inaccessible, requiring a journey of around five hours in a 4x4 between each and the winter weather conditions contributed further to these difficulties.

Success of the first phase of the project was thanks to the close collaboration between the signalling and telecommunications disciplines, and the teams at Fenix, Telent and Park Signalling worked very effectively to achieve this. 2016 will see the Far North Lines, totalling 230 miles, upgraded for the frequency change and the interlocking at Inverness upgraded.

**Key Facts...**

- **PLANNING**
- **MULTI-DISCIPLINARY**
- **QUICK RESPONSE**
- **TECHNICAL ASSISTANCE**
Project experience
UK: Bellenden & Westdown

The Bellenden Road Underbridge upgrade replaced the existing 12-metre single span deck with two new Network Rail standard U decks, which were 66 tonnes each.

The Westdown Road Underbridge project also centred on the replacement of the existing 12.5-metre bridge with two new Network Rail standard U decks, which were 74 tonnes each. It included the replacement of new station platforms.

Both projects included the reinstatement and re-tamping of the tracks before reopening to rail traffic.

Fenix was responsible for initial survey of the impacted S&T cable routes and trackside equipment; powering down and making safe signalling equipment prior to the works; the subsequent support and protection during the works; and the reinstatement of the signalling system upon completion.

Fenix’s S&T staff worked in collaboration with the multi-disciplinary team throughout the works, assisting with the detailed planning to ensure there was minimal disruption to the railway network. This required quick thinking and proactive action on site by the Fenix signalling team to resolve a number of technical issues that arose during the works.
Following the Waterfall Rail accident in New South Wales, Australia, in 2003, the Special Commission of Inquiry mandated the rollout of a state-wide automatic train protection system (ATP). Following extensive research into driver safety systems, RailCorp adopted the European Train Control System (ETCS) Level 1 Full Supervision as its preferred ATP technology.

Following an initial review and undertaking of the planned roll-out of ETCS Level 1 Full Supervision (FS), an alternative solution known as ETCS Level 1 Limited Supervision (LS) emerged with the release of an updated version of the ETCS specification in 2013.

A business case was developed that supported a change in project scope to the installation of the LS system as it was considered that this would better manage the safety of the network. This system was also in line with the ‘Sydney’s Rail Future’ plan to eventually replace ETCS level 1 trackside equipment and progress to ETCS Level 2.

A modified version of the limited supervision application ‘Advanced Migration System’ (AMS) was chosen for the rollout.

Fenix Rail Systems, due to its long experience with ATP systems in many countries worldwide, was contracted to provide the wayside design scope for Areas 4 and 5. The design is being completed by Fenix’s UK-based team, with a senior engineer located with the client in Sydney to ensure effective management of the works.

The team built a comprehensive knowledge of Australian signalling principles, standards and processes in order to successfully apply their UK-based knowledge in a foreign setting.

The work involves circuit modifications in over 130 location cases, plus associated track and cable plans.

Thanks to the expertise and flexibility of the Fenix team, a relatively straightforward and well controlled design was delivered for this large and complex project. This played a key part in allowing the team to work remotely from the project team, ensuring efficient and smooth collaboration between all teams.

**Key Facts...**

- **SAFETY CRITICAL**
- **PROACTIVE ACTION**
- **AUTOMATIC TRAIN PROTECTION**
- **COMPLEX SYSTEM INTEGRATION**
Fenix South East Asia (then named MGB Systems) was contracted to design, install, test and commission modifications at Sri Petaling for RSD1.

RSD1 was a key milestone on the project for the two revenues serving the existing Alstom signalling system controlling the traffic safety of the Sri Petaling half station at platform P1 on the Chan Sow Lin side and the new CBTC signalling systems controlling traffic safety at platform P2 on the Kinrara side.

Fenix was responsible for the production of the concept design report; test and commissioning strategy plan; final design report; detailed design; installation and supervision; and test and commissioning services covering RSD1 works. The company was also responsible for IV&V assurance activities covering the review of safety-critical design, as well as witnessing, auditing and T&C certificate sign off.

The Ampang metro line has been extended by 17.7km, creating 11 new stations. It currently has a ridership of around 200,000, with this extension project expected to increase that number to 400,000 passengers.
Since March 2016, Fenix South East Asia (then named MGB Systems) has been working with Hitachi Rail to provide requirements management (RM) services for 11 sub-systems in the first line of Ho Chi Minh City’s new metro line.

Fenix took on the role of RM manager, included the following: signalling; track work; automatic fare collection; platform screen doors; telecoms; rolling stock; SCADA; depot and equipment; signage and graphics; power supply; and overhead contact systems.

Fenix worked closely with Hitachi to develop a custom RM database to manage the requirements of all stakeholders for the systems work associated with the first line of the city’s urban railway project.

Using this database, Fenix was required to produce a systems requirements specification followed by a sub-system requirements specification before progressing to the traceability stage to link all requirements. Finally, gap reports were created to filter those requirements yet to reach the ultimate status of verified or validated.

The first line of the city’s new metro system, the Ben Thanh-Suoi Tien line, will cover 19.7km and connect the city centre with eastern districts. It is expected to begin operation in 2020.
Fenix South East Asia (then named MGB Systems) was appointed to fulfil the independent verification and validation function on the Ipoh-Padang Besar electrification and double tracking project – approved by the Malaysian Minister of Transport.

Fenix was responsible for the independent verification and validation of all safety-critical signalling and train control designs for the project. This included scheme plans, control tables, Microlok circuits, Microlok application data, ATP data and track bonding plans.

In addition, Fenix took on the role of ongoing witness and provided audits of all testing and commissioning activities on the project as well as final T&C certificate sign off for all station interlockings.

The Ipoh-Padang Besar electrification and double tracking project is one of many recent projects improving rail transportation across Malaysia. It involved electrification, re-signalling and double tracking of 320km of rail line and 21 stations between Ipoh and Padang Besar as a continuation of an earlier electrification project between Rawang and Ipoh.

Key Facts...

320 KM TRACK

21 STATIONS

APPROVED BY MALAYSIAN MINISTER OF TRANSPORT