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EDITION THREE 2015

Welcome to railway-news magazine Edition Three.

Following on from the success of our first edition Innotrans special we are now producing the magazine on a quarterly basis. The Innotrans magazine was fantastically received and was aimed at promoting suppliers and exhibitors at the show. This latest edition is aimed to show more of the same leading suppliers and their products but also we have introduced some fantastic independent pieces which we hope you find interesting and informative.

We hope you like this edition as much as the first and if you have any questions about any of the products or services promoted within then please do not hesitate to contact our suppliers directly or if it helps contact us and we will happily help make the contact for you.

Have a great 2015 and we will be back again next quarter.

Andrew Lush

Director

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Contents

RTUs playing a vital role in telent's Network Rail SCADA project

A NEW SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION) SYSTEM COVERING NETWORK RAIL'S SOUTHERN ELECTRIC REGION IS MAKING USE OF THE LATEST REMOTE TERMINAL UNITS (RTUS) FROM ABB.

A new SCADA (Supervisory Control and Data Acquisition) system covering Network Rail's Southern Electric region is making use of the latest remote terminal units (RTUs) from ABB.

An RTU is a control device that connects telemetry and remote control links to the substation equipment including transformers, switchgear, circuit breakers, rectifiers plus other important equipment such as security alarms.

The equipment is being installed as part of Network Rail's investment being made in preparation for the planned electrification of the UK's rail network. telent has been appointed by Network Rail to design, supply and install a new SCADA system to cover the entire national network. It has ordered ABB's RTUs for installation at traction substations across the Southern Electric region, covering south London, Dorset, East and West Sussex, Hampshire and Kent, where trains are powered by a 750 V direct current supply to the third rail.

During the four-year contract, telent is installing a system that will provide the complete control interface so that Network Rail can monitor the network remotely, carry out isolations and implement automatic execution and service restoration. Plus, the system needs to deliver flexibility to accommodate future changes to the electrified network.

The project will deliver a single electrical control system and will replace time served equipment. By upgrading its SCADA system, Network Rail will manage its electrical power in a more efficient and flexible way. Plus, the new system will support the future expansion of the electrification network. It has the potential to increase capacity and improve journeys, while reducing costs and carbon emissions.

In the Southern Electric region, telent has adopted RTUs supplied by ABB to provide the vital telemetry and remote control links to the main traction substation equipment. In operation the RTUs will use high-speed fibre optic connectivity to interface with telent's head end SCADA system in Network Rail's control centre.

telent and Network Rail have standardised on the state-of-the-art RTU540. The RTU540 is the medium sized module in ABB's new generation 500 series and provides a flexible, scalable and compact solution. It offers maximum functionality within the restricted space available in trackside substation enclosures.

The RTUs will use classic hard-wired inputs and at the same time will use the DNP3.0 protocol for communications with the telent control centres. In addition, they feature built-in cyber security features and capability to interface with equipment based on the IEC 61850 protocol for substation communications. This means that they are future-proofed to operate with any new primary equipment that incorporates modern IEDs (intelligent electronic devices).

telent was appointed by Network Rail in August 2013 to deliver the new national SCADA system within a four-year period and has already taken delivery of the first 20 modules from its total order for 242 RTU 540 modules for the Southern Electric region.

Danny Lyonette, ABB's Sales and

Marketing Manager for Substation Automation said: "Network Rail's new SCADA is a very prestigious project that provides the first large scale UK deployment for our new generation RTU 540 modules. Our selection was based on the successful completion of telent's stringent approval process. One of the key factors was the module's compact design, which is capable of handling up to 5,000 information points."

Once complete, there will be a phased migration programme to transfer existing controls and new electrification schemes to the new system.

Four products make up the RTU540 series and have been designed for a wide range of applications including railways, as well as utility transmission, primary and secondary distribution, and also process automation in industry. The units have been designed to withstand the harsh environmental conditions of trackside substations in a compact housing.

Future proofed solution

In rail electrification schemes Remote Terminal Units have the role of interfacing between electrical power and distribution infrastructure and a control centre via a SCADA system. Applications include monitoring and control, fault current indication and medium voltage measurement, metering and supervision of power quality.

ABB introduced the new generation RTU500 series of RTUs in 2013 to meet demand for future-proofed telemetry. This is achieved with the series in-built compatibility with the IEC 61850 communications protocol.

Many thousands of substation automation systems are in place worldwide. But until recently, there was no overall standard for serial communication in substation automation. This means that the vast majority of these systems have been based on proprietary standards and that each system is either limited to using components from a single supplier, or that complex and costly protocol conversions have to be applied.

IEC 61850 is the first and only global standard that considers all the communication needs within substations. It defines standards for data models and sets, communication mechanisms and the system configuration language (SCL).

The protocol has a number of objectives. The first of these is interoperability of system components and software tools, which will enable operators to integrate technology from multiple vendors. Other goals are to enable the free allocation of functions and options for different system architectures.

One of the key considerations of the standard is that it takes account of the fact that developments in communication technology move faster than developments in substation automation, protection and control equipment.

Leading the way in IEC 61850

ABB has pioneered the development and implementation of IEC 61850 through a number of initiatives, the first of which is continuous engagement in the elaboration and validation of the standard.

In preparation for adoption of the protocol, ABB created a System Verification Facility (SVF) in Stone, Staffordshire in 2006 with the goal of carrying out the vital (FAT) acceptance testing for substation protection and control systems in the UK. Rather than carrying out limited representative pre-site tests, the SVF enables ABB to deliver rigorous testing that closely replicates the actual installation.

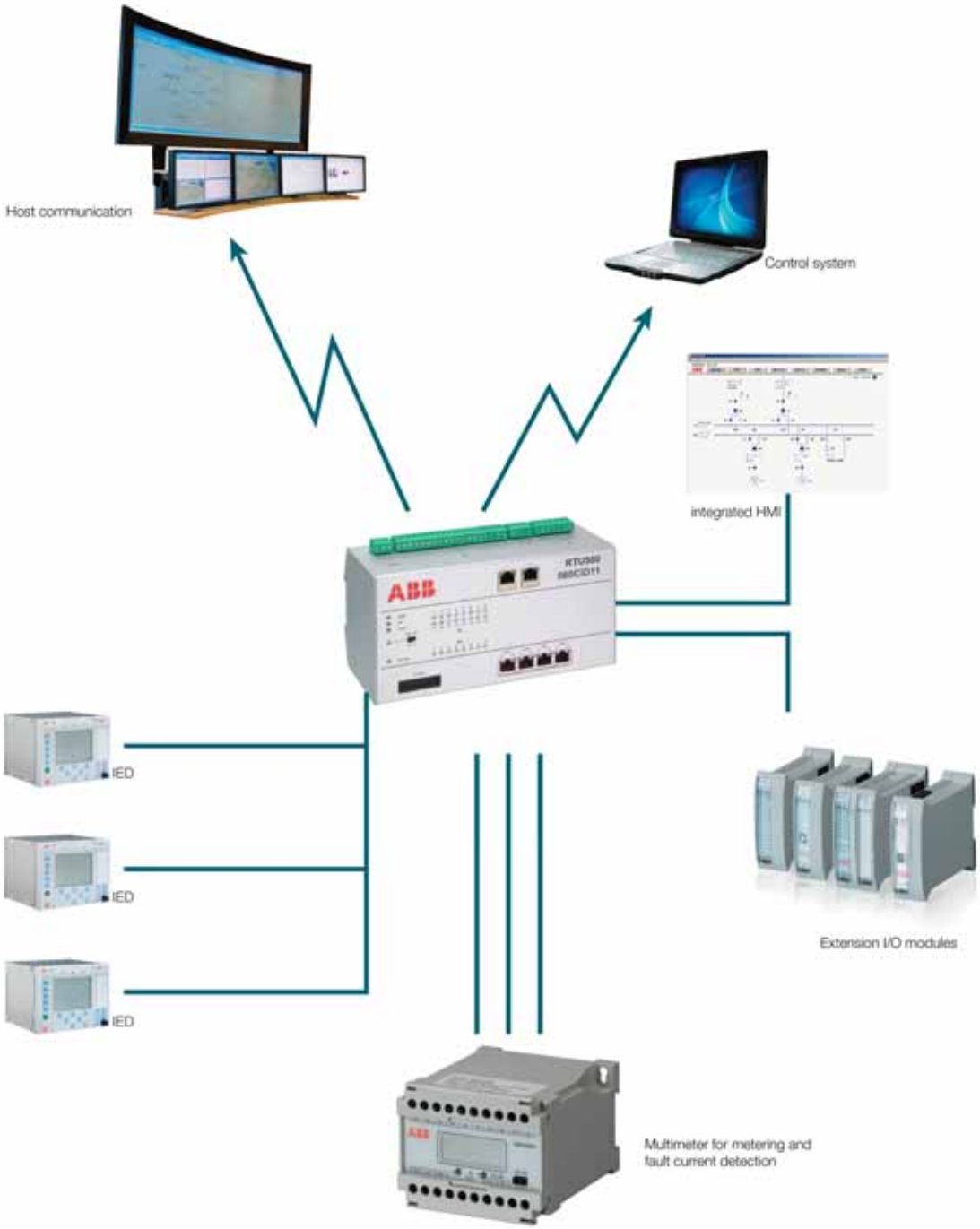
The facility simulates the behaviour of equipment such as switchgear, circuit breakers and transformers. A library of test routines covers all potential situations.

The SVF effectively 'transports' much of the final commissioning elements from site using the same IEDs that will be deployed and uploading them with project specific settings and configurations. The SVF has proven popular with ABB's customers, who can visit the facility to witness their protection and control schemes being tested in real-life conditions.

The benefits of the approach are reducing risk and driving down costs. A rule of thumb is that an issue that costs £10 to rectify at the FAT stage will cost in the region of £100 to fix on site. And not only does it save costs in commissioning but also time and risk on-site, ensuring a fast and smooth commissioning process.

Going a step further, ABB has developed a new generation of portable relay rooms (PRRs). These bring together complete protection and control systems within a containerized transportable unit that is factory built, configured and tested before being largely commissioned at the SVF. They can then be despatched to site as a plug and play solution.

One example from within the rail industry is on the Great Western Electrification Programme. A consortium made up of ABB and UK Power Networks Services is delivering 30 new traction power substations.



The brains of these substations will be protection and control systems housed within containers and developed by ABB to suit Network Rail's Rationalised Autotransformer Scheme (RATS), a sophisticated method of deploying IEC 61850 to achieve a lower-cost substation solution.

Native IEC 61850 implementation

IEC 61850 was introduced to enable flexible, future-proofed systems that are able to cope with changing requirements, philosophies and technologies as well as integrate products from multiple suppliers.

Even before the standard was launched, ABB had committed to a 'native implementation' philosophy so that the standard would be fully implemented in new product developments like the RTU 500 series.

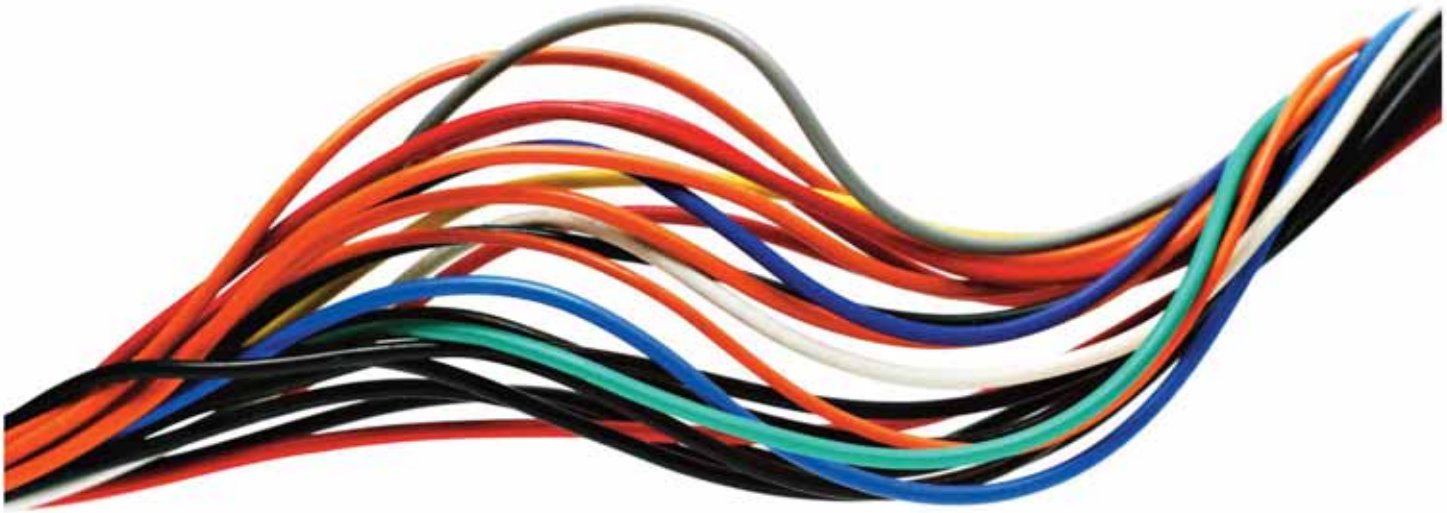
In a typical IEC 61850 native design, the functionality of the IED must consider the entire lifecycle process from specification, through engineering, commissioning to operations and maintenance.

A high level of interoperability can be achieved by providing a full set of protection and control data to the overall SCADA or substation automation system as well as other devices and third-party tools.

Fast communication and application performance are another critical aspect of IEC 61850 devices as they use generic object oriented substation event (GOOSE) peer-to-peer communication.

BT Cables

A world leader in cable manufacturing



At BT Cables we passionately believe in these key messages

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BT Cables expands its product portfolio by introducing its range of cables for Building Infrastructure Systems

THE IMPRESSIVE RANGE OF NEW PRODUCTS FROM BT CABLES HAS BEEN ACCOMPANIED BY THE LAUNCH OF A SERIES OF BRAND NAMES WHICH ARE REGISTERED TRADEMARKS.

Designed for ease of association with the product application the brand names will make them instantly recognisable as cables which afford customers complete peace of mind and excellent value for money. The products are branded as

- **BT BMS-Tec ®**
- **BT Data-Tec ®**
- **BT Firepro-Tec ®**
- **BT Industrial-Tec ®**
- **BT Security-Tec ®**
- **BT Optical-Tec ®**
- **BT Voice-Tec ®**

The new products complement perfectly BT Cables' traditional product offering. The company now offers complete solutions from trackside infrastructure to in-station applications for access control, security and intelligent building systems.

New Website (www.btcables.com)

BT Cables is delighted to announce the launch of its new website which went live in April 2015. Built on the Trendzer platform that is used by BT Marketing Solutions for the BT Group's impressive range of small business customers, the site is fully responsive to meet the demands of modern online requirements. The new site is more aligned to other BT Group websites and whilst maintaining BT Cables' individual identity it is intended to be instantly recognisable as part of the BT family.

The website now has more downloadable content than ever before and will provide BT Cables customers with an impressive reference library and up to date information on its products and services. BT Cables enhanced product portfolio is well represented and from the Home page you can move quickly to any of the market sectors in which it now operates. It's just the latest stage in the ongoing growth and development of BT Cables, and we're very happy with the results.

Expansion into new geographies

The introduction of the enhanced product range and development of the new website are both key developments in BT Cables expansion initiatives across MENA and Europe. The BT Cables brand is proving extremely popular and this has led to recent contract awards from

European operators and Partner agreements with a number of major distribution outlets covering the UAE and Saudi Arabia. BT Cables remains committed to work with YOU, its customers and partners, to ensure growth and mutual success and continue with its investment in operations and people.

Supply chain

BT Cables is heavily integrated with BT Supply Chain, an organisation with c950 professionals across 22 countries. Recently BT Cables transferred all its logistics requirements across to the BT Supply Chain team which works with other logistics providers and freight forwarders as required, to ensure customer orders are delivered on time, to the correct specification and in the most efficient manner.

Utilising this transport infrastructure and model, BT Cables can be proactive in the collection and return of the empty drums upon which they supplied cables. Each drum owned by BT Cables has a unique number engraved on each flange and allows us to understand where the drum was delivered to against a particular order.

Continuous Improvement at BT Cables

Over the last quarter, the Continuous Improvement (CI) team has been very busy working on a number of initiatives across the manufacturing facility in Manchester. Activities have included Kaizen events on core lines and in the planning department. The latter aimed at achieving shorter lead times for customer orders and improved customer service levels. Daily performance meetings have been re-introduced and new problem solving tools are being developed to solve some of the more complex problems. All of these activities have also contributed to significant cost savings generated by CI in the last quarter.

The hard work continues through the new financial year 2015/16. Improvement and cost saving targets have been set which the CI team see as challenging but achievable thanks to the involvement of all the teams across the factory. A plan for regular Kaizen events with clear benefits has been set and there will be a renewed emphasis on 5S (Sort, Streamline, Shine, Standardise & Sustain) which has a major impact in a high volume 24 hour manufacturing operation like BT Cables. Continuous improvement is wholly dependent on the support and engagement of all team members across the entire business and not just in the manufacturing facility itself. The change process does not rely entirely on the Kaizen event schedule as there is an active focus on making small changes on a daily basis which not only contribute towards achievement of the CI targets but also improve the working environment, health and safety.

Royal Society for Prevention of Accidents (RoSPA)

BT Cables has this year achieved the prestigious President's Award for 10 Gold Medal awards.

The RoSPA Occupational Health and Safety Awards are internationally recognised and have fast become the most sought after accolade by organisations from every sector. These awards are a key part of the health and safety calendar and offer organisations a prime opportunity to prove their ongoing commitment to raising health and safety standards. This is intrinsic to the working ethos at BT Cables and the awards culminating in this year's President's Award are recognition of the dedication and diligence of the BT Cables team in maintaining such high standards consistently year after year.

BT Cables

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THERMIT GROUP

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In 1895 Prof. Goldschmidt invented the Thermit® process for the continuous welding of railway tracks and today we continue to remain committed to this spirit of innovation and develop products and services to make railway tracks as comfortable and safe as possible for your customers. We offer a unique range of services for the construction, repair, maintenance and renovation of track systems. You benefit from the power of our global group with more than 20 companies and numerous partners around the world.

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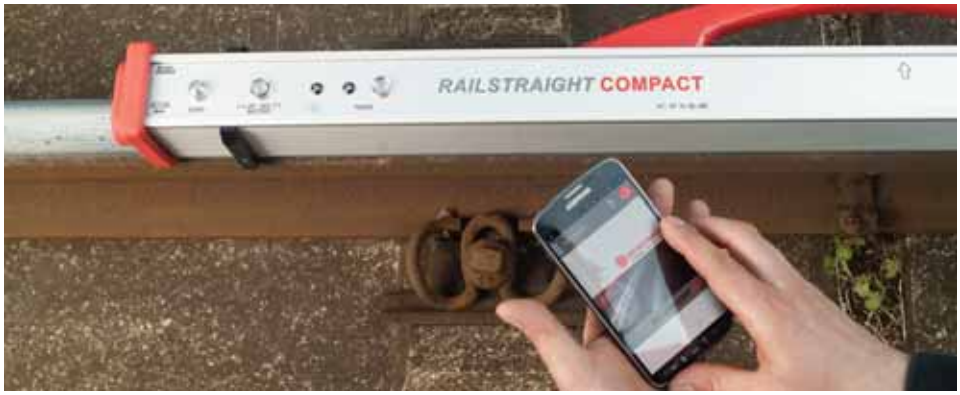
Goldschmidt Thermit Group- 120 years of continuous success

IN 1895 HANS GOLDSCHMIDT WAS GRANTED THE IMPERIAL PATENT NUMBER 96317 FOR THE ALUMINOTHERMIC PROCESS INVENTED BY HIM, WHICH IGNITED TWO DRAMATIC SUCCESS STORIES: THAT OF THERMIT® AND THE GOLDSCHMIDT THERMIT GROUP.

Did he have an idea of how important his invention would prove to be for modern railway traffic? In fact Thermit®, as it soon turned out, enabled the safe and reliable continuous welding of rails for the first time and this as we know today is an essential condition for comfortable railway travel, for high-speed trains just as with the rail transport of extremely heavy loads.

120 years after the patent application the "Goldschmidt process" still represents the state of the art for the welding of rails and is the standard process with all the major railway companies around the world. Furthermore, it continues to be further developed and improved. Thanks to its persistent innovative drive the Goldschmidt Thermit Group is today the global market leader with different Thermit® processes for the continuous welding of rails and enjoys global success with a wide range of products and services for the construction, repair, maintenance and renovation of railway tracks. This success story only became possible due to the innovative drive of Prof. Goldschmidt which remains with us today, as future thinking has a tradition at Goldschmidt.

The group offers a unique range of services for the construction, renovation, maintenance and modernization of railway tracks with a local presence, innovative technology, high quality level and extensive experience. In this way the Goldschmidt Thermit Group promotes, just like Prof. Hans Goldschmidt did, greater efficiency and safety and travel comfort on the railways.



RAILSTRAIGHTS: An upgrade of the electronic measuring devices for the inspection of longitudinal profiles

The geometrically perfect production of welded rail joints and the correct alignment of the rails are essential parameters for the durability of the welded joints. It is therefore necessary to control these factors – namely using measuring technology that is reliable. The key features of RAILSTRAIGHTS: high-precision measurement of rail straightness and surface quality, location of corrugations, Bluetooth operation from Android devices, automatic calibration at 30-second intervals, simple data transfer, and much more. Our RAILSTRAIGHTS meet DB 824.8210 and EN 14730-2 requirements and comply with the Dutch Quality Index (QI).

RAILSTRAIGHT app: Precision measurement via smartphone

The RAILSTRAIGHT app offers even greater ease of use for our clients and allows Android-based devices to control RAILSTRAIGHT precision measurement devices for the measurement of rails and rail joints in order to determine straightness and corrugation. The RAILSTRAIGHT app received an award for its participation in "Innovationspreis-IT", a competition dedicated to innovative IT products, and received the title "BEST OF 2014".

SMARTWELD SPARK: safety with Thermit® portion initial ignition

The innovative SMARTWELD SPARK ensures reliable and precise initial ignition of Thermit® portions. With initial ignition using electrodes ignition rods declared as a hazardous substance are completely eliminated for import and transport. SMARTWELD SPARK significantly increases operational safety through the use of acoustic and visual signals to indicate a successful ignition.

Efficient tools and machines for your track works

The Profile grinder GP 4000 with petrol or diesel engine allows the precise and user-friendly reprofiling of rail heads and rail joints after rail joining, recharging and repair welding on rail surfaces and edges. The GP 4000 profile grinder is a proven machine suitable for all types of track superstructure, also in tunnels.

If you need a device for quick and easy tamping of railway sleepers and efficient ballast tamping, the Ballast tamper TB 5000 P with a petrol engine is exactly what you are looking for. The TB 5000 P is a robust product which impresses with its excellent practicality and suitability for working with track ballast. You receive a tool with a specially designed tamping blade or optionally with a vibrating plate. The tool uses a quick-fit mechanism to allow a rapid change.

The newly developed Torque wrench WT 1400 P with a petrol engine enables the powerful and precise loosening and tightening of sleeper screws and nuts with the opportunity to electrically adjust the torque. The maximum torque of 1400 Nm gives the machine a large reserve of power.

Magnetic barriers: Maximum safety for working on railway tracks

Safety for the workers is always the top priority when carrying out work on the tracks. A solid barrier ensures that the tracks where trains are running are cordoned off by a safety barrier. The special feature of the barrier is that using a strong magnet it is very easy and quick to install.

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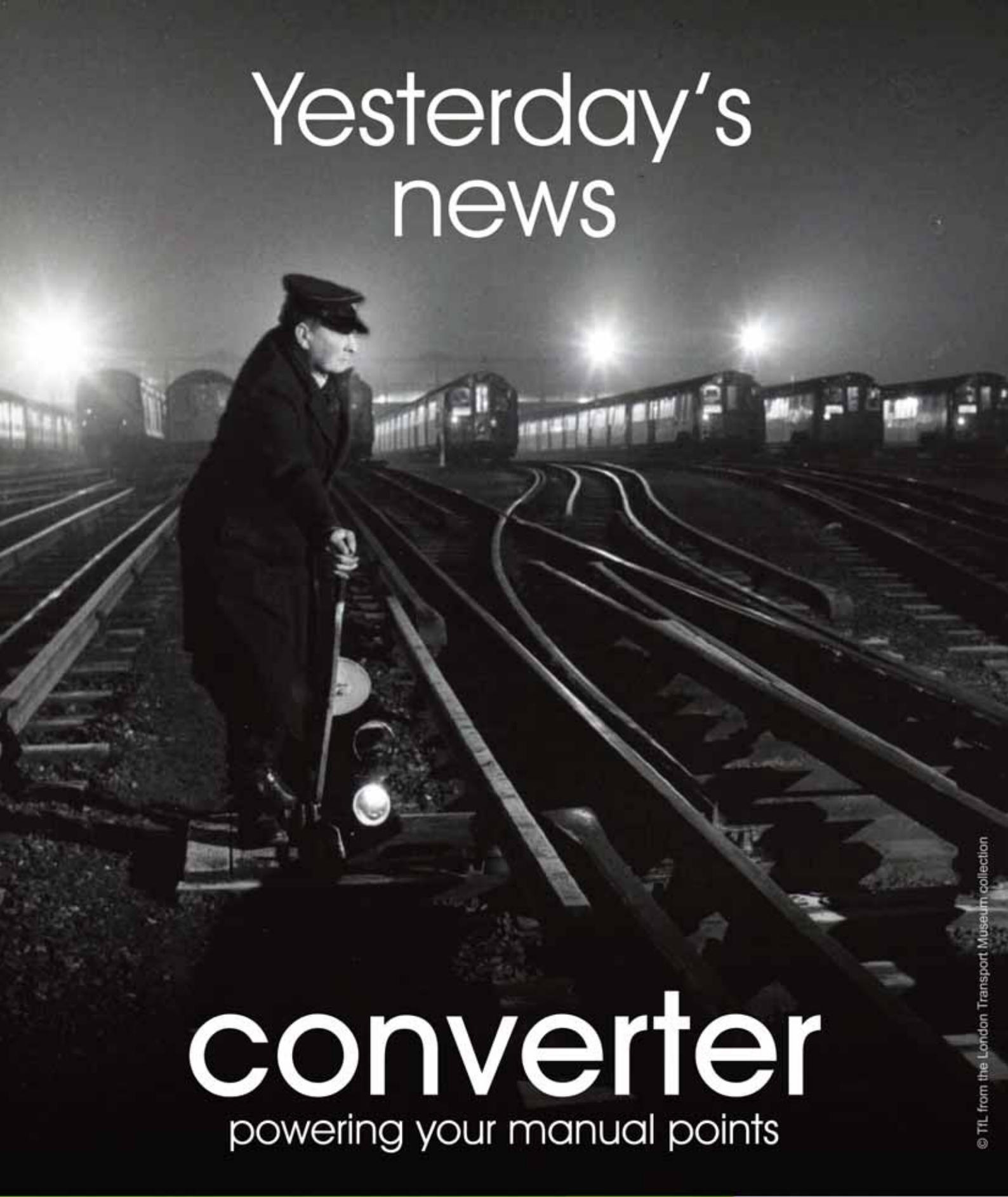

The Zonegreen Points Converter is a safe, efficient and reliable solution designed for modern train care facilities. The Converter allows the automation and remote operation of traditional manual points/switches and rail road crossings.

- Enhanced safety by reducing the potential for slips, trips and falls.
- Removes the need for excessive manual handling, reducing the risk of injury.
- Fully EMC Tested
- Expandable. Routes can be pre-set, re-configured and upgraded at any time.
- Traceability. Includes an event logging system to keep a record of the points operation.
- Low cost and simple to operate.

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Zonegreen Develops Smarter Depot System

SHEFFIELD-BASED ZONEGREEN IS LAUNCHING A NEW VERSION OF ITS FLAGSHIP RAIL DEPOT SAFETY SYSTEM, IN RESPONSE TO INCREASING INTEREST FROM CLIENTS ACROSS THE GLOBE.

Zonegreen has unveiled the second generation SMART Depot Personnel Protection System (DPPS™), following its first complete overhaul in 15 years.

Designed with export in mind, DPPS™ now uses intuitive functionality, based on a simple four button controller and a graphical interface that can be programmed in any language, accommodating characters and letters. Remote configuration and assistance also makes overseas installations simpler and more cost effective.

A wealth of extra features have been added to this latest version of DPPS™, which has been under development for six years and cost many thousands of pounds to bring to market. The system has always been the safest method of controlling train movements in depots, but it is now easier to use and more efficient to run.

DPPS™ is specified in most modern maintenance facility designs in the UK and its reputation is growing quickly, having been installed in some of the largest and most sophisticated depots in the world.

It combines powered derailers, road end control panels, train detection equipment, warning signals and personal datakeys to protect staff and infrastructure and is the most advanced, reliable and tested product of its type. In addition, DPPS™ can be interlocked with a depot's signalling system, removing the need for shunt signals and allowing more streamlined processes to be implemented.

The powered derailer used by DPPS™ is the only one approved by Network Rail at present. During its development, Zonegreen underwent a testing programme in its advanced research workshop that simulated five years' of continuous use, to ensure total reliability. This cutting edge, essential piece of equipment offers absolute safety to depot staff, preventing them from injury caused by moving trains.

The customer centric focus of the next generation DPPS™ extends to its design, which is more ergonomic than its predecessor. A tactile membrane has been added to improve durability, along with high quality electronic components that have increased its reliability and reduced power consumption, delivering further cost savings.

By continuing to utilise distributed intelligent technologies, Zonegreen has also ensured that if an error is detected on one road, normal operation can continue throughout the rest of the depot. This minimises disruption to workshop activities and represents a significant step forward from traditional project life cycle (PLC) systems.

Off the shelf software is now used to run DPPS™ , which means the system can still be configured to the unique layout of each facility, yet enables depots to benefit from years of development, mitigating the risk of errors and reducing the risk of bugs. It is also now easier for Zonegreen to the share new features and updates with existing and future clients.

The standardised nature of the software means every installation is tested rigorously and repeatedly by Zonegreen's in house experts and is verified independently to ensure it complies with safety standards, as defined in IEC61508 and EN50128/50129. The system has been approved by impartial compliance consultancy, York EMC Services and is proven to meet current electromagnetic compatibility railway guidelines, EN50121-4:2006.

By increasing the lines of programming code, the amount of wiring and circuit boards needed in each DPPS™ have been reduced significantly. Automatic set up and self testing functions have been introduced to make installation and maintenance more efficient and this has resulted in reliable advanced fault diagnostics. For example, if there is a power failure at a derailer, the operator can access feedback on errors to establish where the problem is and its likely cause. In the rare event a fault is detected, the system will always fail safe, removing any possibility of employee injury or damage to other equipment.

The datakeys used to operate DPPS™ have also undergone a facelift. Most notably, they have changed in appearance, whilst internally the electronic memory chips have been upgraded. Following feedback from depots about their standard processes, the key now allows for an increased number of authorisation levels to be granted, improving inscription and security.

An engineer's datakey can be programmed with a depot layout and used to transfer the information to the system when inserted, again minimising installation time and making expansion easier, if required. Temporary keys are also available for the first time, which are only active for a limited period, mitigating security issues arising from the distribution of duplicates, should a member of staff forget their original.

Christian Fletcher, Zonegreen's technical director, said: "We are very proud of the next generation DPPS™. In the 15 years since it was launched, we have come a long way in terms of the technology available to us and the capacity of our team. Throughout the research and development phase, we listened to the needs of clients at home and abroad and used their feedback to create a system that is now simpler to install, easier to operate and more efficient to run."

International interest

Zonegreen's longevity and reputation as a global leader in depot safety systems is credited largely to the enduring success of DPPS™ and a milestone moment in the company's history was marked recently as its 1,000th order of depot protection equipment was delivered to Siemens' Ardwick depot in Manchester.

Whilst the majority of these 1,000 orders have been made in the UK, DPPS™ is already used across three continents – Europe, Australia and Asia – and export activity continues to increase.

In response to the growing popularity of its products, Zonegreen has expanded its in house capability, with the addition of two new engineers and its first dedicated sales and marketing manager, who is tasked with developing new business across the globe.

This trio of appointments joins a highly qualified team, who are Technis certified for functional safety and reliability and recognised by Lloyd's Register Yellow Book, which is acknowledged in the UK as the definitive guide to engineering safety management.

The firm also has experts in electrical radiated emissions who are certified for electromagnetic compatibility on railways and meet the requirements of Personal Track Safety, the Institute of Railway Signalling Engineers and the internationally renowned Railway

Industry Supplier Qualification Scheme.

This investment in personnel is matched by a determination to grow the firm's export business. Having identified an increasing interest in its products overseas, Zonegreen has spent the last five years focusing on building a team of international representatives who can introduce its technology to depot operators in their respective territories.

Currently, the firm is represented in the Middle East by Masar, based in Saudi Arabia, Mercury International in India, AWI Maskin AB who cover the Nordic region and Andrew Engineering in Australia. As a direct result of these partnerships, DPPS™ is already used in the Dubai Metro depots, Jebel Ali and Rashidiya, a second generation system is being installed in the Wulkuraka depot in Ipswich, Australia, where end users believe there is a genuine need for the technology and enquiries are being received from all other areas.

Planning for the future

Zonegreen's engineers are constantly looking for new ways to develop its progressive rail technology to improve the protection afforded to people and infrastructure in depots, without compromising maintenance operations.

The firm has brought a range of products to market that are compatible with DPPS™ and increase efficiency by automating time consuming or expensive procedures. These include Operator Planning Suite (OPS), a web-based application designed to replace the traditional whiteboard, providing cost effective maintenance planning.

OPS consists of two main screens – an easy to visualise graphic of the depot on which users can position trains and create or assign tasks, plus a tabular layout to plan scheduled arrivals and departures. The data is then transmitted to monitors positioned in strategic locations, providing accurate updates about any vehicle.

This multi user system enables seamless management of maintenance activity and collation of information from which reports can be generated, reducing manual tasks and paperwork.

In 2013, OPS was implemented at Alstom's facility near Nola, Italy to manage the maintenance of high speed trains on the Turin-Salerno and Rome-Venice lines. The 140,000 square-metre depot has 12,000 metres of track and employs 200 people. As changes occur, they are recorded automatically and the updates transmitted immediately, reducing the likelihood of communication failures.

Francesco Fidanza, Alstom's fleet operations manager at Nola, said: "Several plasma screens around the depot display the OPS system so everyone can visualise train locations and update information accurately. It is important for us to share and disseminate maintenance data to different locations in a convenient way and the Zonegreen system enables users with various levels of access to log in from anywhere."

Striving for safety

The latest figures from the Office of Rail Regulation show that last year, total workforce harm increased by 10% and infrastructure worker harm increased by 22%, compared to 2013. Although leadership and policy improvements have been made within the rail industry, they are yet to filter down to ground level and management of occupational health remains an issue.

These statistics were echoed by Mark Carne, Network Rail chief executive, who commented recently that rail workers were put at risk by out of date work practices that have failed to keep pace with other industries. He told an audience of rail figures that whilst UK passenger safety is the best in Europe, personnel injuries were around ten times the rate of equivalent sectors.

Gemma Houghton, Zonegreen's sales and marketing manager, concluded: "We believe the Office of Rail Regulation statistics are unacceptable and that maintenance facilities should be doing all they can to protect workers. There is no reason why we should be so far behind other industries when the technology necessary to keep depot personnel safe is readily available.

"These are exciting times for us. Not only are we gaining global brand recognition, but we are also launching new, pioneering products that have the potential to vastly improve working conditions in depots of all ages, shapes and sizes.

"We are dedicated to developing cutting edge systems that respond to the needs of rail operators and have the flexibility to adapt to this rapidly changing environment. We have ambition, drive and vision, plus ongoing dialogue with international partners and existing clients who are helping us shape the future of depot safety. We believe our latest product range – spearheaded by the all new DPPS™ – has the potential to transform the industry's occupational health record and we look forward to spreading the word about our systems among potential clients the world over."

Zonegreen uses intelligent technologies to protect rail personnel from dangerous environments. By combining industry experience and consistently high standards, it enjoys successful relationships with customers who value products that are innovative, yet built to last. For further information about the firm's suite of depot safety systems, telephone (0114) 230 0822, email info@zonegreen.co.uk or visit **www.zonegreen.co.uk**

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Frauscher Sensor Technology: Highly available products based on research and experience

FRAUSCHER SENSOR TECHNOLOGY IS A LEADING SUPPLIER OF AXLE COUNTERS, WHEEL DETECTION SYSTEMS AND WHEEL SENSORS.

Frauscher Sensor Technology is a leading supplier of Axle Counters, Wheel Detection Systems and Wheel Sensors. The main application areas of these products are highly available safety relevant railway signalling and train control systems. Frauscher components can be found in use in more than 70 countries all over the world.

Enabling all products to operate in accordance with related approval regulations assumes ongoing innovation processes. All parts of the Frauscher portfolio are developed in-house in Austria and are continuously optimised on the basis of experience gained internationally and active research.

To support research and development as an essential part of its growth strategy, in 2015 the Frauscher Group is investing 8 million euros into the extension of the Wheel Sensor production and the construction of a new building at their headquarters in St. Marienkirchen/Upper Austria: The Frauscher Innovation Centre. This will be the company's hub, where information from global markets is going to be collected, evaluated and fed into the structured development process.

Michael Thiel, CEO of Frauscher Sensor Technology, stresses on the great importance of research and development in the growth strategy of the company: "Long-term success is based on unique selling propositions and innovation of the product portfolio, which are primarily dependent on intense, efficient and target-oriented research and development. To achieve this on the highest level, new state-of-the-art laboratories and test facilities will be set up in the new building. By investing into R&D we reaffirm our independence which will allow us to continue setting up research and development alliances with operators and system integrators at any time. The extension of the production will also enable us to reliably and efficiently realise bigger projects", he summarises.

FAdC R2: Research-based revolution in train detection

The importance of ongoing improvement was demonstrated once again, when Frauscher presented the next generation of its Axle Counter "Frauscher Advanced Counter", the FAdC R2, at last year's InnoTrans in Berlin. Ever since it was unveiled in 2012, the first edition of the innovative Axle Counter has been arousing tremendous interest among specialists in the field. Those taking part in

productive training sessions and configuration workshops recognized just how flexible and adaptable the system is. Many ideas for applications were generated and functionalities were developed which gave reason to bring the new release to market. While leading signaling experts participated in the development process they talk about "the revolution in train detection".

Due to its functional modularity and simple scalability, combined with the optional Ethernet interface, the FAdC R2 system now offers maximum flexibility when it comes to configuring a very wide range of applications.

Software-based interface for maximum flexibility

The possibilities range from small central systems with voltage-free relay contacts to complex systems located in decentralised clusters along the track and connected to one another via Ethernet. As the complexity of the systems increases, space, energy and investment cost savings compared with conventional axle counting systems also rise significantly.

When FAdC R2 systems are integrated into high-performance electronic interlockings, the benefits of this modern Axle Counter become clear: minimum equipment requirements, vital future-proof communication and maximum flexibility in terms of configuration. The connection can be established either by developing a customer-specific interface or via the Frauscher protocol (FSE). On request, an individual software interface can also be developed in accordance with a customer's specification. In any event, the higher-ranking application provides all the functional and diagnostic information from the system for further processing.

Structure and functional principle

All boards of the FAdC R2 system conform to a proven format and are housed in 19-inch board racks. Evaluation boards AEB communicate with one another by means of an internal bus. The communication board COM that is also connected to the internal bus provides an Ethernet interface offering a fail-safe clear/occupied indication for further processing. Alternatively, the clear/occupied indication can be output through the extension boards IO-EXB connected to the evaluation boards AEB.

In addition, the communication board COM offers the option of connecting the Frauscher Diagnostic System FDS to the Frauscher Advanced Counter FAdC R2. In this way, the diagnostic data can be logged, evaluated and displayed in an internet browser.

Tried-and-tested wheel detection components are a vital prerequisite for safe and highly-reliable train detection. As with all Frauscher Axle Counters, the Wheel Sensor families RSR180/181 and RSR122/123 once again form the basis for train detection that performs at the highest level.

New benefits based on innovative functions

The modularity and scaleability and the wide range of functions offered by the FAdC R2 provide a range of benefits, particularly when it comes to carrying out the scheduling and project planning stages for complex train detection systems. This means that a special solution can be configured for all conceivable customer requirements.

A special focus in developing the FAdC R2 was set on the system's availability – a topic that challenges researchers in the field of signalling with the requirement of providing cost-effective solutions for safety-relevant systems. As an alternative to an expensive fully-redundant design, intelligent functions to increase the fault tolerance of signalling systems enable interesting options. With the FAdC R2 Frauscher provides two of such innovative functions: Counting Head Control and Supervisor Track Sections.

These functions are implemented as standard in the Axle Counter and may be taken into consideration as an option in configuration. Where necessary, both the COM boards – for redundant communication – and the PSC boards –

for protecting the power supply – may be duplicated.

By raising the fault tolerance inherent to the system, the system is able to activate intelligent functions in order to maintain operation without noticeable limitations in the event of a fault – particularly one caused by external influences. In many cases, this enables the required level of availability to be achieved. Two different approaches are taken to achieve this.

Suppression of faults

The Counting Head Control principle, or CHC for short, is used for fundamental avoidance of errors caused by unavoidable influences. When used correctly, the patented functionality satisfies the requirements in line with SIL 4.

Operating mode:

If the adjacent track sections are clear, the counting head is switched to a stand-by mode. In this idle state, a freely configurable number of undesirable instances of damping can be suppressed. This means that no fault or occupied indication is generated by a short-term influence; no reset is required. Possible triggers for such interference include:

- **Damping by tools**
- **People**
- **Trolleys**
- **And other similar triggers**

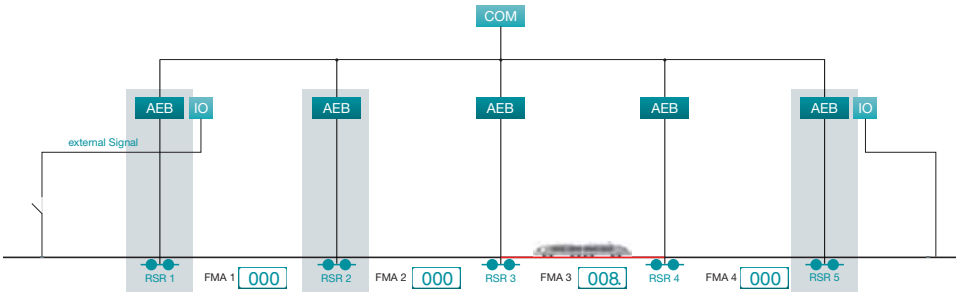
Automated fault correction process
The intelligent Supervisor Track Section process, or STS for short, corrects unavoidable, external interference in a fully automated manner. By observing the general reset conditions, it is thus possible to further optimise availability without any negative effect on safety.

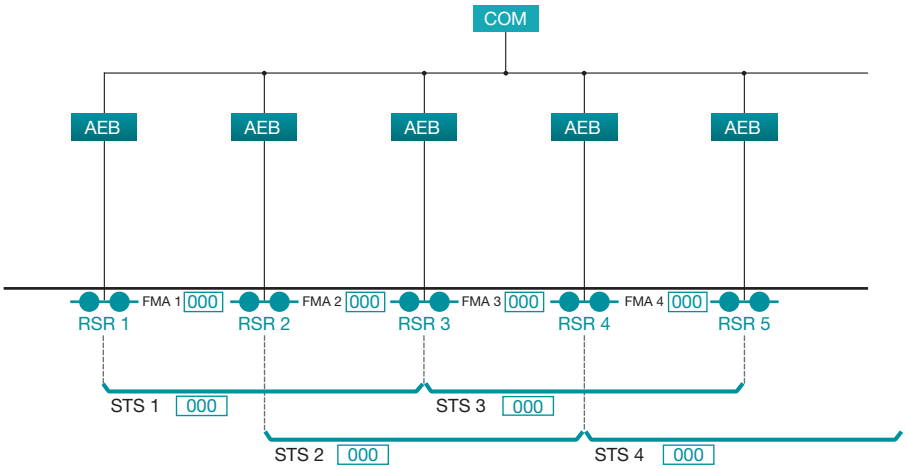
Operating mode

Every two track sections are overlaid by a supervisor section. Consequently, it is possible for a faulty track section to be reset automatically, without manual intervention, if the corresponding supervisor section is clear. Similarly, a faulty supervisor section is reset if the two corresponding track sections are clear.

FAdC R2: Future-oriented Axle Counter

With the development of the FAdC R2, a milestone has been set regarding modularity, flexible modern interfaces and comprehensive yet optimal configurability. The easy scalability and modern configuration tools allow not only simple and efficient adaptation to specific customer requirements but are also a precondition for meeting future challenges. As a result of permanent improvement based on customer feedback and experience the FAdC R2 sets new standards.





Socomec Awarded Pads Approval for Masterys Rail IP+ UPS

THE NETWORK RAIL PRODUCT ACCEPTANCE PROCESS PROVIDES ASSURANCE THAT ALL PRODUCTS ACCEPTED FOR USE ON OR ABOUT THE RAIL INFRASTRUCTURE ARE SAFE AND FIT FOR PURPOSE.

As part of a continuous programme to improve safety and performance, the rigorous PADs product approval process enabled Socomec to demonstrate product and engineering excellence, as well as its capabilities in terms of design and specification compliance.

The long term site test was integral to the approval process; Socomec and Network Rail engineers worked closely together to ensure that the system integration was completed as planned

Network Rail engineers also attended Socomec's product training course at Socomec's UK facility.

Nick Golder, mass transportation sales manager for Socomec comments: "It is a privilege to have been awarded the PADs approval for our Masterys IP+ RAIL. Socomec continues to make significant investment in research and development, and is continually working on innovative products designed to meet the unique challenges faced by the mass transportation sectors in particular rail infrastructure"

A Comprehensive Range

Whether planning a new installation or upgrading an existing facility, Socomec 's low voltage electrical solutions for rail or specific system architectures guarantee network safety and robustness, even in the most challenging operating environments.

High Performance Critical Power

Socomec's IP+ Rail range provides the very latest UPS technology for the mass transportation sector. Housed in a compact, robust, steel-framed enclosure, the system has IP31 or IP52 ingress protection as well as anti-corrosion tropicalised circuit boards: this system will operate where conductive dust or dripping water may be present.

The electromagnetic disturbance immunity level is double that required by European EMC standards and has been independently tested and certified to pass EN 50121-4 and 5 Furthermore, low smoke, zero halogen cables are fitted as standard.

With frontal access for input / output cabling, spares replacement and preventative maintenance, Socomec's Masterys IP+ Rail can be installed in enclosures or containers where space is at a premium. The units can be paralleled up to 6 units for high availability, scalable power.

Emergency Lighting & Security UPS - Rail CPSS (EN 50171)

The Rail CPSS (Centralized Power Supply Systems) EMergency range is designed and manufactured to protect passengers and staff in the event of a major power failure or incident. The system complies

with European safety and fire regulations and is designed and built to be in compliance with EN 50171.

CPSS provide emergency lighting in the event of a mains failure. The CPSS can also be used to support other emergency systems, such as:

Socomec's also provides comprehensive range of load break switches, Fuserbloc, protects people and key assets by preventing overload and short circuit.

Advanced Switching and Energy Management Solutions

Socomec's Sircover and AtyS Automatic and Static Transfer Switches have been engineered to enhance power availability and simplify the electrical architecture, ensuring standby and alternate power availability.

With ongoing investment in development, Socomec has been recognised by Transport For London as part of a wider project with partner, AF Switchgear. The Socomec AtyS has been approved by LUL as an integral part of a complete system being manufactured by AF Switchgear.

Socomec power solutions have also been deployed as part of the upgrade to Victoria Station in order to guarantee the effective management of energy consumption and associated costs. Socomec's compact Diris Digiware system delivers the most advanced energy monitoring, measuring and management system and has been approved for use by London Underground for the Victoria Station project.

Testing Platform

As a champion of innovation in the rail sector, Socomec has an electrical testing platform at its European factory – recognised and accredited by the world's major electrical test certification bodies. Customer Witness Tests and Factory Acceptance Tests (FAT) are carried out to industry standards on factory test platform, with a full witness test report supplied with the equipment and a tour of the production facility to complete the programme.

The Socomec FAT can typically be concluded within one day but can be tailored to suit a customer's specific requirements. Additional testing can if necessary include discrimination studies, short circuits and specific equipment cables.

Engineering Support

With unprecedented numbers choosing to travel by rail, the ongoing performance of installed systems is vital. Socomec's dedicated engineering team will ensure business continuity, optimising efficiency and guaranteeing the safe performance of the networks electrical infra-structure.

Golder continues, "We understand the importance of maintaining vital equipment whilst also being mindful of our customer's operating costs. We can create a completely customised Commissioning, Inspection and Maintenance (CIM) package for any system architecture. Our specialist engineering team has the necessary trackside training and accreditations to install and support equipment, throughout its lifecycle."

From design and build through to installation and commissioning – as well as ongoing maintenance – Socomec has a strong track record in providing robust, efficient and complex integrated power solutions for the exacting requirements of the rail sector.

Please contact Nick Golder on
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or **01285 86 33 00**
info.uk.ups@socomec.com
www.socomec.co.uk

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NetworkRail
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efficient... compact... tough... reliable.

Socomec IP+ Rail - the new standard in UPS critical power equipment.

Socomec's IP+ Rail is the very latest in UPS technology for the mass transportation sector and has been engineered specifically to provide optimum energy efficiency for high performance critical power applications - in the most challenging operating environments.

Housed in a compact, robust, steel-framed enclosure, the system has IP31 or IP52 ingress protection as well as anti-corrosion tropicalised circuit boards and an electromagnetic disturbance immunity level, double that required by European standards. Low Zero Halogen Cables as standard

Socomec's specialist engineering team has the necessary trackside training and accreditations to install and support your equipment throughout its lifecycle.

To find out how you can benefit from Socomec's expertise and comprehensive range of critical power solutions contact us at info.ups.uk@socomec.com or speak to a member of our team on 01285 863300.


Fuserbloc Fuse Combination Switches from 20 to 1250A


Countis / Diris Metering, Monitoring & Power Quality meters


Static Transfer Switches From 32 to 4000A


ATyS Automatic Transfer & Bypass switches from 40 to 3200A


Overhead Line Infrastructure (OLI) UPS - IP+ Rail (OLI)

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Supplier ID 25176

TE Connectivity Rail Keeping the mark on track

TE CONNECTIVITY HAS USED ITS KNOWLEDGE OF FLAMMABILITY AND DIESEL RESISTANCE STANDARDS AS WELL AS MATERIALS SCIENCE TO DEVELOP A HEAT SHRINK SLEEVE CABLE IDENTIFICATION MARKER THAT IS RESISTANT TO DIESEL AND GIVES LFH PERFORMANCE

As a technology leader, TE Connectivity designs and manufactures the electronic connectors, components and systems inside products that are changing the world, making them smarter, safer, greener and better connected. In the world of rail, TE Connectivity delivers the broadest portfolio and systems expertise required to connect power and data safely and reliably, from the high-voltage supply and on throughout the entire train.
In this white paper, Lee Smith, Materials Engineer, explains how TE Connectivity's ZHD-SCE identification marker meets the demands of rail applications where low toxicity and diesel resistance are paramount.

Contents

The role of cable identification markers
Cable idents perform a vital role throughout the life of rolling stock. As covered in the companion white paper 'A single cable ident that delivers low fire hazard performance and diesel resistance', their only role is to remain in place and legible throughout their life – a phrase that is deceptively simple.
The operational life of a locomotive or car lasts 20 years or more. With constant pressure to ensure high reliability and availability of assets during their lifetime, rolling stock will undergo many maintenance inspections, proactive and reactive maintenance, refurbishments and refits of key instrumentation and key equipment.

It is during these inspections that the operator's up-front investment in cable identification will pay dividends. With cable idents in place and legible, maintenance engineers will be able to find any wire or cable with a minimum of delay, meaning that maintenance work will be carried out quickly and efficiently. Reducing inspection time by just a few seconds per cable adds up to significant time savings during maintenance and inspection, enabling cost savings as well as the prompt return of rolling stock to service.

Safety and performance standards
While the idents have the role of

remaining in place and legible they must also meet stringent safety standards, particularly on passenger services. A drive in the industry is to continually improve the use of materials.

All products and materials used must both meet safety standards and minimise the risk to passengers in the event of fire. Many years ago, fire retardancy was the focus and products contained halogens to prevent the formation of fire. However, these products increased the level of risk during fire situations because halogens form toxic fumes during fires. Today's Low Fire Hazard (LFH) products have been developed to exhibit low smoke and low toxicity behaviour in the case of fire. Today's safety standards and codes of practice are more stringent than ever in terms of material selection and are directly linked to passenger safety in the event of fire.

Until recently, some rail operators in Europe had their own controlled substance lists. These developed from the introduction of European REACH legislation (EC 1907/2006) in 2007, which covers the registration, evaluation, authorisation and restriction of chemicals. In 2011, these were superseded when UNIFE, the Association of the European Rail Industry, launched a comprehensive list of the prohibited and declarable chemicals used in the railway industry. The list defines and categorises materials and substances that may be prohibited or controlled within the European rail industry.

The larger European rail operators now demand that UNIFE's substance list is embedded in their procurement processes so that they can be certain that rolling stock is safe and secure. This means that as a product used on board rolling stock, cable ident markers must comply with UNIFE's legislation.

The evolution of cable identification markers

Two basic types of cable ident product have emerged to perform in two very different passenger train environments. On one hand, diesel-electro powered locomotives require ident products that are resistant to the fuels and fluids that might be present, whereas on the other hand the diesel-free environment of electric services require LFH products that ensure low smoke and low toxicity. These are particularly important for underground services, where passenger escape times will be longer than above ground.

TE Connectivity's ident products evolved to meet these very different sets of criteria. D-SCE was designed for applications where superior diesel and fluid resistance is needed and HX-SCE was created for environments where the risks to people and equipment from fire are high and where LFH properties are prized. The technical specifications for the interoperability of railway infrastructure are fostering the development of a single railway system in Europe. National standards are being replaced by European norms, and train builders are looking for smarter materials that can span this development.

As operators and train builders standards aim for ever-higher safety standards, they have been calling for a product that meets the requirements for both diesel resistance and LFH specifications and standards.

In response, TE Connectivity has developed ZHD-SCE, a heat-shrink sleeve that bridges the gap between diesel and LFH standards. The systematic approach behind its development are covered in detail in the companion white paper 'A single cable ident that delivers low fire hazard performance and diesel resistance.'

Real-life environment and the effects of ageing

Beyond the specs and standards, an understanding of the application is vital. A component's operating environment plays a major role in determining whether its longevity and conditions are influenced by many factors. These include its geographical location and placement on the vehicle or equipment.

An ident may regularly come into contact with extremes of temperature, humidity, moisture or radiation. A typical railcar can have several microclimates and so when combined the impact of these factors can multiply.

For example, the relatively clean propulsion and control systems on board electrified cars may only experience changes in temperature and humidity, whereas some idents may be exposed to oil spray from transmission systems and others will experience continued attack from dirt and grime. Further chemical attack may come from detergents during repeated chassis cleaning sessions or from proprietary cleaning fluid during inspection of terminals.

Idents are manufactured from heat shrink materials that are based on a matrix of cross-linked polymers tailored to meet a particular set of standards with specific functional additives.

When new, an ident will work as it is intended, and on a molecular level, the polymer matrix and filler compounds work harmoniously. However, as the component ages, it will experience the wear and tear of working life and a cocktail of chemical compounds that will build up over its life. Further complications may result from cyclic temperature changes causing the marker and / or equipment to expand and contract.

Achieving flammability and diesel resistance performance

When developing ZHD-SCE, TE Connectivity was highly aware of the flammability performance demanded by industry standards and their impact on the composition and structure of the heat-shrink product.

Filler loadings in a zero halogen product typically need to be around double the loadings of a halogenated product. In some cases, the loading can be as high as 60 parts per hundred resin (PPHR).
This level of filler typically has a negative impact on the mechanical and chemical performance of the ident. In developing ZHD-SCE, the challenge for TE Connectivity was to maintain good performance in both diesel and LFH environments.

Polymer performance

On a molecular level, basic chemical interactions and reactions from substances in the operating environment can represent challenges to cross linked polymer products.

As more zero halogen filler is added to the polymer matrix to ensure the product meets LFH standards, the structure of the material changes. The polymer matrix must be 'stretched' further to encapsulate the fillers and in turn, the fillers become more mobile within the matrix.

This leaves the matrix vulnerable to damage from a number of sources:

- **Loss of valuable additive, reducing both desired effect of ingredient and longevity of the component.**
- **Chemical attack on the polymer chain itself can reduce physical properties.**
- **Reactions with functional groups in or on the chain and depolymerisation.**
- **Softening and swelling of the polymer due to physical changes such as absorption of solvents.**
- **Stress cracking as a result of interaction with agents such as detergents, lubricants, oils and other substances.**

These can lead to symptoms such as cracking, softening, swelling, and dissolution of the ident itself or loss of the printed mark, leading to failure of the ident as a system.

Selecting the right additives

Used on their own, polymers don't tend to provide consistently good properties. Exposure to radiation, heat, light, moisture and precipitation takes their toll over time. Additive fillers reinforce and protect the polymer matrix to ensure long-term stability and functionality, such as flame retardancy. Each additive lends strengths and weaknesses to the end product and must be added in precise quantities through a controlled process to optimise performance.

Some must remain locked into the polymer matrix to protect the polymer or activate in the event of fire. Others are needed to create stability or a surface barrier to protect against environmental conditions such as UV or microbial activity.

Other types of filler must be mobile within the polymer matrix to replenish the layer that protects against oxidation from heat – with a careful balance to avoid erosion of additive and reduction in performance. Compounds need to be engineered to perform as well in the future as they do when they are first installed.

As compounds built up from carbon and hydrogen, non-halogenated polymers tend to be extremely combustible. The companion white paper 'A single cable ident…' explains the importance of flame retardant systems.

Flame retardants inhibit combustion either by cooling, formation or a char barrier, fuel dilution or by chemical reaction.

TE Connectivity's extensive knowledge of cross linked materials and additives meant that it was able to develop ZHD-SCE as a system that can withstand long-term exposure to railway fluids and retain its thermally printed identification mark as well as minimise toxic smoke in the event of fire.

Manufacturing process

Meeting diesel and LFH standards for cable ident marker products is not limited to the chemical and LFH performance and TE Connectivity also had to consider the mechanical and chemical composition and its processing.

Amending the size and surface area of filler particles and selection of coupling agents are both aspects that influence mechanical properties of a heat shrink product.

At the molecular level, it's important to avoid having large particles. Not only do they reduce the surface contact area between filler and polymer but they act as sites where stresses can build up, increasing the likelihood of the material failing.

Chemical or mechanical bonding between the filler and the polymer is equally important. Many fillers have active surfaces that bond easily with the polymer, whereas others require a coupling agent that creates crosslinks between the polymer and filler. Furthermore, processing of the polymer was another significant part of the development. During the manufacture of polymers, aspects of processing such as temperatures, flow rates, mixing and cooling can all impact the structure of the material and therefore the consistency of the end product and its performance.

Rigorous testing

The true challenge in developing ZHD-SCE was in selecting and testing the fillers and bonding agents, rigorously testing them to gain a deep understanding of their properties (alone, in combination and through different manufacturing processes).

Only after evaluating the many combinations of possible materials against the standards of the rail industry was TE Connectivity confident that it could offer a product that bridges the gap between diesel resistance and LFH standards.

About the author

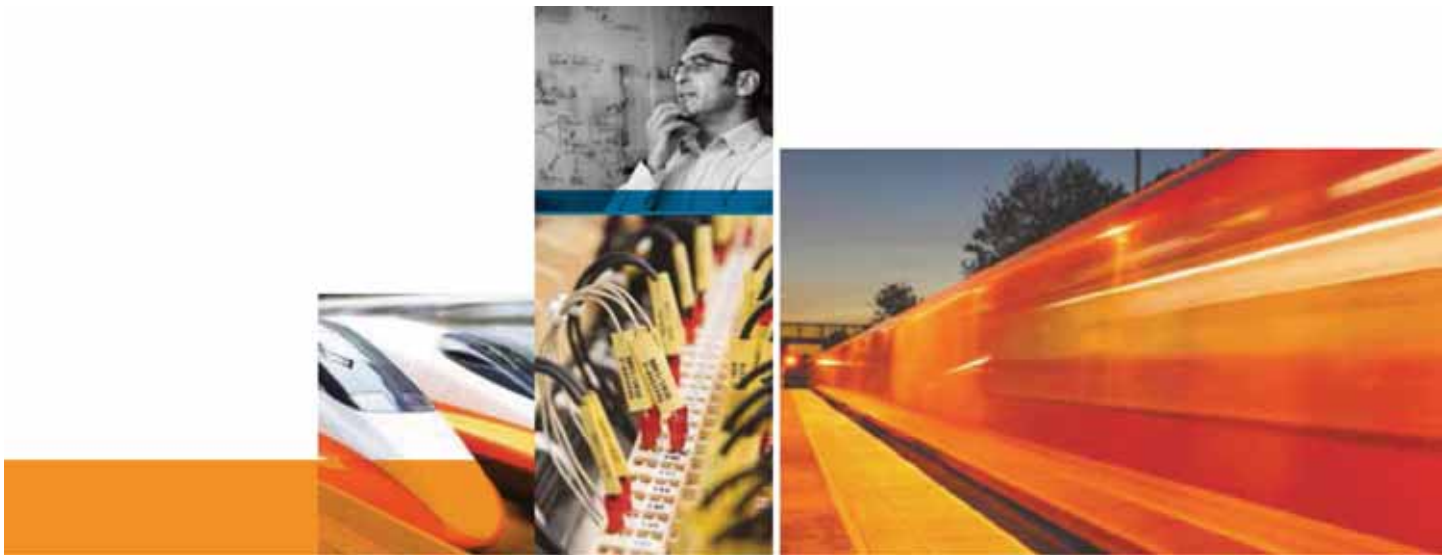
Materials Engineer Lee Smith is responsible for environmental compliance of identification and sleeve products at TE Connectivity and has extensive knowledge of standards and testing. He is TE Connectivity's technical lead in products that fall under the European norm EN44545-2. He started his career during the 1980's as an apprentice developing heat shrink identification materials and has implemented major improvements in printing technology for identification markers for the Euroject EJ 200 amongst other projects.

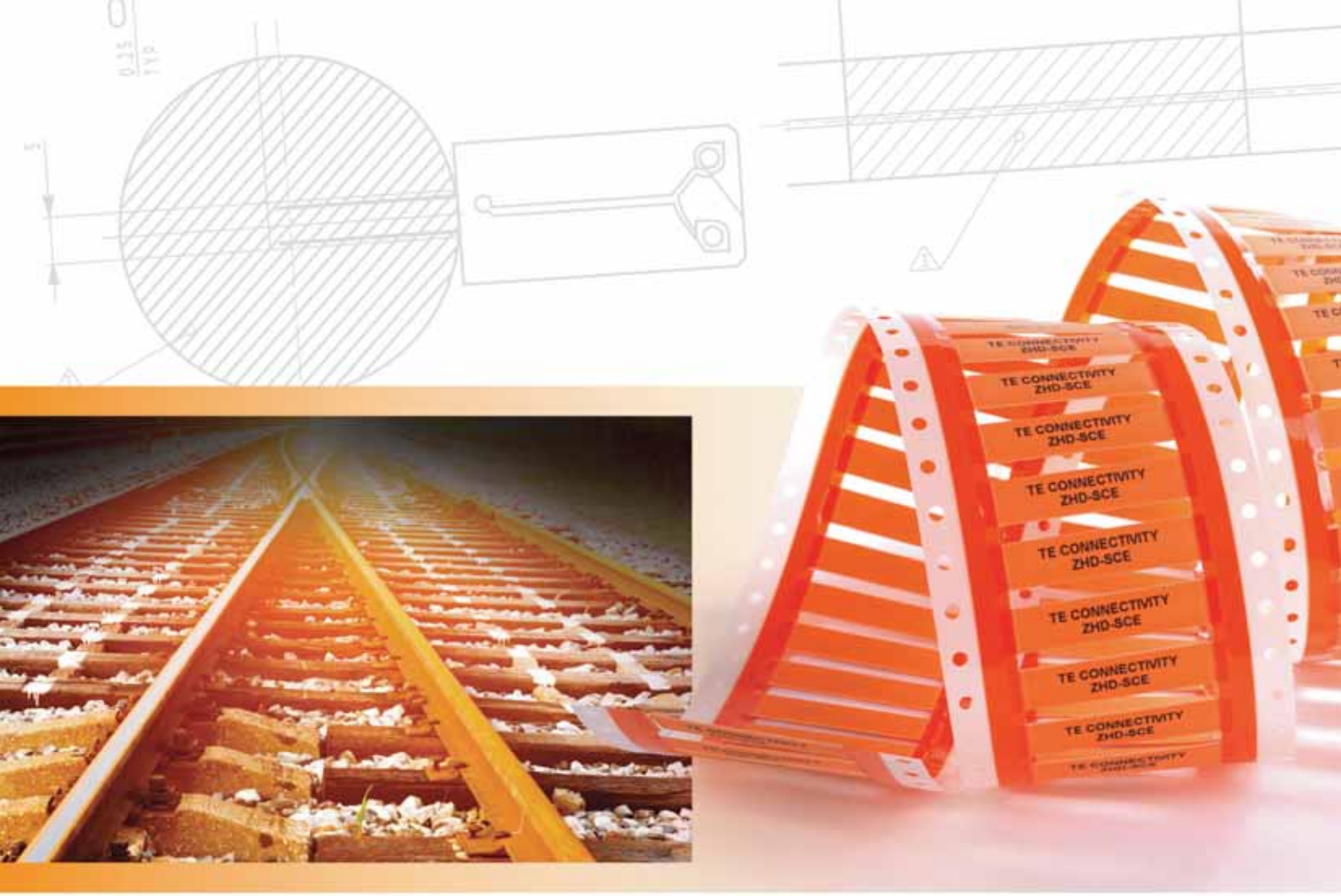
History of TE Connectivity

TE Connectivity is a technology leader that designs and manufactures the electronic connectors, components and systems inside the products that are changing the world – making them smarter, safer, greener and more connected.

It is a leading supplier of high-voltage components to the rail industry that deliver proven longevity and performance in diverse and harsh environments. TE Connectivity's unique knowledge of materials science positions it at the forefront in developing the insulation materials that perform the essential task of insulating line power from the train structure.

Its legacy dates back to the 1950s when Raychem, which has since joined the TE Connectivity group, first used the technique of radiation chemistry to develop products. Since then, the firm has undergone a number of changes of name and structure. These include the name of Tyco Electronics, which the firm bore until March 2011 when it took the name TE Connectivity to reflect its role as a component and communications manufacturer.





TWO INDUSTRY CHALLENGES. ONE INTELLIGENTLY COMBINED SOLUTION

ZHD is the ONLY Low Fire Hazard, Diesel Resistant heat shrink cable identification solution in the market today. It's a unique product, created in response to a clearly identified customer need - something which no other provider has been able to deliver to the Rail industry. Until now, heat shrink cable identification systems were either Low Fire Hazard or Diesel Resistant, but never both. ZHD changes all that. With this combined technology, train manufacturers can standardise and simplify cable identification, and still remain compliant with the latest industry regulations, including the EN 45545-2 standard for fire safety in rail vehicles. We call it the Next Generation of Cable Identification Solutions.

Find out more at www.te.com/zhd

EVERY CONNECTION COUNTS

TE connectivity

The NAUTIZ X1 Ultra-Rugged Handheld Now with Windows Embedded Handheld

HANDHELD GROUP, A LEADING MANUFACTURER OF RUGGED MOBILE COMPUTERS, TABLETS AND HANDHELDS, IS NOW OFFERING ITS ULTRA-RUGGED HANDHELD AND ENTERPRISE SMARTPHONE NAUTIZ X1 WITH WINDOWS EMBEDDED HANDHELD 6.5, MICROSOFT'S OPERATING SYSTEM OPTIMIZED FOR USE IN ENTERPRISE HANDHELDDEVICES.

The Nautiz X1 is the perfect blend of an ultra-rugged handheld device and an enterprise smartphone. It is slim and lightweight yet incredibly tough with an IP67 ingress protection rating which means that it is fully dustproof and waterproof. It has been tested according to MIL-STD-810G military test standards to endure humidity, vibration, shock and extreme high and low temperatures.

Since its launch, the Nautiz X1 has run the Android 4.0 operating system. Handheld now also offers the choice of Windows Embedded Handheld 6.5 operating system optimized for use in enterprise handheld devices. Built on the Windows Mobile 6.5 platform, Windows Embedded Handheld 6.5 enables OEMs and enterprises to achieve application portability between Windows Mobile 6.5 and Windows Embedded Handheld devices, running mobile line-of-business applications on a platform that ensures that data is captured securely and efficiently.

"With Windows Embedded Handheld 6.5, the Nautiz X1 will now have broader appeal. This OS is the operating system of choice for many enterprise users of ultra-rugged computers," said Jerker Hellström, CEO of HandheldGroup. "We're now also shipping all units with a spare extended battery as part of the standard package, for an even better field experience."

The Nautiz X1 weighs 180 grams (6.3 ounces) and is sized 125 mm (4.9") x 65 mm (2.6") x 15 mm (0.6"). It has a 4-inch special sunlight-readable display with capacitive touchscreen and ultra-durable Gorilla Glass. It runs on a powerful 1 GHz dual-core processor and has 1 GB of RAM. It features BT, Wi-Fi, compass, professional u-blox GPS, and 5-megapixel camera.

The Nautiz X1 with Windows Embedded Handheld 6.5 is being shown at Handheld expos and trade shows worldwide. See the full schedule of upcoming events here.

For information on how to order the Nautiz X1, please contact Handheld, your IT supplier or your local GSM service provider.

Designing electronics products for the railway industry - trade-offs and compromises

BY DUNSTAN POWER, DIRECTOR OF EMBEDDED ELECTRONICS DESIGN CONSULTANCY BYTESNAP DESIGN (STAND V90, RAILTEX)

With investment in the UK rail sector at the highest level for over a century, and a record as one of the safest rail networks in Europe to maintain, the UK's rail companies are looking for innovative ways to collect and transmit data about every section of line to ensure highest levels of safety and security.
As this new golden age of rail dawns, rail companies will be adopting new technologies such as 3D-video measuring systems, virtual train simulators and low-power wireless monitoring. These technologies are underpinned by sophisticated electronics.

Electronics is an art. Give the same specification to ten engineers and you will get ten, possibly wildly different designs, all of which may meet the specification perfectly. However one of those designs will win in terms of unit cost and another on development cost.

Here we explore some of the key trade-offs made during product design for the rail industry. With reference to both software and electronic design aspects, we focus primarily on the commercial and time implications of these decisions.
A fine balancing act - time, specification and unit price.

When deciding on trade-offs, the first priority is to identify what is being traded (Figure 1, overleaf).

A design engineer needs to balance the three factors of technical specification, development cost and unit price. To understand where the bias should be, the following factors are considered:

- **Time to market**
- **Available development budget**
- **Target market sale price**
- **Anticipated annual sales volumes**
- **Value in exceeding or modifying the specification**

Unfortunately many of these are not hard values and, in particular, the anticipated volume can be a wild guess.
Many factors can skew decisions, such as high annual volume, shown in Figure 2.

The focus here is on unit cost. But what if the time to market pressures are high? As shown in Figure 3, the choice may be to use a greater proportion of off-the-shelf, modular hardware, at the expense of unit price and technical spec.

Give it to an engineer without guidance and you may end up with this in Figure 4. something that is over-engineered and expensive but will still be around and working long into the next century.

For products within the rail industry, with demands for product longevity and robustness, it is this trade-off that is typically reached. This does result in extended development costs and time to market and also in high unit costs. For the company developing the product, it is important that there is an awareness throughout the team, that such trade-offs are being made, and what this means. For development teams who are not normally engaged in rail industry work, they need to also take these constraints into account at the planning stage, to prevent unforeseen overruns in time and budget.
At the centre of the technical decisions are the trade-offs between software vs hardware.

The software cost doesn't appear on the bill of materials generally, but it is far from "free". Software development can be extremely onerous and, in a typical project that we carry out, the software cost (application plus drivers) represents approximately two thirds of the overall development cost.

Figure 1. The starting point when considering design trade-off factors.

Figure 2. Here, initial planning for a product where units will be built in large numbers shows that the unit price is the overriding design consideration.

Figure 3. High time to market pressure: design choices need to reflect the focus on reducing development cost and time.

Figure 4. Given a free choice, engineers tend to make design choices that focus on the best technology and features at the expense of development time and unit cost.

Figure 5. In embedded designs, using more costly components can often help reduce software development time (and vice versa).

Figure 6. For the prototype, features and time to delivery were more important than unit price.

Figure 7. For the production unit price was important. We focused on features and unitcost, so consequently development time and cost rose.

Choice of components can have a fundamental impact on software development time. As a result there is often a straight fight between this time and the unit cost as shown in Figure 5.

In practice - simplifying a ruggedised GPS datalogger design

So how does all this equate to decisions in a real project given that the ideal is minimum development time, development cost and unit cost?
We were commissioned to design a ruggedized device for collecting and logging speed/position information. Initially the customer needed a proof of concept to test a variety of features. The brief was for minimum development time and cost plus maximum technical flexibility. Unit cost was immaterial at this stage, as it was not a production product. To meet this requirement, we made two key decisions. The first was to use an operating system, which allowed for easy peripheral expansion with network stacks and debug capability, rather than going for the lowest cost microcontroller with bespoke drivers and code. Secondly, we decided to use a single-board computer as a prototyping platform and to add an expansion board to this, rather than creating a full-custom solution. The prototype weighing of factors may have been represented as shown in Figure 6 whilst for production, it would be represented as in Figure 7.

We selected an Olimex OLinoXino card, as it supported operating systems (Linux and Windows CE) and had more than enough

horse power for our needs. It was also open-sourced in the hardware department unlike some other contenders (Raspberry Pi for example), so we knew we could modify the design and create a full custom solution at a later date. We created an add-on board for it with hardware specific to the system such as RPM measurement and evaluation of two separate GPS modules for sensitivity and real time response.

Once this system was working and the concept proven, we then evaluated whether it could actually be used in production, to reduce time to market and development cost. It was clear to us, from an engineering perspective, that the solution was not robust enough for production, here the technical specification needed to poke its head up and trump the financial and time considerations. However, having taken a big step forward, much of the risk had been taken out of the project.

Understanding project risk

Trade-off	Risk
Technical specification	Specification cannot be met, product recalls etc.
Unit price	Unit price target cannot be achieved.
Development cost/time	Development cost/time will balloon.

Each of these factors has implications on product design.

1. Development time vs development cost

Whether you have your own development team, or outsource the work, in general the development cost of a product is proportional to the time it takes. So you are getting hit twice when overruns occur, once with cost and again with time to market.

One solution is to assign development to a team on a fixed price basis, so passing the timescale risk on – they foot the bills for overruns that you are not responsible for.

Third party software libraries can reduce software development time but increase the cost. Further licensing costs will also impact the unit cost. Reusing tried and tested hardware or software is a good option, but in manufacturers and product companies software can become quickly out of date (or at least key aspects such as processor, storage devices etc). For design companies this is less of a problem as new designs are executed back to back with many customers, re-use of experiences and technologies is an important part of the design process, both the positive and negative aspects.

2. Bill of materials (BOM) cost vs risk

Generally, the level of risk translates to the difference between an accurate and inaccurate time and cost estimate. Zero risk projects complete inside time and cost projections, while high risk projects wildly deviate from these estimates. System planners generally aim to eliminate as much risk as possible to allow for the most accurate budgeting. Engineers can and do mitigate risk by "playing it safe" when choosing components, for instance using older, tried and tested technologies, rather than a newer, lower cost devices. Shorter development cycles therefore often result directly in a higher BOM cost.

To minimise BOM cost, often some level of experimentation is required of uncertain time duration. The risk here is to timescales for the customer and to costs for a contractor who has quoted a fixed price, or internal costs for an engineering team. So BOM cost optimisation is often best done once after the technical design goals have been met, so that time to market impact is minimised.

For rail projects, risk mitigation is particularly important and for most projects, a conservative approach will be taken at the expense of BOM cost.

3. Software vs hardware integration

Carrying out software design in isolation from the hardware design is highly inefficient.

A project that is purely software driven may result in an expensive hardware platform to support it, rather like the 'bloatware' that is often complained about in desktop computers. In this

scenario, ever more powerful hardware features are introduced, and yet all too frequently the software support is not added to use them, software 'grunt' being used instead because it is easier to implement.

Conversely, hardware design without reference to software can lead to different problems. For instance, a microprocessor module may have its operating system shipped as a binary board support package (BSP), rather than as source code, with limits on which I/O pins can actually be used, and how peripherals are mapped to the I/O. Just looking at the data sheet for the module can lead to a false sense of security during the design.

Similarly, choice of peripherals modules, such as Wi-Fi, is driven more by availability of software drivers for the target operating system than by the cost, size etc. No matter how strong the hardware's feature set, if the software isn't compatible, it's probably an unsuitable solution. A critical success factor is deciding whether the design and development process should be hardware or software driven.
4. Reference vs production-ready software
The difference between a reference software package (e.g. a BSP) and 'production-ready' code is important as the resulting software development timescales can differ greatly.

As system-on-chips (SoC) have become more complex, some suppliers can only remain competitive by selling large amounts of source code to support their devices. However, a reference BSP is unlikely to be optimised, will probably be buggy and won't in all likelihood support all the features.

A production-ready BSP should have a clearly defined bug free feature set, and importantly, if bugs are found, the vendor should take responsibility to fix them or change the specification.

Production-ready code is more valuable but comes at a price – either being locked to a hardware platform typically (e.g. CPU module), or being sold with a licence fee. While a reference software package is often free.

Summary

Making decisions on product development can appear to be a circular process as you narrow in on the best platforms to use. At each stage you can find that making one decision has adverse effects on another. It is a moment of joy when you make a decision that helps tackle multiple problems simultaneously.

ByteSnap Design

ByteSnap Design is a specialist in innovative embedded systems development encompassing hardware and software design with an international client list. The company will be exhibiting on stand V90 at this year's Railtex, and is a Zigbee Alliance member and Windows Embedded Silver Partner. The team's experience ranges from electronic design, OS porting on Linux/Android/Windows Embedded through to application design on mobile and embedded platforms. ByteSnap Design won Design Team of the Year in 2013 at the British Engineering Excellence Awards (BEEA) and was a finalist for Consultancy of the Year 2011 for its design work on electric vehicle charging posts for the London 2012 Olympic Games, and was highly commended the following year, at BEEA 2012. The company also won European Design Team of the Year 2011 in the Elektra awards.

The consultancy also has experience in electronic circuit and microcontroller, microcontroller design, Linux and embedded software development, designing hardware products such as PDAs and smart meters, and software projects such as developing Windows CE board support packages (BSPs) and signal processing applications.

Dunstan Power is a chartered electronics engineer providing design, production and support in electronics to all of ByteSnap Design's clients. Having graduated with a degree in engineering from Cambridge University, Dunstan has been working in the electronics industry since 1992. In 2008, Dunstan teamed up with his former colleague Graeme Wintle to establish a company that would supply its clients with integrated software development and embedded design services, and ByteSnap Design was born.

The rail-retail connection

THE BRITISH PUBLIC SPENDS ON AVERAGE TEN DAYS PER YEAR STANDING IN QUEUES

By Russell McCullagh, Managing Director, Ecebs

Public transport inevitably plays its part in this statistic, as does shopping. Remove the need to queue for train tickets or for your newspaper in the local convenience store and that figure would halve – or more.

Train tickets and newsagents may not sound like natural bedfellows, but pairing smart ticketing with retail networks – allowing commuters to buy rail tickets along with their morning paper– and in turn creating a more convenient service, is a developing trend in public transport. There are two fantastic case studies in the North East of England and in Glasgow. Both transport hubs began their smart ticketing journey with a smartcard-based ticketing system and they have both recently integrated this technology into a Payzone-enabled retail network.

Commuters are able to buy tickets or add funds to their smartcard at the same time as buying a lottery ticket or a pint of milk at their local convenience store, allowing them to skip the queues at the train or subway station.

The success of these examples lies in convenience and commercial opportunity: it provides a useful service for consumers; increased footfall for retailers; and a more effective service for the partnering organisations involved. It's this approach that makes it a great opportunity for rail, particularly in city centres.

Providing retailers with the technology and training to sell tickets on operators' behalf is an important step in the adoption of smart ticketing systems across the rail network. The commercial rewards being seen in Glasgow and Newcastle are exceptional – the data now available to operators eclipses anything available from paper based systems. Extending the availability of ticket retailing beyond a station makes perfect sense.

This new, convenient approach stems from a broader shift in consumer habits across the last decade. The impact of the internet and more recently mobility has been substantial on traditional retail models. Take banking, for example: the era of the traditional bank branch is practically dead with three out of four Britons using either mobile or internet banking each month, according to the British Bankers Association.

Imagine the impact on traditional rail ticketing if three out of four travellers used mobile or out-of-station ticketing services. Indeed, it doesn't really take a great imagination in this context because it will happen and is already happening. There are around 70,000 Glasgow Subway smartcard users - making 230,000 journeys per week - and only 15 stations. That's over 4,000 customers per station, assuming an even spread of distribution – which there isn't at peak times, of course. The technology used is simple: the credit or travel season ticket is uploaded directly to a customer's smartcard using contactless technology in Payzone terminals similar to that used by payment terminals in coffee shops.

The impact, however, could be

substantial. Fewer queues, more tickets purchased, better customer service, and a more attractive travel experience.
In Glasgow the move is possible thanks to the flexibility of the smart technology used in the Subway Smartcard, called Bramble, delivered by the joint venture partnership between SPT and Ecebs called Nevis Technologies. This is part of a wider vision to deliver even greater convenience to public transport customers through the use of smart technology. Future deployments will include topping up online or remotely through smartphones.

Smart ticketing is extremely flexible. The Bramble technology, for example, can be deployed across multiple modes of transport and has the capability of being deployed via multiple forms including smart cards, NFC mobiles & tablets, P.C's, kiosks, Chip & Pin terminals and more. Bramble can also incorporate ticketing, payment, loyalty and other applications – once rail operators understand the opportunity, they will not limit themselves to just selling tickets.

The data-driven approach created by smart technology creates a more effective and efficient service, using analysis of travel patterns to inform better use of resources. This will have a positive impact on the perception of public transport and in turn benefit the rail operator with increased passenger numbers.
Exploring partnerships with retailers aids this process.

If you consider the 'door to door journey' most include retail components – from picking up tickets to purchasing a coffee and a newspaper to while away the time. But currently that process is not convenient: separate payment, separate collection points.

Improving commuter convenience and overall service satisfaction is key to changing attitudes towards public transport. It's about fitting the practicalities of buying a ticket into the individual's lifestyle in a way that streamlines their daily routine, making it seem like they're not doing it at all.
This approach makes smart ticketing more attractive. With most of us adopting a 'digital by default' mind-set, we have adapted to everyday life without paper – reducing the need for cash handling and paper tickets.

Some train operators have introduced technology that allows commuters to add funds to their ticket using a mobile app or online portal. But where this is not yet possible, topping up at local retailers is the next best thing. It reduces the number of transactions you make on a daily basis, saving minutes on your morning commute and potentially hours over the course of a month.

Technology has revolutionised many parts of our lives. As a result of changing consumer demand it is inevitable that rail will adopt innovative approaches to create more effective, efficient ways of working.

Of course, there are some commuters who will prefer to remain using paper tickets. Whilst this demand continues, rail operators should meet their needs with physical terminals and real people having real conversations in stations. However, smart ticketing will become the norm and it will benefit operators to increase the number of smart media users by creating more convenient ways to pay for ticketing while developing retail partnerships to help achieve this.

New benchmarking tool to make high-speed rail projects more cost effective and efficient

LEIGHFISHER INTRODUCES UNIQUE ANALYSIS THAT CAN LEAD TO BETTER DECISION MAKING FOR INFRASTRUCTURE MANAGERS AND GOVERNMENT DEPARTMENTS

Global infrastructure and transport consultancy, LeighFisher, has launched a benchmarking tool to assess the cost effectiveness and efficiency of high-speed rail projects. By analysing specific cost drivers and comparing these to high-speed railways across the world, this unique tool allows users to identify cost optimisations and areas for improvement, ultimately leading to better decision-making.

With high-speed rail projects coming under increased scrutiny and pressure to continuously optimise both cost and effectiveness, the ability to benchmark performance through an independent review of costs is vital for infrastructure managers, rail operators and government departments alike.

The benchmarking tool compares specific high-speed railways across the world by identifying the Inherent, Structural, Systematic and Realised (ISSR) cost drivers and collecting staff and cost data for all comparators. The data is normalised for the inherent cost drivers, as these cannot be influenced by infrastructure managers. Using this method, cost and staff numbers per kilometre of track can be calculated, allowing for detailed comparison of effectiveness and efficiency. As such, cost optimisations in the short and long term can be identified and inform better decisions in terms of operations, staff and maintenance.

Kimmo Oostermeijer, Director at LeighFisher, comments: "The very nature of high-speed rail means it is subject to high levels of scrutiny. As such, there is a real need for all parties involved in high-speed rail projects to have access to independent cost analyses.

About LeighFisher

LeighFisher is a global consulting firm with an unrivalled breadth of expertise and depth of experience across the aviation, government and infrastructure, transport, energy and port sectors. The consultancy occupies a unique space, offering the technical insight of a specialist firm and the strategic thinking of a larger consultancy.

For nearly 70 years, clients have trusted and relied on LeighFisher's advice, which combines deep technical knowledge with commercial and financial acumen. The consultancy has a proven, consistent track record in the industries it operates in, regardless of the economic circumstances. This long-term commitment is evidenced by the lasting relationships it fosters with clients.

At its core, LeighFisher aims to deliver forward-thinking solutions to clients that are as innovative as they are practical, helping them solve complex and multi-faceted problems and ultimately delivering sustainable outcomes and lasting value. This is why LeighFisher consultants have been integral to the success of many of the most important global infrastructure projects over the past 20 years.

"This tool not only helps infrastructure managers demonstrate they are working cost effectively and making informed decisions to deliver more efficient and effective services, it also enables government departments to show that public funds are being well invested and managed. We're already working with clients who are using this tool to optimise costs and deliver deep insight."

For further information, please visit **www.LeighFisher.com**

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PANDROL TRACK SYSTEMS - THE GLOBAL MARKET LEADER IN THE SUPPLY OF RAIL FASTENINGS

Pandrol Track Systems operates around the globe, with a proven supply record covering a very wide range of climates and train operating conditions.

In the high speed sector in particular, we have supplied fastenings for both ballasted and non-ballasted tracks to railway systems in many countries, operating with design speeds of up to 350 km/hr. The maximum speed of 574.8 km/hr reached in trials in France created a new world record for wheel-on-rail technology, and this was achieved on track with Pandrol rail fastenings.

Running trains at these high speeds requires absolute confidence in the track. Pandrol has been supplying rail fastening systems for over 75 years, and its portfolio of products for high speed track continues to evolve. The latest designs embrace tomorrow's demands for high capacity operation and very low maintenance.

For more information about Pandrol's wide range of rail fastenings visit www.pandrol.com

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Diversity and Inclusion – Time for the rail industry to catch up.

WHEN IT COMES TO INCLUSION AND DIVERSITY THE RAIL INDUSTRY HAD NOTHING TO SHOUT ABOUT, OR EVEN WHISPER.

Today we know that diversity is important, not only in ensuring the industry reflect its stakeholders in appearance, but because we need to access the most talented individuals across our society. The industry must be attractive to all and have the structure to facilitate that everyone can achieve their potential. So what do we need to do?

Progress has been made, especially in encouraging more female apprentices, but when we look at the industry from the top down it remains the bastion of white middle aged men. Apart from a few exceptions like Alison Munro at HS2, the top tier of railway management does not reflect the society we live in. With fewer than 20% of the industry comprised of women the efforts we now make have to be substantive and serious. It will take commitment and determination from the whole industry. It should be a fundamental strategic driver for improvement.

The Mckinsey report on diversity and inclusion, launched at the end of last year, provided some of the most detailed research demonstrating that organisations with a greater diverse gender and cultural make up were both more effective and more successful. The analysis details evidence that diverse workforces from the Board down lead to better financial performance. The companies in the top quartiles of genuinely gender diverse workforces were 15% more likely to have above median financial returns. Companies in the top quartile of ethnic and gender diversity were 30% more likely to have above median financial returns relative to their national industry median. Companies in the bottom quartile for both ethnic and gender diversity were statistically less likely to achieve above average financial returns.

With evidence like this staring us in the face, we must begin to address and overcome the inherent cultural legacy biases that pervade our industry.
As a Public Member of Network Rail I have been incredibly heartened by the steps the company is taking under Mark Carne its chief executive, and the Board as a whole, in thought leadership. The macho culture is finally being addressed, as diversity and inclusion within the organisation has become an intrinsic goal to ensure Network Rail is a successful business. The huge investment in projects over the next 20 years will be the rail industries opportunity to reinvent itself as an exemplar of best practice in terms of diversity. The TOC's and 1st tier supply chain companies must follow the example now being set by Network Rail. This will lead to huge long term benefits to the rail industry ensuring its dynamism and resilience.

This agenda must have structure in terms of partnerships between politicians, industry leaders, women's organisations, unions, LGBT and ethnic minority groups. Constant engagement in formal and informal structures will drive change. We are talking about a cultural evolution which reflects the society we live in. How can we make the industry be flexible enough to let women be mothers but not sacrifice career progression? How does the industry ensure it does not lose these valuable assets? How can we make the industry a welcoming long term career choice for our ethnic minorities and LGBT communities?

The industry must set some KPI's on inclusion and diversity and let us shout about our aspirations to engage with all our communities.

There is also a huge lack of diversity in the supply chain. From NR, to the TOC's and the incumbent primary suppliers, no-one is monitoring, or attempting to monitor, how many of our fantastic women owned and BAME businesses are actually being offered the opportunity to be part of these huge infrastructure projects. There is no formal architecture to ensure our diverse businesses can be part of the supply chain. It is a real issue in the BAME communities and it is something that the rail industry has failed to address. There are many excellent diverse SME businesses that should be part of every aspect of the these major projects but, in reality, few get a look in. This is a scandalous waste of talent and money. Nimble businesses with new ideas and diverse talents are being excluded.
The rail industry has lazily allowed the growth of gate keeper businesses which demand yearly fees from SME's just to be part of a supplier list. These gatekeepers are stifling diversity and getting fat on exploiting their position. Rail procurement professionals have decided to offload their responsibilities onto these companies who are actually doing the Rail industry a huge disservice. How many small businesses will be able to continue to pay the hefty yearly fees to be on a list which offers little opportunity of commercial benefit. I know of successful companies that have been on a gatekeeper list for over 10 years paying fees without a single enquiry generated. Last year, MSDUK, an organisation that represents BAME businesses in the UK, launched a research paper at the House of Lords which evidenced that diverse owned businesses in the UK were the most successful and entrepreneurial, yet few were able to access the rail industry supply chain. The rail Industry must seek to facilitate SME's, women and BAME owned businesses to access their supply chain.

My main worry is that the rail industry is actually quite oblivious to this major problem that is inhibiting diversity and inclusion. Does the industry know how limited and unrepresentative its supply chain is? I doubt it.

It is high time that NR, the TOC's, the freight companies and the tier one suppliers looked at their supply chains and started asking questions about the complete lack of diversity.

My final challenge to the rail industry is to address these issues holistically if it is serious about representing its stakeholders and reflecting our society.

Arnab Dutt

MD of Texane Limited
and Public Member of Network Rail

VIRGIN TRAINS STOPS LOST LUGGAGE IN ITS TRACKS

VIRGIN TRAINS IS LAUNCHING A TRIAL OF AN INNOVATIVE NEW SERVICE THAT COULD SPELL THE END OF LOST LUGGAGE.

The introduction of HomingPIN™ to Virgin Trains marks the first time in the world that a railway operator has adopted the lost property recovery system to reunite customers with their belongings.

The revolutionary HomingPIN™ puts customers' minds at ease, removing the worry of losing something important by safeguarding their belongings while on the move. The handy system works on whatever the customer chooses to protect, from phones, cameras and wallets through to passports, keys and bags.

Up to one thousand Virgin Trains' customers will take part in the trial, with each receiving a unique PIN code to register on the secure website, HomingPIN.com, together with a phone number and email address, which are never shared. Customers also receive a luggage loop, key ring and a set of labels – each with their unique code printed on – which can be attached to their possessions.

If a lost item is found by a member of Virgin Trains staff or member of the public, they simply enter the PIN code on the website, which is then matched back to the owner. In just a few moments, a text message or email alert is sent to the property's owner, who can then contact the finder to arrange the safe return of their belongings in a quick and convenient way.

The service will be available for those who contact Virgin Trains directly by calling customer relations on 03331 031 031 and will also be offered as a trial to JourneyCare customers, who have mobility impairment or other disabilities.

Steve Tennant, Executive Director of Customer Service for Virgin Trains, said:

"Losing anything important, valuable or special to you can be a stressful experience – particularly when travelling. This new service is a really simple, reassuring solution which we hope will reassure our customers that their belongings are safeguarded if they are accidentally left behind. HomingPIN™ is a fantastic contribution towards returning items which have been misplaced or left on our trains and part of our approach to put the customer first. It follows our Teddy Tracker initiative which was introduced last year to ensure lost toys are returned to their rightful owners."

To find out more information visit **www.homingPIN.com**

We hope you have enjoyed our latest Railway-News Magazine, be sure to look out for our next edition.

We are now producing a magazine on a quarterly basis so please do not hesitate to contact us at al@railway-news.com if you would to feature your latest technology in an upcoming edition and also please take a look at **www.railway-news.com** for all that latest Rail news, events and technology.

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