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MAGAZINE

The latest news & reviews from the industry

MiddleEastRail

السكك الحديدية في الشرق الأوسط

Middle East | North Africa | Central Asia | South Asia

This Year at Middle East Rail 2018

& How traceability technology can help reduce copper cable theft

Letter from the Editor

Now that we are well into 2018 we are back with our first magazine of the year, focusing on Middle East Rail.

Middle East Rail 2018 will be held in the Dubai International Convention & Exhibition Center, Dubai, UAE, on 12–13 March. Now in its 12th year, it most recently attracted 7,500 visitors and 300 exhibitors. There will be demonstrations, interactive sessions and many speakers from government ministries from the UAE, Bahrain, Spain and the European Commission as well as presidents, CEOs, CTOs etc. of major rail companies such as Greenbrier, Deutsche Bahn, SNCF, Saudi Railway Company, Unife, Indian Railways and much more. The event is run in partnership with Etihad Rail, the Federal Transport Authority – Land & Maritime, and the United Arab Emirates Ministry of Infrastructure Development. Please visit **http://www.terrapinn.com/exhibition/middle-east-rail/index.stm** to find out more about the show.

In this issue have compiled for you a fact file of some of the exciting rail projects in the Middle East – some of them, such as the Haramain High-Speed Rail project in Saudi Arabia, are virtually complete and about to open; others, such as the skyTran project envisaged for Yas Island in the UAE is a futuristic personal rapid transit system that has not yet reached the construction phase. All of these projects are forward-thinking and ambitious.

We have taken a closer look at the apprenticeships on offer in the rail industry for those considering this option as a route into this line of work. We talked to the CEO of the National College for High Speed Rail, Clair Mowbray, and two students currently studying at the college to find out more about their experiences.

We also have interesting contributions by industry suppliers attending Middle East Rail such as E-Leather, FIME, Loram and Trackmobile.

Our next issue, due to be published in May 2018, will focus on Rail Live, which will be held at the Quinton Rail Technology Centre, UK, on 20–21 June. This show stands out by showing you the railway in action, featuring demos of many different types of rolling stock and other railway equipment. There will also be seminars and presentations to round off the programme. If you are going and would like to be represented in our magazine, please contact Andrew Lush at **al@railway-news.com**.

Please enjoy our 1st issue of 2018!


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If you would like to submit editorial content, or you are interested in giving an interview for the magazine, please contact **Josephine Cordero Sapién**. If you would like your company to join Railway-News's online platform, please contact **Andrew Lush**.

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FEATURES

SUPPLIER NEWS

Middle East Rail

The largest and most exclusive rail conference and exhibition across the Middle East, North Africa, South Asia and Central Asia

Now in its 12th year, Middle East Rail has grown to become the most significant rail event in the region, and one not to be missed. Dedicated to the heart of rail developments across some of the most exciting regions in the world, Middle East Rail is recognised as a leading international event. It is the only rail event to be run in partnership with the UAE government, hosting more regional and international government representatives and buyers than any other rail show.

The event holds official patronage with the United Arab Emirates' Federal Transport Authority and Ministry of Infrastructure Development and is opened annually **by His Excellency Dr Abdulla Belhaif Al Nuaimi, Minister of Infrastructure Development and Chairman of the Federal Transport Authority – Land & Maritime, UAE.**

As populations and freight demands continue to grow and urbanised areas increasingly converge into large networks of mega-regions, Middle East Rail is strategically positioned to reflect the on-going developments and updates in the region. Within the next ten years we will see a complete reform of mobility across emerging markets in the Middle East, Africa, Central and South Asia. Covering $614bn worth of railway projects, mega trade corridors and smart cities, Middle East Rail is your gateway to the key railway projects happening across the region – the most exciting new networks in the world.

Middle East Rail is the unrivalled platform for the region's railway industry to come together, to learn, network and do business in just two days. Global companies come together to help build and operate brand new rail infrastructure, as well as upgrade legacy networks across the Middle East, North Africa, South Asia and Central Asia.

In 2018, Middle East Rail will once again deliver an unrivalled conference, hosting over 150 speakers across three conference tracks.

As the leading rail conference for the regional markets, our project overviews include those in South Asia and Central Asia – some of the most untapped markets globally.

Middle East Rail will not only bring together transport ministries from the regional markets, but will also welcome rail developers, transport operators, government, contractors and suppliers to talk strategy, technology and innovation for passenger and freight projects. Our partners and solution providers are global leaders and innovators. They use Middle East Rail as their annual opportunity to meet and do business with new and existing customers.

From modernising legacy networks, to building transport corridors of the future, upgrading signalling and telecommunications systems and financing new networks; Middle East Rail has it all. From the latest developments of the GCC connectivity network, to the modernisation of Egypt's rail lines; the Belt & Road links in Central Asia to the boom in Indian passenger and freight efficiency; operators from across the world will bring updates in the form of interactive roundtables, panel discussions and presentations.

In 2018, the conference agenda features more content on digitalisation, modernisation,

UAE	Saudi Arabia	Kuwait	Oman	Bahrain	Egypt
INVESTMENT: **$27bn** PROJECTS: Metro, tram, long-distance freight and passenger	INVESTMENT: **$118.9bn** PROJECTS: Metro, tram, long-distance freight and passenger, high speed rail	INVESTMENT: **$17bn** PROJECTS: Metro, long-distance freight and passenger	INVESTMENT: **$16bn** PROJECTS: Tram, long-distance freight and passenger	INVESTMENT: **$12.9bn** PROJECTS: Tram, long-distance freight and passenger	INVESTMENT: **$30.9bn** PROJECTS: Metro, monorail, long-distance freight and passenger, high speed rail
Algeria	**Tunisia**	**Lebanon**	**Jordan**	**Iraq**	**Iran**
INVESTMENT: **$34.4bn** PROJECTS: Metro, tram, long-distance freight and passenger	INVESTMENT: **$546m** PROJECTS: Metro, long-distance freight and passenger	INVESTMENT: **$500m** PROJECTS: Tram	INVESTMENT: **$3.8bn** PROJECTS: Metro, tram, long-distance freight and passenger	INVESTMENT: **$14bn** PROJECTS: Metro, high speed rail	INVESTMENT: **$24.6bn** PROJECTS: Metro, long-distance freight and passenger
Morocco	**Kazakhstan**	**Kyrgyzstan**	**Tajikistan**	**Afghanistan**	**Uzbekistan**
INVESTMENT: **$10bn** PROJECTS: Tram, long-distance freight and passenger, high speed rail	INVESTMENT: **$6.2bn** PROJECTS: Long-distance freight, passenger, metro	INVESTMENT: **$850m** PROJECTS: Long-distance freight and passenger	INVESTMENT: **$760m** PROJECTS: Long-distance freight and passenger	INVESTMENT: **$3.2bn** PROJECTS: Long-distance freight, passenger, metro	INVESTMENT: **$1.7bn** PROJECTS: Long-distance freight
Turkmenistan	**Nigeria**	**India**	**Djibouti**	**Turkey**	**Sudan**
INVESTMENT: **$1.2bn** PROJECTS: Long-distance freight and passenger	INVESTMENT: **$75bn** PROJECTS: Metro, long-distance freight and passenger, high speed rail	INVESTMENT: **$140bn** PROJECTS: Metro, tram, monorail, long-distance freight and passenger, high speed rail	INVESTMENT: **$4bn** (shared with Ethiopia) PROJECTS: Long-distance freight	INVESTMENT: **$40bn** PROJECTS: Metro, tram, long-distance freight and passenger, high-speed rail	INVESTMENT: **$12bn** PROJECTS: Long-distance freight and passenger

privatisation and pioneering the future of Mobility 4.0. You can hear from leaders of innovation, big data, cybersecurity, digital transformation and more from global heavyweights such as RATP Dev, SMRT Trains, Deutsche Bahn, SNCF and more.

KEYNOTE SPEAKER: **Patrick Ropert**, CEO, SNCF Gares & Connexions, & Chairman of the Supervisory Board, AREP Group, France

KEYNOTE SPEAKER: **Niko Warbanoff**, CEO, DB Engineering & Consulting, & Chairman of International Business, Deutsche Bahn AG, Germany

KEYNOTE SPEAKER: **James Cowan**, President, The Greenbrier Companies, USA

KEYNOTE SPEAKER: **Rolf Härdi**, CTO, Deutsche Bahn, Germany

KEYNOTE SPEAKER: **Jean-Jacques Thomas**, Chief Innovation Officer, SNCF, France

KEYNOTE SPEAKER: **Shahrin Salam**, SVP – Plans & Development, SMRT Trains, Singapore

KEYNOTE SPEAKER: **Harj Dhaliwal**, Managing Director - Middle East & India, Virgin Hyperloop One

KEYNOTE SPEAKER: **Mathieu Dunant**, Head of Innovation, RATP Group, France

Latest project updates from the GCC covered at Middle East Rail

UAE

Abu Dhabi Metro & Light Rail Project: Phase 1A comprising 17 stations and 18km of metro rail. Tenders for Phase 1B and for Phase 1C of the city's light rail network project are also in place; both of which will be tram lines.

skyTran Yas Island: MOU signed in 2016 for a planned magnetic levitating transit pod system around Yas Island in Abu Dhabi.

UAE National Rail Network: Etihad Rail's 1,200km network will extend across the UAE from the border with Saudi Arabia to the border with Oman. Stage 1 (264km) has been operational since 2015, Stage 2 will consist of 628km and Stage 3 will extend the network from the Emirate of Dubai to the northern regions of Fujairah, Ras Al Khaimah and Sharjah.

Dubai Metro: Red Line Route 2020 extension is on-going and scheduled to be completed several months in advance of the Expo 2020 event.

Al Sufouh Tram: The Al Sufouh Tram has been operational since 2014, has 11 stations and 10.6km of track. The second phase of the Dubai tram will extend the track by 4km and link the network to Mall of the Emirates in Dubai.

GCC Rail Network: The construction timeline for the 2,117km $200 billion GCC railway network has been pushed back to 2021 from 2018 in the aftermath of the oil price plunge.

KEY PLAYERS:
Federal Transport Authority, UAE
Ministry of Infrastructure Development, UAE
Department of Transport, Abu Dhabi
Roads & Transport Authority, Dubai
Etihad Rail

KEYNOTE SPEAKER: **Ahmed Jasem Al Mansoori**, A/CEO, Etihad Rail, UAE

OMAN

Oman National Rail Network: Oman Rail plans for a national network of 2,135km, part of the GCC rail network, and to connect southern parts of the country where main ports are located.

Mineral Line: In December 2017, Oman Rail announced they are looking to mandate an international consultant to provide advisory services on PPP funding for its mineral line project – a single track bulk freight railway connecting mines to ports.

KEY PLAYERS:
Ministry of Transport & Communications, Oman
Asyad Group
Oman Rail

KEYNOTE SPEAKER: **Nathan Wiles**, General Manager – Projects, Oman Rail

Kingdom of Saudi Arabia (KSA)

KSA National Rail Network: 2,400km of railway links the northern border to the central region and eastern coast. The line has been operational for mineral freight exports since 2011.

Landbridge: 1,065km of new line to connect the two major cities in KSA: Riyadh in the east and Jeddah in the west. The KSA government will grant concessions to the private sector via a 'Build Operate Transfer' contract.

Haramain High-Speed Rail: Saudi Arabia's first high-speed train connecting major holy sites: Mecca, Medina and the eastern major city Jeddah. The Haramain Express includes 453km of track, achieved speeds faster than 300km/h in 2017 and will be fully operational by mid-2018.

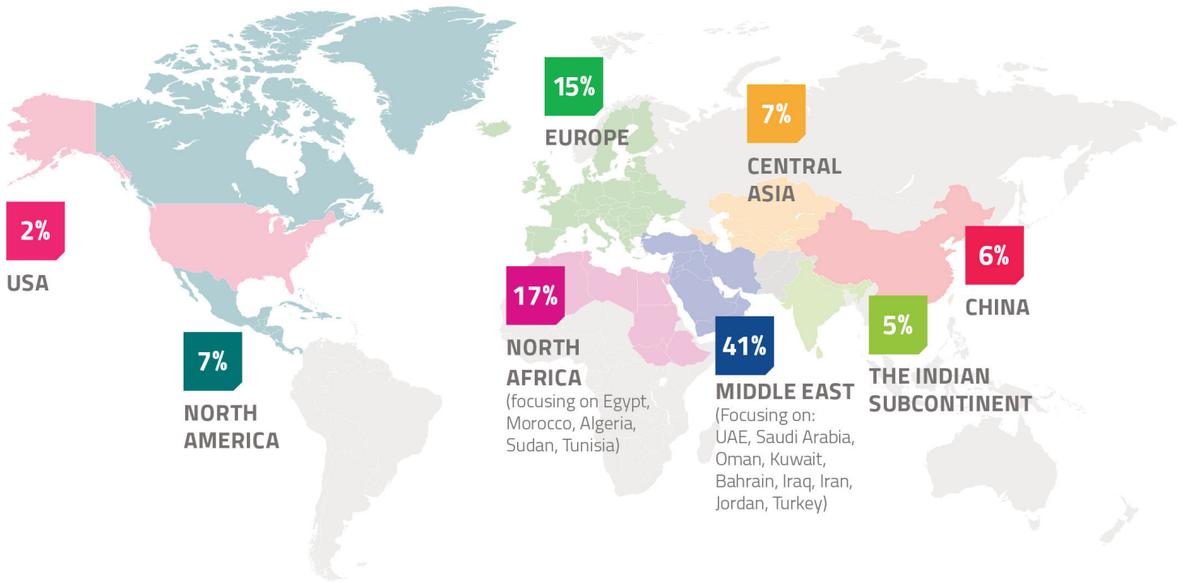
North-South Railway: Contributing to a total of 3,000km, the North Railway project was an expansion of the national network launched in February 2017 to support the massive development of the mining industry; prioritised as KSA's third pillar of the economy after oil and gas.

Riyadh Metro: In summer 2017, it was reported that the Riyadh Metro project had passed the halfway mark. 86 driverless train-cars have been manufactured and delivered to the capital. Testing the trains on the tracks has been scheduled for mid-2018.

KEY PLAYERS:
Ministry of Transport, KSA
Public Transport Authority, KSA
Saudi Railways Organisation (SRO)
Saudi Railway Company (SAR)
Arriyadh Development Authority

KEYNOTE SPEAKER: **Bashar Al Malik**, CEO, Saudi Railway Company (SAR)

KEYNOTE SPEAKER: **Alwalid Alekrish**, VP – Programs & Projects, Arriyadh Development Authority, KSA



BAHRAIN

Bahrain Light Rail: Feasibility studies have been completed and Bahrain is currently in the tendering phase to appoint an operator to run the Bahrain Light Rail project. The monorail project is planned to consist of 105km of light rail.

Bahrain National Rail Network: Planned 84km, double-track line to connect Saudi Arabia and Bahrain with a new causeway in its first phase of construction.

KEY PLAYERS:
Ministry of Transportation & Telecommunications, Bahrain

KEYNOTE SPEAKER:
H.E. Mariam Jumaan, Undersecretary, Ministry of Transportation & Telecommunications, Bahrain

KUWAIT

Kuwait Metro: A 160km transport network consisting of four lines and 68 stations. In 2017 the feasibility study for the project was completed and its tender for public bidding began.

Kuwait National Rail Road (KNRR): An integrated rail network with 511km of track to serve freight and passenger needs. The plan is to link Kuwait City and airport, as well as other GCC countries.

KEY PLAYERS:
Ministry of Communication, Kuwait Public Transport Authority, Kuwait Kuwait Authority for Partnership Projects (KAPP)

KEYNOTE SPEAKER:
Mohammad Saud Alhadbah, Board Member, Public Authority for Roads & Transportation, Kuwait

For more information visit **www.terrapinn.com/merail**.

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Featured Exhibitors at Middle East Rail 2018

Contributor	Stand	Website
E-Leather	A72	www.eleathergroup.com
FIME	F82	www.fime.com
Loram	C102	www.loram.com
Plasser & Theurer	F76	www.plassertheurer.com
Thales	Gold Sponsor	www.thalesgroup.com
Trackmobile LLC	A42	www.trackmobile.com

Tackling the latest trends in transport ticketing

Key considerations to support the launch of next-generation ticketing solutions

Traveller expectations are at an all-time high. In the age of on-demand, mobile services and the convenience of 'tap-and-go' technology, the **public transport industry** is under increasing pressure to deliver the same, high-quality interoperable experience with its **ticketing solutions**.

While the pressure is on to deliver new services, the **benefits of next-gen ticketing** are many and wide-ranging. In a rapidly evolving, converging and advancing market, public transport players are faced with several opportunities to meet both the rising expectations of end-users and tap in to new revenue streams. For the transport ticketing market, **the time to innovate is undoubtedly now**.

However, navigating the latest trends and technologies can be a complex and technically exhausting challenge. To help make sense of it all, let's take a closer look at **the front-running trends in the next-generation ticketing race, the benefits and challenges of implementation, and the key considerations** players in the transport market need to guarantee a successful project.

Come together: converging services, new form factors and making the move to MaaS

As the industry's latest buzz-word, it's hard to avoid the growing popularity of Mobility-as-a-Service, or MaaS. As services increasingly converge onto smartphones, there's huge potential for **transport operators to deliver greater convenience to travellers**. In addition, by translating multiple transit solutions, adjacent and value-added services into one simple, seamless app, there's huge potential for operators to generate new revenue streams.

So, how best to make the move to mobile?

Partnering with handset manufacturers and mobile network operators (MNOs) to deliver a near field communication (NFC) based solution is one option, but not the only one. Host Card Emulation (HCE) technology for example, can offer a simple, considerably more cost-effective NFC solution for those looking to remain independent of OEMs and MNOs. **However, security remains vital and additional considerations, such as implementing tokenization, may also be needed**.

Wearables are also tipped to have a potentially revolutionary effect on transit ticketing, enabling passengers to 'tap' their way through the transit network without touching their wallets or bags. But with knowledge limited on these solutions, **ensuring their security, functionality and interoperability** across the network poses a real technical challenge that requires unique expertise.

Account-Based Ticketing: easy as A-B-T?

With capacity to simplify maintenance logistics, improve security and ultimately reduce costs, account-based ticketing solutions are proving popular too. As the traveller's funds are managed in the back-office account and 'payment' occurs automatically after travel, **ABT gives travellers the flexibility to choose between several fare media to authenticate themselves with, whether that is a smartcard, mobile device or a wearable**. What's more, while solutions can be done in conjunction with EMV®*, account-based can also be developed independently of EMV, accommodating support for young and unbanked travellers.

To guarantee a successful implementation and realize the full scope of ABT benefits, **operators need to ensure solutions are secure and fully interoperable across all fare-media**, with the capacity to work effectively both offline and during instances of poor connectivity, managing risks.

Offering open-loop EMV® payments

Following the success of Transport for London's (TfL) implementation and the increasing penetration of EMV globally, it's not hard to see why many operators are following suit and upgrading their systems to offer **open-loop EMV payments**.

Accommodating EMV payments in public transport networks offers travellers greater flexibility, convenience and, as with all contactless-centric implementations, reduced queues and quicker throughput. From an operator perspective, this also translates into a reduced need for transit-specific travel cards, cutting manufacturing costs and the need for on-the-ground resource to support issuance. These benefits also readily serve tourist markets, enabling visitors to easily board the local transport network with a fare-media that's already in their pocket.

Whilst proven, secure and widely adopted across the payments market, the EMV ecosystem is complex, with several players, technologies and guidelines. For public transport players looking to cash in, getting to get to grips with these complexities first is essential.

Deciding the next steps

The opportunities are evident, but to truly make the right choice in delivering high-quality ticketing systems, **players need support right from the start of projects to fully evaluate their options**. In-depth knowledge of the standards and requirements solutions must conform to, and how suitable these are to their respective systems will be key to a smooth and successful launch.

To truly realize **seamless transport ticketing,** open standards will also play an increasingly important role. Delivering interoperability and the capacity to transform the business models of the global ticketing industry, understanding and integrating these standards can deliver real value. **Partnering with a business enabler helps you evaluate all of the options in line with your strategy**. This ensures the quality of projects from the start, minimising unnecessary delays and guaranteeing a smooth, cost-effective path to market. **A thorough testing and certification plan is also key to guaranteeing secure and interoperable solutions first time**. During this implementation process, defining a robust **quality assurance (QA) system** will ensure your solution runs smoothly and efficiently, year after year.

The convergence of payments, mobile and transit holds exciting possibilities, but also increased risk. Expert technical consultancy, from implementation partners well versed in payments and developing new, **innovative solutions** across form factors, is essential.

Choosing a trusted implementation partner

With over 20+ years of experience ensuring the efficient and successful implementation of card and mobile transaction service, FIME is well-equipped and experienced in supporting the transport market in delivering the next-generation of transit ticketing solutions. With unrivalled expertise in EMV and developing mobile payment solutions, FIME can provide end-to-end support for your projects, from technical consultancy and training, through to design support, quality assurance, field testing and certification services.

For more information, visit **www.FIME.com** *EMV® is a registered trademark in the U.S. and other countries and an unregistered trademark elsewhere. The EMV trademark is owned by EMVCo.

FIME®

One Action. **A billion transactions.**

Enabling smart ticketing to go digital

- **Evaluate your options in line with your business strategy**
- **Guarantee the security, quality and interoperability of solutions**
- **Deliver a superior, seamless traveller experience**

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fime.com

Careers in Rail: Apprenticeships

The British Government has designated 2018 as 'The Year of Engineering.'

By Zoe Cunningham

This project expands on a longstanding commitment to improve the competence and competiveness of industries in the UK. In addition to improving the attractiveness of degrees in engineering, especially among girls, the government has also widened the range of apprenticeship programmes and funded the set up of 5 National Colleges. This approach is important for the rail industry because many of these apprenticeships are in rail, and the National College of High Speed Rail was the second college to commence welcome learners onto its campuses in Birmingham and Doncaster. Apprenticeships have become increasingly popular in the UK because of the opportunity to 'earn while you learn' and accrue skills which direct relevance to industry. In this article Railway-News presents a round-up of the most important questions for potential apprentices to consider when deciding on a scheme. **We also interview Clair Mowbray, CEO of the NCHSR, and 2 of the apprentices currently studying at the college**. If you are interested in an apprenticeship in rail you should visit the government's portal for apprenticeships, traineeships and internships. For details on any specific scheme, including the recruitment process and closing dates for applications you should visit the website for the particular provider who you would like to work for.

railway-news.com

What can I do?

There is a wide range of apprenticeship schemes across the rail industry in the UK: **Network Rail** and **Transport for London (TfL)** provide two of the largest ones, but several train franchises – **Virgin**, **GWR** and **Arriva** – also offer their own schemes. Crossrail is also running a scheme for the duration of the project.

The majority of these schemes focus on acquiring certification in engineering; Network Rail specifically offers Advanced Engineering Apprenticeships, but these include specialisms in Track, Telecoms and Signalling. Virgin has also started a unique programme to train apprenticeships as train drivers. A number of schemes are not in a technical trade, including finance and human resources. The range of technical specialisations is also very broad: TfL probably offer the largest range of specialisms including software development and cyber security. **All providers offer different accredited qualifications, from HNCs (Higher National Certificates) to BTECs (Business and Technology Education Council). TfL also offers degree apprenticeships** in in several disciplines, including Civil Engineering and Quantity Surveying, which pays for the cost of the degree in addition to a salary.

When can I do it?

All the schemes mentioned in this article are recruiting now, but **the closing dates for applications vary**, so please check the websites for any which you are interested in as soon as possible. Virgin Trains recruits apprentice drivers for specific vacancies, so check their careers website regularly.

What will I get from it?

The biggest selling point of apprenticeships is the opportunity to 'earn while you learn' and most apprenticeships in the rail industry offer generous remuneration packages, although this **varies, depending on the provider and specialism; Network Rail offers approximately £9,500 in the first year, rising to an average of £14,000 in the final year; TfL offers at least £18,600, which includes the allowance for living in London. Virgin pays its apprentice train drivers £15,000 per year.** Other benefits include the standard benefits for contractual employment in the UK, including holidays and pension schemes. Apprentices in rail also benefit from free or subsided travel cards or season ticket loans.

How do I do it?

The duration and setup of any apprenticeship scheme obviously depends on the provider and there is a lot of variety between them, including between specialisms on a particular scheme. **The average length of a scheme is 2 to 4 years, with specialisms related to engineering requiring the longest training periods.** Network Rail requires all apprentices to spend 21 weeks at Westwood, its National Training Centre in the Midlands, which provides food and board.

What can I do with it?

There is no requirement on any scheme to continue working for the provider after the completion of the scheme, but **one of the principle attractions of an apprenticeship is the expectation of employment with the same organisation after completion of it.** The qualifications gained by apprenticeships also serve them well across the industry, including the opportunity to work in other countries.

The export of technical expertise is one of the hopes for the NCHSR, as explained by Clair Mowbray.

Careers in Rail

Apprenticeships

Interview with NCHSR CEO Clair Mowbray

1. Railway-News: ***The National College for High Speed Rail is one of 5 National Colleges for 'high-level technical training' announced by the government in 2014. Why has the government prioritised high-speed rail for investment and why has the setup of the college happened so quickly in comparison to the other institutions?***

Clair Mowbray: There is currently a shortfall of at least 69,000 engineers every year in the UK. This shortage has the potential to be addressed by a significant pipeline of over £460 billion worth of planned infrastructure investment across the public and private sectors. One of these projects is HS2 which, when it gets fully underway, will be Europe's largest infrastructure project.

With 25,000 jobs expected to be created from HS2 alone, it's understandable that the government is looking to invest heavily in the skills pipeline. Our two new campuses in Doncaster and Birmingham are dedicated to supporting projects like HS2 by solving the engineering, design, planning, manufacturing and construction skills gap. However, this is about much more than HS2 – it's also about thinking longer term; how Britain's railway network and infrastructure will be upgraded for future generations.

The speed with which the college has gone from initial conception through to opening its doors is testament to the immediate support we have had not only from the government but also from our industry partners, who continue to provide us with equipment, technology and a pipeline of learners, as well as helping to develop our courses to ensure that the skills we train our learners in are suited to creating the generation of learners that British industry requires.

2. RN: ***What does study at the college offer apprentices in addition to their regular training?***

CM: The college is led by businesses and with their support, has been equipped with the latest rail, engineering and digital technologies to ensure that our learners gain the most up-to-date training and access to information; that's whether they're studying for our full-time certificate of higher education in high-speed rail and infrastructure, or joining the college through the apprenticeship route. Our courses offer access to dedicated workshop areas with real industry equipment, as well as cutting-edge tech and interactive platforms, including virtual and augmented reality training. This kind of training delivery means that our learners have a hands-on approach in both a practical and academic environment. The learning materials can be configured and adapted to suit their chosen areas of expertise.

The college had a soft launch in 2017 offering a limited number of pathways – Civil Engineering,

CAREERS

Track, Systems Engineering and Leadership / Management. All 8 pathways will be offered from September 2018 and bring forward Command, Communication and Control, Power, Rolling Stock and Operations.

***3. RN:** Do you think that study at the college, will benefit learners more than the training on the traditional model of an apprenticeship?*

CM: I think that access to the unique training environment at the college, along with our strong links to industry employers, will offer learners the best of both worlds. The college is able to support employers in finding suitable apprentices because we have prospective learners coming to us directly. Our full-time learners, who have invested to study in high-speed rail and infrastructure, are able to move into an apprenticeship and complete that course in two years rather than three. We're striving for a healthy balance between practical and academic learning which can be tailored to suit the needs of each individual.

***4. RN:** How will the rail industry in the UK benefit from the increasing numbers of graduates from the college in its labour force? Will the 'export' of some of these workers have distinct benefits for the UK?*

CM: At the moment, one in five British rail engineers is aged over 55 and the industry is notably lacking in diversity, with females for example accounting for only 6% of the railway engineering workforce. So the challenge that we are rising to is to improve diversity across the sector while also helping the industry to prepare for growth and to tackle existing skills shortages. The industry will benefit because we're working with its businesses directly, to identify specific gaps and collaboratively appeal to a new generation of workers by highlighting the many opportunities that are on offer. Our learners will also gain transferable skills so that they can work in transport and infrastructure of a wide-ranging scale. Some of the businesses we are working with are international and do indeed offer secondments to locations around the world. The knowledge and understanding that our learners and future workers gain from spending time abroad can be invaluable, and in a globalised industry this definitely brings distinct benefits to the workforce.

***5. RN:** How does the setup of this, and similar colleges, change the model of apprenticeships and what long-term impact will it have on the development of vocational training in the future?*

CM: Being one of five new National Colleges means we share a consistent approach towards our apprenticeships and training delivery, which is backed by both government and a growing network of industry stakeholders. We are developing a curriculum focused on being agile to employers' needs, to ensure the outcomes are aligned with industry need and attract a diverse workforce with opportunities that are open to all.

The vocational training model has already changed in that we are driving expertise into a sector which is earmarked for future growth and development. In terms of the long-term impact, I expect the cutting-edge technologies we are investing in – such as augmented and virtual reality – will make a huge difference to how training is delivered in future. All of this is supported by our unique industry links which bring good access to the supply chain for HS2 and other major infrastructure projects. The way in which we're receiving business support is a model that could be replicated in other specialist fields; with the supply of apprentices and donations of specialist kit and equipment, guest industry lecturers, and the development of new standards and qualifications, such as the Certificate for High Education (Cert HE) in High Speed Rail and Infrastructure.

Interview with Learner Jonathan Tranter

Your name: *Jonathan Tranter*
Job role: *High Speed Rail and Infrastructure Civils Apprentice*
Location: 19 Cornwall Street, Birmingham
Age: 37
Apprenticeship you are studying towards: *Level 4 Civil Engineering (working on a joint venture with Effiage and Kier)*

***1. Railway-News:** Why did you decide to study at the National College for High Speed Rail?*

Jonathan Tranter: I wanted to make a career change but found that the options I had for transferring my skills were limited. Looking at the scale of development within the HS2 project, I thought it was a great opportunity to be at the start of something new so I decided to approach the college through the apprenticeship opportunities it had to offer.

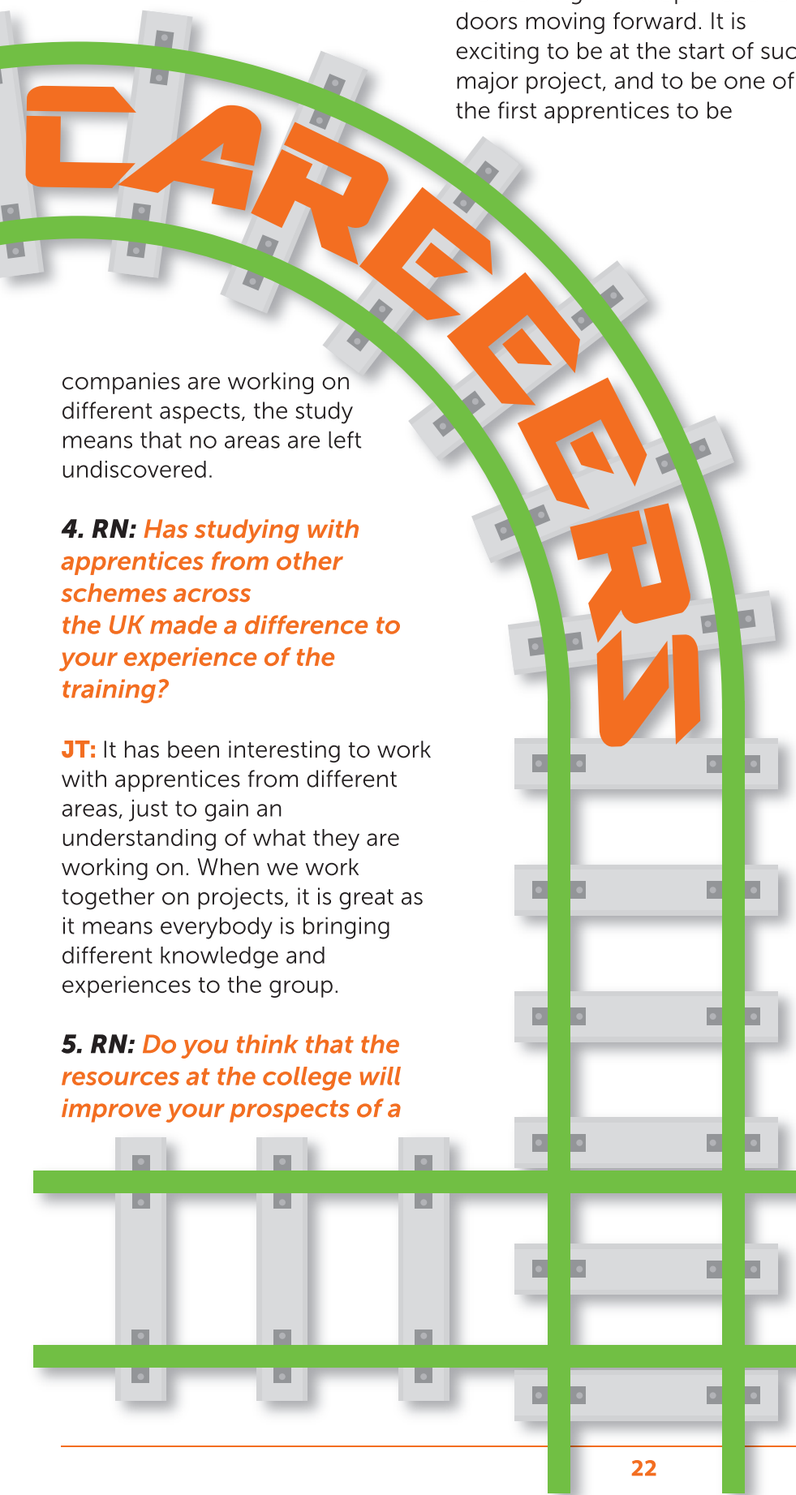
***2. RN:** How do the facilities and training at the NCHSR compare with your expectations of it?*

JT: I have been really impressed with my experience so far. I was a bit nervous, because the technology has moved on a bit since I was last at college, but the support is there to help in any areas where we feel we need it. The mix of permanent college lecturers and guest lecturers from companies working on HS2 means we are getting a great mix of expertise.

***3. RN:** How does study here compare with the training you receive on your regular apprenticeship, and how, if at all, does it affect your experience of it?*

JT: The training I receive within

our apprenticeship is quite task specific, so what we learn in the college helps me to see how what I am working on fits into the larger picture. Because different



companies are working on different aspects, the study means that no areas are left undiscovered.

4. RN: ***Has studying with apprentices from other schemes across the UK made a difference to your experience of the training?***

JT: It has been interesting to work with apprentices from different areas, just to gain an understanding of what they are working on. When we work together on projects, it is great as it means everybody is bringing different knowledge and experiences to the group.

5. RN: ***Do you think that the resources at the college will improve your prospects of a career in rail and your capacity to do the work?***

JT: I think the apprenticeships we are working in will open a lot of doors moving forward. It is exciting to be at the start of such a major project, and to be one of the first apprentices to be focussed on high-speed rail. It is already clear that there are some massive opportunities available through learning about HS2.

Interview with Learner Megan Foster

Your name: *Megan Foster*
Job role: *High Speed Rail and Infrastructure Civils Apprentice*
Location: *19 Cornwall Street, Birmingham*
Age: 19
Apprenticeship you are studying towards: *Level 4 Civil Engineering (working on a joint venture with Effiage and Kier)*

1. Railway-News: ***Why did you decide to study at the National College for High Speed Rail?***

MF: I was previously studying on a Level 3 rail apprenticeship scheme and was looking to push my career forward by taking the natural progression to the Level 4 apprenticeship. When I saw these were available with the college I thought it would be a fantastic opportunity to work on such a massive project, gaining new knowledge and experience while working with some of the most up-to-date technology. I thought it sounded like a really good chance to gain the Level 4 qualification with the college and make use of all the facilities they have available while still gaining key experience from an employer.

2. RN: ***How do the facilities and training at the NCHSR compare with your expectations of it?***

MF: I think the facilities and training here exceed my expectations. The facilities are cutting edge and not like any other college around. The college gives us the chance to learn through guest lectures from people working in the industry already. The technology across the campus and the close relationships that are being fostered with professional companies are beyond my expectations.

I was fairly worried I would be out of my depth at first, and thought it was going to be too much of a challenge. However, the college have helped support me where needed and have always ensured that I receive the right amount of training.

3. RN: ***How does study here compare with the training you receive on your regular apprenticeship, and how, if at all, does it affect your experience of it?***

MF: I think the training has a huge impact in the progression of our apprenticeship. Having training at college has meant I am able to put the things at work into a greater context and vice versa. For example, the particular decisions they make on the project; learning the information in college makes me understand why things are done a certain way.

4. RN: ***Has studying with apprentices from other schemes across the UK made a difference to your experience of the training?***

MF: I feel working with people from all different experiences benefits the group far more. I feel it benefits us massively when working in groups together. We all have different experiences, knowledge and skills and therefore can all contribute something different to the group. It is giving us a chance to learn new things from each other and use all our skills collectively to produce the results required.

5. RN: ***Do you think that the resources at the college will improve your prospects of a career in rail and your capacity to do the work?***

MF: I feel the resources at college are going to benefit my career massively. From the technologies they offer and from the experience we gain from the college; including the networking opportunities, the close relationships they have with employers, and the training itself, from lectures to school presentations. I feel that by learning all this from the college, we have chance to build our skills and understand what is required of us to give our careers a head start.

As one of the first apprentices on the project, I've already seen the opportunities available from both the college and my employer. I think having all this experience is going to open a lot of doors in the future, especially as the project progresses.

Upcoming Railway Events

March, April, May 2018

Light Rail 2018
01 Mar 2018 – 02 Mar 2018

Location: Sofitel Sydney Wentworth, Sydney, New South Wales, Australia

Informa Australia and the ARA are pleased to announce Light Rail 2018. On the back of the highly successful Light Rail 2017, which saw over 200 attendees in a record-breaking testament to the Australian light rail renaissance, Light Rail 2018 is set to be the standout industry event of the coming year. Located in the heart of Sydney at the Sofitel Wentworth on 1 and 2 March 2018, the conference will focus on light rail as a driver of change, urban renewal and development under the theme: Light Rail: Transforming Our Cities.

Railway Division Annual Luncheon 2018
02 Mar 2018

Location: Grosvenor House Hotel, 86–90 Park Lane, Mayfair, London, W1K 7TN

The Railway Division Annual Luncheon is without a doubt the must-attend event in the industry calendar. Attracting over 1,200 attendees, it is an unparalleled opportunity to network with the most senior technical and commercial executives from all parts of the rail industry. Hosted by Richard McClean, Chair, Railway Division, the luncheon is the principal event in the rail calendar and as such, places are limited. The keynote speech will be given by the Rt. Hon the Lord Adonis, Former Chair, National Infrastructure Commission and Former Transport Secretary.

Middle East Rail 2018
12 Mar 2018 – 13 Mar 2018

Location: Dubai International Convention & Exhibition Centre, Dubai, United Arab Emirates

Held on 12 and 13 March 2018 in Dubai, Middle East Rail will once again deliver an unrivalled conference, hosting over 200 speakers. As the leading rail conference for the regional markets, it will extend its project overview into the Indian subcontinent and Central Asia. Running alongside the conference is a dedicated exhibition which gathers over 7,500 industry professionals, including transport ministries from the regional markets, rail developers, transport operators, government officials, contractors and suppliers to talk strategy, technology and innovation for passenger and freight projects.

Accelerate: Rail 2018
15 Mar 2018

Location: Hilton Tower Bridge, 5 More London Place, Tooley Street, London SE1 2BY

Now in its 16th year, Accelerate: Rail 2018 (previously known as The Future of Rail) brings together senior executives within the UK rail industry to discuss the critical challenges, solutions and opportunities emerging during an uncertain time. The conference attracts major UK TOCs, FOCs, transport groups, and key industry influencers. This year we are hosting the chief executives of Network Rail, the ORR, the RDG, and First Group, plus senior decision-makers from a plethora of TOCs and PTEs.

Asia Pacific Rail 2018
20 Mar 2018 – 21 Mar 2018

Location: Hong Kong Convention & Exhibition Centre, 1 Expo Drive, Wan Chai, Hong Kong

Bringing together rail professionals for over 20 years, Asia Pacific Rail is one of Asia's premier railway industry events. Supported by MTR and attended by movers and shakers of Asia's rail sector, the event will feature eight theatres, covering exciting developments in rail freight, mainlines, high-speed rail and metros. The show will feature leading exhibitors showcasing the latest technologies and innovations in signalling, communications, track infrastructure, rolling stock, automated ticketing systems, asset management, condition monitoring, mainline, construction and more. Railway-News subscribers enjoy 15% off with promo code: RWPH

Wheelsets: More for Less Seminar
20 Mar 2018

Location: 1 Birdcage Walk, Westminster, London, SW1H 9JJ

Learn from a variety of mainline railway, metro and light rail speakers as well as major suppliers about wheelset design and management. Hear from pioneers of new inspection technologies to ensure you are using the most efficient equipment for maintenance of your assets. Take the opportunity to network and share best practice with wheelset experts from researchers and maintenance engineers to rail operators, rolling stock operators and technology suppliers.

RailwayTech Indonesia 2018

22 Mar 2018 – 24 Mar 2018

Location: PRJ Kemayoran (Gambir EXPO), Jakarta International Expo, East Pademangan, Central Jakarta City, Jakarta, Indonesia

RailwayTech Indonesia will take place for the second time on 22–24 March 2018 at Jakarta International Expo, Kemayoran, Jakarta, Indonesia. It will be notably serving as one of Indonesia's most anticipated one-stop exhibition for railway industry players to market their products under one roof in Indonesia.

World Travel Catering & Onboard Services Expo

10 Apr 2018 – 12 Apr 2018

Location: Hamburg Messe und Congress GmbH, Hamburg, Germany

World Travel Catering & Onboard Services Expo (WTCE) is the leading global event for travel catering, onboard retail and passenger comfort. Held annually in Hamburg, Germany, it showcases the latest onboard products and services from 350+ suppliers. The event attracts over 800 airline and rail buyers looking to source new products, stay up-to-date with industry trends and build their business networks. WTCE takes place alongside the Passenger Experience Conference and Aircraft Interiors Expo.

Istanbul Rail Tech Conference and Exhibition

11 Apr 2018 – 12 Apr 2018

Location: Istanbul Congress Center (İCC) Istanbul, Turkey

The Turkish government is investing US$45 billion in its national rail infrastructure. In addition, the wider Middle East and Eurasia regions have allocated US$500 billion for rail expansion, improvements and development. Istanbul Rail Tech provides you with the gateway to these markets and the opportunity to showcase your products to buyers in need of solutions. Across two packed days you will be able to showcase your products at the heart of the railway industry, forge new international partnerships, gain market intelligence, save time and meet current clients and new clients in one go and promote your products with the industry media.

Transport Research Arena 2018

16 Apr 2018 - 19 Apr 2018

Location: Reed Exhibitions Messe Wien, Vienna, Austria

Digitisation, automation and de-carbonisation are major trends that will drastically change the way we live, work and use mobility and transport in the future. Under the heading of "A Digital Era for Transport", the Transport Research Arena 2018 (TRA 2018), to be held 16–19 April in Vienna, Austria, will explore, discuss and demonstrate these major paradigm shifts specifically directed at important areas of our lives, such as transport, mobility, logistics and industrial production.

SmartRail

17 Apr 2018 – 19 Apr 2018

Location: Passenger Terminal Amsterdam, Piet Heinkade, Amsterdam, Netherlands

Building the digital railway of the future – SmartRail is the place to embrace the technological evolution of rail. It is the dedicated and only show for railway infrastructure managers, train operating companies, system and data integrators and technology suppliers to create the digital railway of the future. Focusing on the latest innovations across rail IT, big data, analytics IoT, assets, signalling, telecoms and passenger systems, SmartRail invites the industry's leading C-level executives and department heads to embrace disruptive innovation and develop implementation strategies.

World Metro & Light Rail Congress & Expo

18 Apr 2018 – 19 Apr 2018

Location: Bilbao Exhibition Centre, Azkue Kalea, 1, 48902 Barakaldo, Bizkaia, Spain

The World Metro & Light Rail Congress & Expo is a flagship annual meeting for rail operators, manufacturers and vendors. The international congress boasts an impressive track record of attracting CEOs and senior leaders from metro and light rail systems across the world. The congress will focus on a wide range of topics covering property, signalling, maintenance, non-fare revenue and other issues facing light rail systems.

CORE 2018

30 Apr 2018 – 02 May 2018

Location: International Convention Centre Sydney (ICC Sydney), Darling Drive, Sydney, New South Wales, Australia

The RTSA's biennial Conference on Railway Excellence (CORE) has firmly established itself in recent years as the premier technical event in the Australasian rail conference market, with a reputation for high-quality papers covering a wide range of rail engineering, operations, planning and management topics. The RTSA is proud of CORE's reputation for high-quality objective papers and presentations which advance the body of knowledge on rail technologies and the sharing of best practice in planning, implementation, operations and management of rail.

Infrarail 2018

01 May 2018 – 03 May 2018

Location: ExCeL London (Halls S7-S10), One Western Gateway, Royal Victoria Dock, London, E16 1XL, United Kingdom

First staged in 1994, Infrarail is firmly established as Britain's leading showcase for every aspect of railway infrastructure technology and expertise, with a strong reputation for attracting visiting managers, engineers and buyers at the highest level. Railway infrastructure in the UK is a busy, exciting and challenging market. As well as once-in-a-generation projects like the HS2 high-speed line, numerous large-scale investments are being targeted at enhancing the performance of the existing system and modernising its assets in preparation for future demand..

Selected Middle Eastern Rail Projects: FACT FILE

KUWAIT

Kuwait Metropolitan Rapid Transit System

Location: Kuwait City (metropolitan population: 2,400,000)
Length: 160km
Number of stations: 68, including underground stations
Number of lines: 4
Construction phases: 5
Trains: Driverless
Speed: 90kmh (operational), 100kmh (maximum)
Tender process: complete
Cost: $7 billion
Status: 11% complete / expected to reach full completion in 2019
Funding: PPP

Line 1:
Length: 23.7km
Stations: 19
Terminal stations: University / Messila Beach (with extensions to Jahra and Fahaheel)

Line 2:
Length: 21km
Stations: 27
Terminal Stations: Great Mosque / Salwa (with an extension to National Stadium)

Line 3:
Length: 24km
Stations: 15
Terminal Stations: Jaber al Mubarak / Airport

Line 4:
Length: 22.7km
Stations: 15
Terminal Stations: Qadisiya Stadium / Railway Central Station

OMAN

Oman National Rail Network

Location: nationwide (population: 2,800,000)
Length: 2135km (Oman currently has no mainline railway lines)
Route: connection from UAE to capital of Oman (Muscat) / connection to ports of Al Duqm & Salalah (3rd-largest city) & Sohar (5th-largest city) / connection to the Yemeni border
Tracks: non-electrified (diesel) double tracks
Usage: freight and passenger rail
Speeds: 120kmh for freight / 220kmh for passenger services / infrastructure ready to cope with speeds of up to 350kmh
Signalling: ERTMS/ETCS Level 2
Gauge: standard 1435mm
Status: on hold

UAE

skyTran Yas Island

Type: skyTran is a personal rapid transit system with lightweight two-passenger vehicles suspended from elevated passive magnetic levitation tracks
Location: Yas Island, Abu Dhabi
Route: connect destinations on Yas Island and then link to Abu Dhabi International Airport
Speed: with the entire system being automated, sophisticated computers will allow the pods to travel safely at high speeds
Status: in planning

SAUDI ARABIA

Haramain High-Speed Rail

Length: 453km
Location: west of the country, connecting Medina and Mecca
Stations: 5
Route: Medina, King Abdullah Economic City, King Abdulaziz International Airport, Jeddah, Mecca
Track: electrified double track
Speed: 300kmh
Gauge: standard 1435mm
Rolling stock: 36 Talgo 350 SRO (12,000 horsepower)
Status: test trains have been running on the whole route since 31 Dec 2017 / planned opening for commercial services: March 2018 if stations completed in time

BAHRAIN

Bahrain Light Rail Project

Routes:
Blue Line: Jufair–Northern City Islands–Budaiya
Brown Line: Manama–University–Bahrain Circle
Green Line: Jufair–Manama–Seef
Orange Line: Airport–Diar Island
Pink Line: Hamad Town–Riffa–Isa Town–Sitra–South Manama
Red Line: Airport–Manama–Qatar-Bahrain causeway
Funding: PPP
Status: feasibility study for phase 1 (30km) completed

Loram Opens Rail Grinding Aftermarket & Technical Services Centre in Derby

railway-news.com

Loram Maintenance of Way announced the opening of their Aftermarket & Technical Services Centre serving railway network owners, rolling stock manufacturers and railcar leasing companies across the UK.

Loram Maintenance of Way, best known for designing and operating rail grinding equipment across major railway networks around the world, announced the opening of their Aftermarket & Technical Services Centre serving railway network owners, rolling stock manufacturers and railcar leasing companies across the UK. The groundwork was laid approximately two years ago with the acquisition of Railway Vehicle Engineering, located in the RTC Business Park in Derby, UK.

Based in Hamel, Minnesota, USA, Loram has enjoyed a significant presence in the UK since the early 2000s, when the first large mainline rail grinders were introduced to Railtrack (now Network Rail) as a means for mitigating multiple surface-breaking cracks, better known as rolling contact fatigue (RCF). These earlier-generation machines proved to be instrumental in reducing the potential for rolling stock derailments whilst extending the rail life and improving overall ride quality. This same Loram rail grinding technology is used extensively on track systems in over 30 countries around the world.

Company Overview

Loram Maintenance of Way was founded in 1954 in Hamel, Minnesota, in the United States, initially cleaning ballast on track beds.

Over time, the company developed a reputation for successfully shifting manually intensive, dangerous track repair work to highly automated rail-bound equipment. Types of track products include rail grinding, ballast cleaning, drainage excavation, friction management, track inspection, material handling, and track maintenance consultation. “Rail grinding, in particular, is one of the more complex and sophisticated forms of railway maintenance, which developed into a unique core competency of Loram over the past four decades or more,” says Joe Carlin, Vice President of International Operations and Business Development. In fact, Loram is firmly established as the rail grinding services contractor of choice for virtually all major railroads across North America.

Working closely with railway customers in its home market to safely integrate track maintenance solutions in and around freight and passenger traffic became a trademark of Loram, and eventually it attracted the attention of many railroads around

the world, beginning around the mid-to-late 1990s. Loram capitalised on these opportunities and began selling customised equipment and services to select international railroads. Today you will find Loram equipment operating in over 30 countries worldwide, whilst they continue to increase their market share on their home turf.

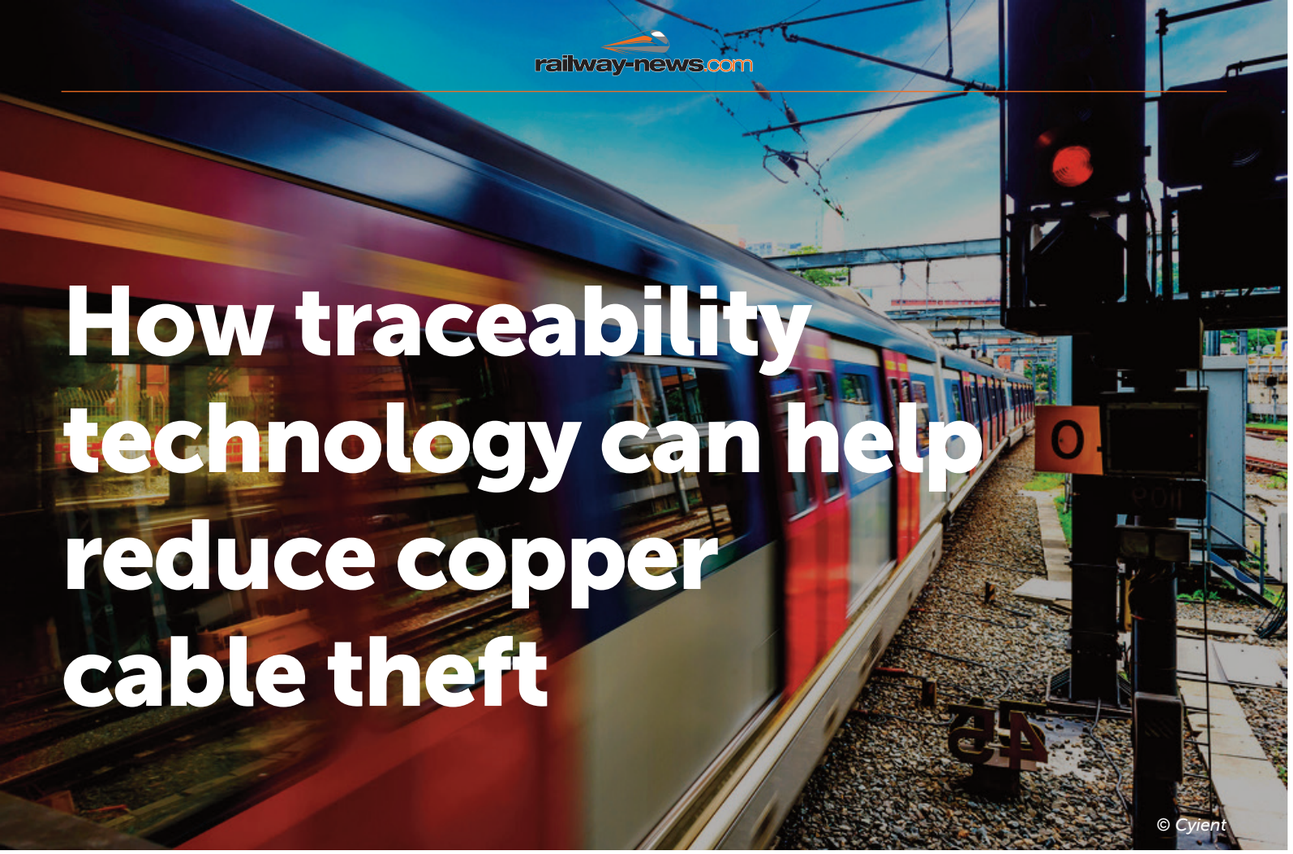
Global Growth Strategy

"The secret to expanding any business globally is to not get too far ahead of yourself, despite the urge to chase every opportunity at your doorstep," says Phil Homan, Loram President & CEO. And whilst the equipment and infrastructure may appear the same on the surface, each railroad customer and working environment carries its own unique regulatory and technical standards and protocols that must be thoroughly understood. Resources can become quickly fragmented by expanding in an ad-hoc fashion, leading to missed deadlines, cost overruns and misunderstandings with the customer. One critical element that is essential in all of Loram's expansion plans is delivering unrivalled customer service before, during and long after the equipment is delivered. This is no easy task for a customer equipment and services provider like Loram. Partnerships with suppliers, thorough documentation, customer training and many other factors come into play. The most important factor is providing strong and reliable local technical support in order to improve response time to the customer, which is the primary driver for selectively establishing regional subsidiaries in Brazil, Australia, Mexico and the UK.

The UK's Role in the Network Rail Grinding Programme

Much has changed since Loram's introduction into the UK railway market some 20 years ago with three redeployed rail grinders. Railtrack became Network Rail and has continued to outsource certain maintenance contracting work. Network Rail added more rail grinding capacity with the purchase of C2102 and C2103 mainline rail grinders. Three more type C44 state-of-the art rail grinders are currently being commissioned, amidst ever changing regulatory and certification requirements. Following two other third party contractors, Colas has been appointed operator and maintainer of the expanded rail grinding fleet. "We are excited about the advancements Loram is making with the introduction of the new C44 machines and their Technical Support Centre approach to enhancing service levels," says Leevan Finney, Project Director, Route Services, Network Rail.

Loram UK has already played a significant role for the rail grinding programme in providing engine generator Tier IV retrofit assembly and testing support after it was determined that the new engines would not be launched by the manufacturer during primary machine production at the Loram USA facility as originally planned. Additionally, Loram UK Train Operations was able to provide machine logistics support for machine movements between dock, assembly shop and testing facilities. They are also working with Colas to establish local inventory management and an emergency response process for delivering spare parts and technical guidance as required. "Improving customer response time and optimising machine uptime is what we are all about, and I look forward to leading our local support team here in Derby," said Richard Kelly, Managing Director of Loram UK.



How traceability technology can help reduce copper cable theft

Line-side copper cable theft continues to blight the UK's rail infrastructure.

By Keri Allan

Line-side copper cable theft continues to blight the UK's rail infrastructure. Aside from the cost implications, which can run into millions of pounds a year, it also has the potential to trigger highly unwelcome service disruptions.

The role of the British Transport Police is obviously key to catching the criminal gangs involved but technology is increasingly helping to limit the illicit removal of valuable copper groundwork.

"You might think it is a victimless crime but it's not. It hurts communities, it brings the transport network to a halt and we will do everything in our power to stop this offending," says British Transport Police Detective Inspector Darren Gough.

The impact of copper theft on train networks

According to Network Rail's own figures, over 3,500 trains were affected by copper theft in 2017, which resulted in delays of more than 28,700 minutes. Bill Kelly, Chief Operating Officer for Network Rail in Wales and Borders, says his company takes the impact of these delays very seriously.

"Train delays and cancellations directly affect people going about their daily lives, such as getting to and from work and visiting family. With more passengers travelling on our network than ever before, even a small delay can have a huge impact on the network."

The scale of the problem is well illustrated by a single case from early 2017. In one incident a man was jailed for cutting copper cable from live lines and selling it for £1,000. The cost to Network Rail, however, was around £164,500 and resulted in more than 3,000 minutes of delays to trains in the East Midlands area.

Operation Crucible

The good news is that copper theft is on the decline but the problem isn't going away. Just last November more than 100 scrap metal dealers across England and Wales received visits from the police as part of Operation Crucible. Most were found to be operating legally but significant finds of stolen metal were made.

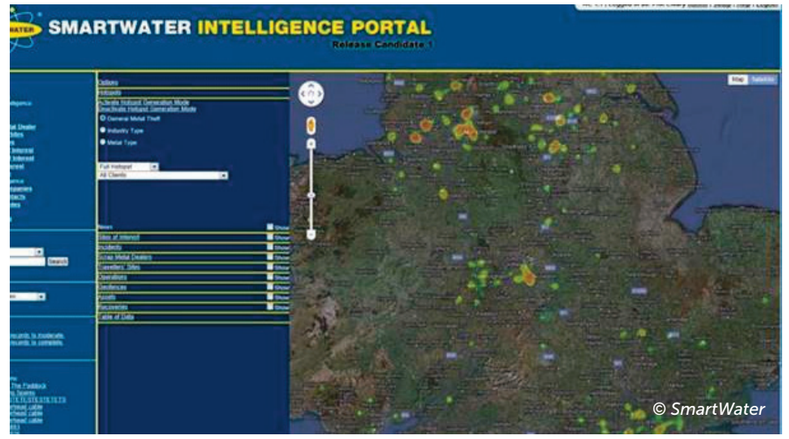
Part of the reason for reduction in line-side metal theft is due to the 2013 amendment to the Scrap Metal Dealers Act. *"Practically overnight, it rendered the possession of stolen metal a threat to the livelihoods of the relatively few unscrupulous criminal scrap metal dealers, who were able, up to that point, to buy copper cable that was obviously stolen with 'no questions asked',"* says Phil Cleary, Chief Executive of risk management and forensic coding company SmartWater. *"It was these people who fuelled cable theft, tainting the reputable metal dealers in the process."*

Traceability technology

'Traceability' technology has played a key role in reducing thefts as in the past possessing cable marked 'Property of Network Rail' was seen as insufficient to secure a conviction – the courts require a higher level of proof that the cable had been stolen. That's where chemical marking technology comes into play – so-called 'smart water'.

This deploys an integrated, forensic marking system that sprays offenders with a chemically coded, indelible liquid when triggered by unauthorised activity. It is invisible to the naked eye but shines brightly under UV light. However, the cost of protecting the entire rail network with a system like this would be prohibitive.

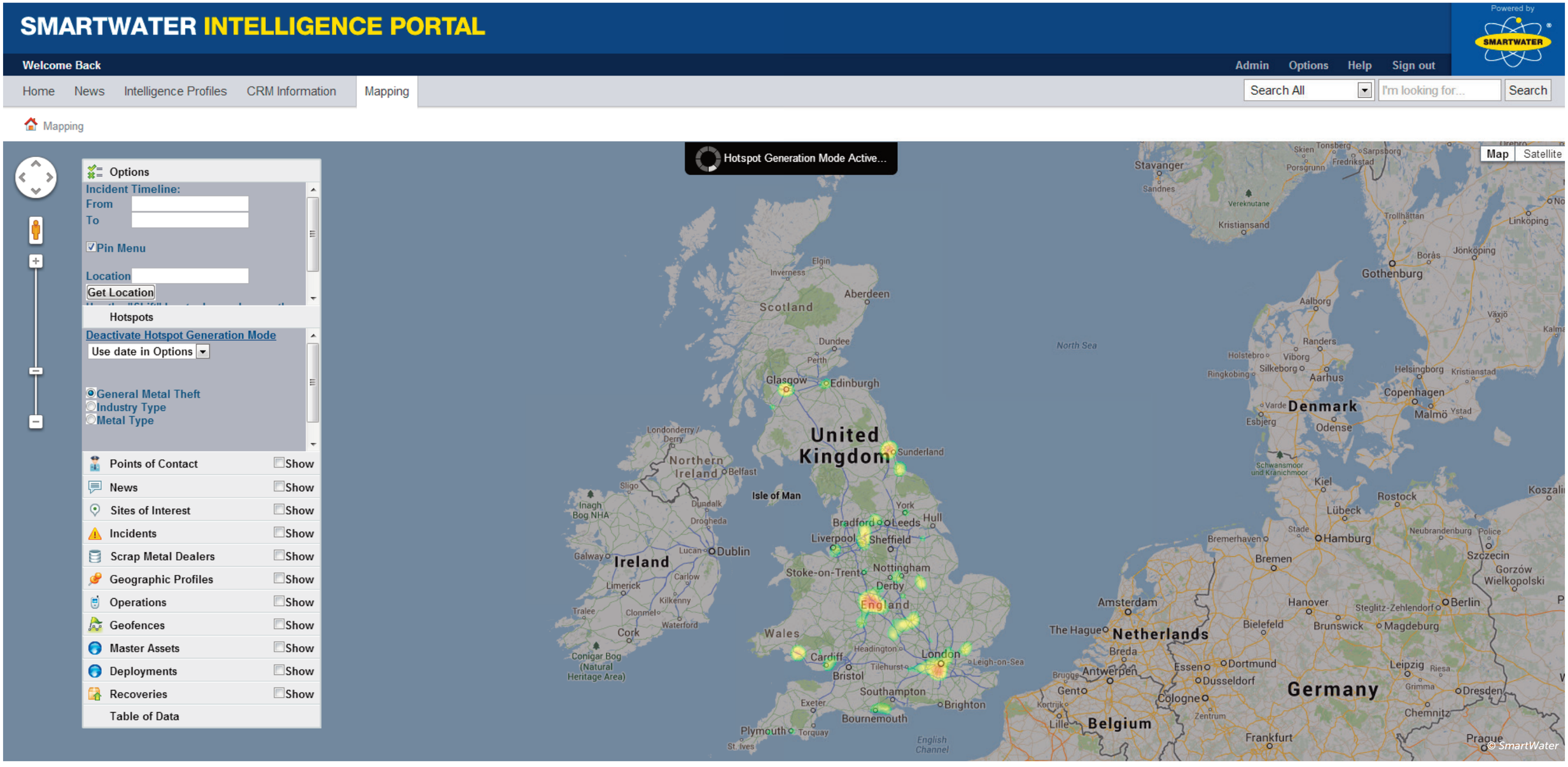
"So, working with the insurance sector and other stakeholders, we use cutting-edge crime pattern analysis to track the movement of organised crime gangs so that we can be targeted in the application of SmartWater, both at key hotspots or new areas that are in the path of a transient gang," explains Cleary. *"We take a 'sniper rifle' approach, using mobile video cameras, rapid response teams comprised of highly professional former military personnel and covert 'sting equipment' as opposed to the old-fashioned 'shotgun' approach of security guards, fixed CCTV systems and so on, which criminals find easy to work around."*



Forensic coding

Cleary goes on to highlight that it is possible to install cable that is forensically traceable back to a particular drum/location. Any stolen copper would then be easily identifiable, making convictions easier.

"The technology exists, it's proven, but I suspect that procurement teams aren't aware of the fact," Clearly notes. *"However, by specifying forensic coding as a proactive 'value added' measure in tender documents for the supply of*



cable, it would save huge amounts of money in having to apply the solution retrospectively, in an outbreak of cable theft."

However, the major challenge is to prevent theft from happening, as most current solutions are forensic-based. Another significant challenge is that some solutions are invasive and require certification.

"A non-invasive solution is the need of the hour," says Avinash Chaudhari, Assistant General Manager – Delivery and Operations, Transportation at global rail engineering solutions provider, Cyient, *"and as part of our approach to creating industry-based solutions, we are working on prototyping a non-invasive solution using the Internet of Things (IoT)."*

"Our solution works on the principle of non-invasive detection, and uses the requisite hardware and communication technologies for detecting the cut, alerting, and providing an approximate length of the cut," says Narendra Sivalenka, Cyient's Senior Manager – Semiconductor, IoT and Analytics. *"Considering the distance between the junction boxes, LoRaWAN would be the best fit, and to showcase the workability of the solution as a proof of concept, we used a different technology for building the functional prototype.*

"Tests on our concept have yielded positive results and efforts are currently underway to make the solution more robust by addressing device sensitivity and ruggedness, and test it in real-world conditions."

Gambling with lives

Cable theft is, of course, very dangerous. *"Any attempt to steal cable is also incredibly dangerous, and anyone seeking to do so risks serious injury – or even death – through electrocution,"* explains Sergeant Ben Randall-Webb, from the Proactive CID team in the British Transport Police. *"Offences linked to theft of metal on the railway can attract a penalty of up to life imprisonment, so the implications are severe.*

"Despite the obvious danger and relative lack of reward, people are still willing to gamble with their lives for the sake of a few metres of cable."

ASC German Sensor Engineering

GERMAN SENSOR ENGINEERING

Vibration Monitoring

ASC German Sensor Engineering, headquartered in Pfaffenhofen, Bavaria, is one of the leading manufacturers of acceleration and rotation rate sensors, as well as IMUs (Inertial Measurement Units).

Something we at ASC know all too well is this: rail transport imposes particularly stringent demands on measuring technology. That's why our development engineers strive hard to develop both ultra-durable and reliable sensors for our rail sector customers. These are sensors which prove their worth in operations, day after day, to monitor safety and wear for trams, underground trains and rolling stock carrying passengers and freight. They meet all the key quality and safety requirements.

Leveraging many years of experience and having an established presence in the rail transport sector has allowed us to develop a particularly wide range of these units for our customers in this key sector. And when there is a need to master individual challenges, we also develop customer-specific sensor solutions that meet even the most complex of requirements.

In the rail transport sector we offer sensor solutions of unrivalled quality, including for the following applications:

Operational stability test

In rail transport, individual components such as bogies, axles, brakes and wheel bearings are exposed to extreme and other ambient conditions. Investigations into operational strengths help uncover potential weaknesses at an early stage and contribute decisively to ensuring the safety and reliability of rail vehicles in the process. Our customers use numerous capacitive accelerometers from ASC to monitor individual components as well as complete trains. Both the uniaxial ASC 4421 MF and the triaxial ASC 5525 MF are preferred choices in this context due to their high shock resistance and their extended frequency range when measuring vibrations at the bogie and its components.

Structural analyses

Within the rail sector, structural analyses are not only performed on trains, but also draw bridges, tracks and the track bed. The task of monitoring vibration on drawbridges (structural health monitoring) in particular may require exceptionally long cabling between the sensor and the measuring computer, which results in unwanted signal losses in the process.

The ASC CS series of capacitive sensors guarantees loss-free signal transmission over even the longest lengths of cable due to their current output of 4–20 mA. Many customers currently use the triaxial CS-1611LN sensor for such applications. Accelerometers with lightweight, high-frequency and robust qualities are preferred for the structural analysis of complete trains as well as for individual components. As satisfied customers confirm: the triaxial piezoelectric ASC P203A11 accelerometer more than meets these requirements.

Track bed vibrations are also examined, for example, to record any settling of the subsoil. In this case, underneath the entire stretch in question, the ultra-durable and hermetically sealed ASC OS series sensors are used, such as the uniaxial ASC OS-115LN or the triaxial ASC OS-315LN.

Bridging navigation

The ability to determine the position of rolling stock at all times is a safety must for modern rail transport. For example, trains may lose their GPS signal when entering a tunnel. Under such circumstances, sensors can help ensure continued accurate positional determination.

The ASC IMU 7.x.y. is a sensor with six degrees of freedom (DOF) that is often installed in rolling stock for the purpose described. The measuring unit is based on a triaxial capacitive MEMS accelerometer and a triaxial angular rate sensor. With the IMU 7.x.y, ASC offers a unique modular system, allowing a customised configuration to meet individual requirements. When it comes to measuring acceleration, there is a choice between the ASC LN series and ASC MF series with a measuring range of ± 2g to ± 50g as well as a rate range of ± 75 °/s to ± 900 °/s.

Driving comfort measurement

Assessing driving comfort involves measuring low frequencies all the way to 0 Hz, to personally record even the slightest impacts and vibrations, which may impinge on the comfort of passengers during travel. The uniaxial accelerometers ASC 4311LN and ASC 4411LN, boasting low frequencies and exceptional dynamics in signal and noise performance, are ideally suited for assessing driving comfort and go a long way towards ensuring passengers have a more pleasant ride.

Middle Eastern Promise for E-Leather's Product Development

E-Leather, the global high-tech materials company, is set to return for a second year to Middle East Rail following a successful show in 2017.

The Middle East and Africa market offers huge growth potential for the business, which has been traditionally more dominant in supplying high-performance leather fibre composite in ground transport throughout Europe.

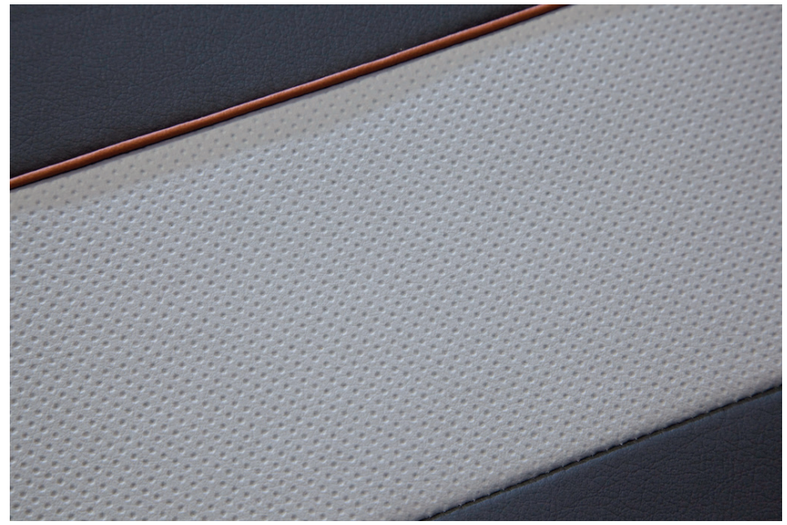
Since the huge increase in business investment and influx of people into the Middle East, transport in the region has been forced to transform in order to reduce traffic congestion and offer more available and more flexible travel options. According to the news and business intelligence service, MEED, every country in the Middle East has announced plans for a scheme. It is estimated that this equates to over 33,000km of mainline routes as well as 3,000km of metro lines.

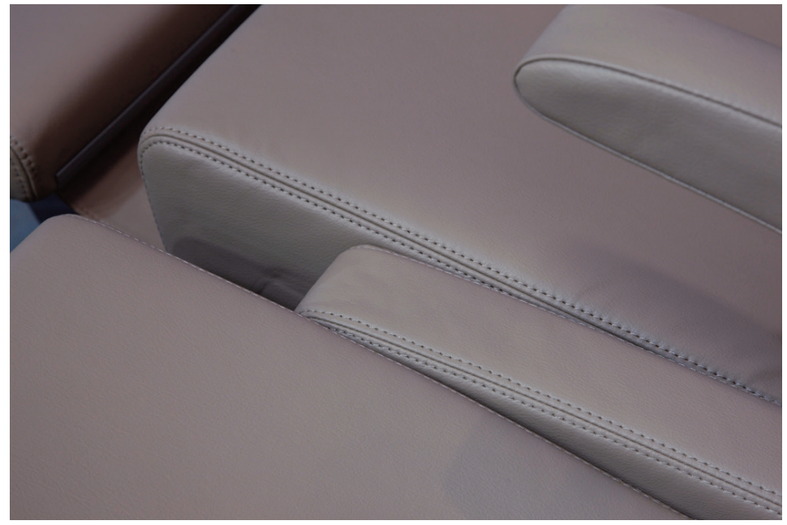
Alexandra Bennett, Business Manager Ground Transport, comments "It is not just the growth potential that attracts us to this market but also the demand for quality, luxurious materials often true of Middle Eastern design taste. From our experience, we see that luxury doesn't always deliver comfort, and this is where we can assist operators and designers to strike a balance with our product."

Comfort can be measured in a number of different ways, which is why E-Leather take a more holistic approach to what really achieves comfort levels for passengers. The company considers three main areas where a material needs to perform for passengers and operators.

Quality, luxurious material

Traditional leather has been heavily used as the material of choice in the Middle East, primarily due to its heritage and





association with high quality and luxury. During traditional hide processing, there is typically between 30–50% wasted due to the irregular shape and inconsistencies found with a natural hide. E-Leather developed a patented process that takes the unused trimmings and engineers the leather fibre into a high-performance leather fibre composite. The benefit of this is huge; the end user gets the quality look and feel of traditional leather as the product contains up to 50% of the original leather fibre, but with enhanced performance and manufacturing benefits. Production yields are significantly increased and the end product is stronger and more durable so it looks healthier for longer.

Cleanliness and hygiene

Not surprisingly, one of the biggest contributors to passengers' perception of comfort is the cleanliness of their seat during travel. Fabric seats are known to contain thousands of unhygienic particles, that even regular cleaning would be hard to deter. Traditional leather offers a more hygienic alternative to fabric but can require more care and maintenance as the more cleaning it endures, the more reconditioning the traditional leather hide requires to prevent it from cracking and drying out. Leather fibre composite is an ideal solution as it offers increased hygiene properties without the need for excessive maintenance. A simple wipe can ensure every passenger experiences a clean and comfortable journey.

Style and design

Passengers have higher expectations in general for their travel experiences, whether it's on a flight, on the road or on a train. People expect to have a positive travelling experience regardless of the ticket price or the class of travel they booked – and part of that experience comes down to design. E-Leather can come matched in any colour and a number of finishes to offer design versatility. In addition, it can be easily embossed, laminated or stitched to enhance brand and style further.

To ensure these areas are addressed, E-Leather continuously analyses the latest in colours and textures to broaden the product range and demonstrate the premium quality of finish you can achieve from a technologically advanced material.

Alexandra Bennett continues, "Our aim is to offer passengers maximum comfort and style while giving operators performance benefits that support their business objectives. We are very excited to show customers in the Middle East how we can help make their rail interiors more inviting."

About E-Leather

E-Leather is an award winning, environmentally friendly materials technology company offering a range of products, specifically engineered for a diverse variety of sectors worldwide.

E-Leather products are designed and manufactured to provide exceptional characteristics delivering an eco-friendly material that out-performs traditional leather, synthetic leathers and fabrics. Using the process of hydroentanglement we combine traditional leather fibers and high-performance core material to produce eco-engineered leather fiber composite materials.

The clean technology product uses only the power of water in the manufacturing process, and recycles 95% of the process water, converting the waste streams into energy, which is then fed back into the process.

We partner with leading brands in the aviation, ground transport, automotive and consumer sectors to meet and exceed their business goals while ensuring compliance with industry safety regulations and helping to create better experiences for them and their customers – all done through a unique, sustainable process.

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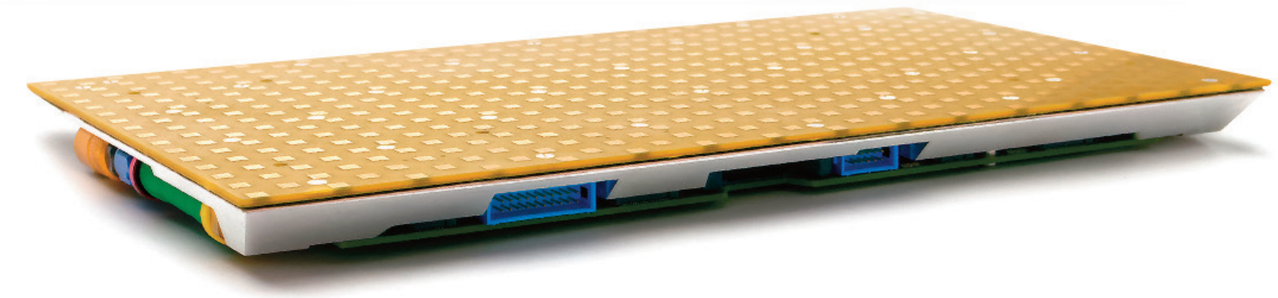
Re-shaping the Future of Rail Connectivity

For connectivity on-the-move, nothing can rival satellite.

Unconstrained by terrestrial infrastructures' limited reach and congestion, satellite delivers complementary broadband access to virtually anywhere in the world. Today, the satellite industry is experiencing a revolution that will transform it forever. These changes will dramatically affect the reach, affordability and accessibility of "over-the-horizon", or satellite-based broadband wireless connectivity - a paradigm shift that will completely transform communications on the rails.

Let's take a closer look at these changes, and why Phasor's break-through electronically steerable antenna (ESA) technology holds the key to unlocking the potential. Communications satellites operate in three types of orbits: Geosynchronous Orbit (GEO), Medium Earth Orbit (MEO) and Low Earth Orbit (LEO). Traditionally, GEO satellites have been the mainstay of the industry and these large communications spacecraft, located over 37,500km above our heads, travel at the same speed as the Earths' rotation, and therefore appear to be "fixed" in one location in the sky. These satellites, though extremely capable as broadband communications relays, suffer from latency, which can affect certain types of communications such as real-time voice & video communication, due to the time - interval for a signal to reach and return from the satellite. Additionally, GEOs reach is limited in coverage in the extreme Northern and Southern Hemispheres where the "look angle" from an antenna to the equatorial satellite is extremely low, which impairs communications links. Alternatively, there are other types of satellites called "Non Geosynchronous Satellites", (NGSOs), which travel in multiple orbital planes around the Earth, at dramatically closer orbits. These MEOs and LEOs were traditionally reserved for scientific, weather, government/defense and narrowband communications missions. The important and notable change that is now rapidly sweeping the industry is the use of smaller satellites in the MEO and LEO orbits for "wideband" (Ku and Ka frequency) broadband



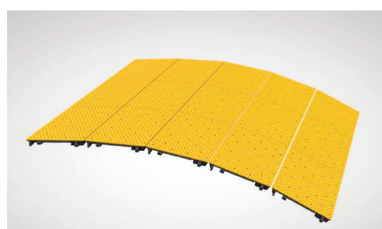
communications. Due to their much closer proximity to the Earth, latency is no longer an issue, and the multiple orbital planes (other than at the equator) ensure coverage literally everywhere on Earth, including the Poles.

The planned MEO and LEO constellations will consist of many – in some cases thousands – of smaller satellites that will orbit the Earth much faster than GEO satellites. This means that the ground terminals (antennas) that receive the signals must be able to track these moving communications satellites (as apposed to the apparently "fixed" satellites in GEO). In addition, it is required that the ground terminal must track two LEOs/MEOs simultaneously - as one comes into view and transits across the sky, the second must be tracked and engaged to ensure the network remains connected seamlessly.

These new developments within the satellite industry have the potential to create huge benefits for land mobile communicators. If GEO, MEO and LEO satellites, with all the individual and complementary benefits they bring, can be used interoperably, rail operators and communicators will be able to realize a connected experience that is unprecedented– the ability to truly connect EVERYWHERE in broadband, independent of location or which type of satellite asset (GEO/MEO/LEO) is being accessed. As most rail operators will opt for terrestrial wireless networks initially, this new and ubiquitous satellite broadband coverage will complement, and in most cases supplement 3G, 4G and 5G- based networks, allowing a seamless operating environment for all rail broadband service providers.

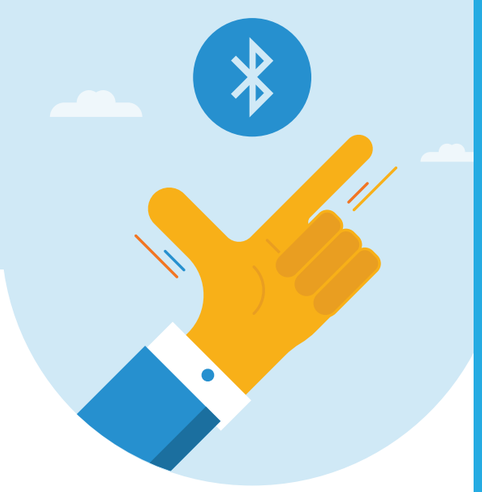
This powerful combination is being built and launched today, but will only work with a new breed of enabling technology – the electronically steerable antenna, (ESA). The right kind of access technology – agile, reconfigurable, high-performance - unlocks the potential of the new space segment infrastructure in development. Without it, these ambitious constellations and their plethora of services and new applications they empower, literally cannot be realised. The ESA is the gateway technology that will enable these transformative communications. Phasor Inc. was founded four years ago to solve this problem, initially focused on solutions for the rail industry. During the development process of its' ESA technology, the team at Phasor focused upon the evolving nature of enterprise broadband connectivity in land mobile markets, and on satellite industry trends. Phasor is now preparing to take its ESA through beta test, and then to bring to market a very low profile, flat panel solution that is future proof, enterprise grade and that offers unrivalled performance, scalability and reliability. The ESA is solid-state (no moving parts or motors), stands at just 2 inches high and will conform to the deck or superstructure of any vessel. This kind of advanced antenna simply does not exist anywhere else today, and it is set to disrupt the mobility and enterprise broadband communications markets.

The demand for broadband mobility is on a growth trajectory that will continue for the foreseeable future, accelerated by the advent of new and more powerful satellite communications fleets. The introduction of a truly high performance, flat panel antenna with the ability to track multiple satellites from a single aperture simultaneously, is the critical piece that will complete the broadband mobility jigsaw. In the near future, Phasor will offer its unrivalled ESA technology to the passenger rail market and help define a new era of connectivity on land, at sea and in the air.



Bluetooth leapfrogs NFC in terms of passenger convenience

ByteToken's 'Frictionless' AirGate solution is a game changer for transport operators and travellers.



ByteToken, Ltd in association with its parent company Bytemark Inc. were the big winners at the recent Transport Ticketing Global Awards in London. ByteToken's AirGate Bluetooth solution won the headline award of the night, 'Ticketing Technology of the Year 2018,' with over 40 entries, the toughest category by far.

The AirGate solution exploits the potential of using a Bluetooth-enabled ByteToken app on a mobile device to facilitate the process of automated fare validation, with the aim of removing user interaction with the fare gate, thereby improving the user experience and increasing passenger throughput.

By utilising a 3D camera, and developing specialist software to increase the accuracy of Bluetooth BLE, it is now possible to authenticate a ticket over a wider area and over a longer period of time compared to the centimetre range that NFC requires. This means a user doesn't need to break stride as they easily pass through ticket validation zones.

First demonstrated in London on the 9th February 2017 and with support from Thales and RSSB, AirGate has been well received within the transportation industry both in the UK and abroad. AirGate will greatly enhance the customer experience by removing the need for a passenger to show a ticket, produce a smartcard or tap their device on a validation target and thus speed up passenger access to and from the station platform.

ByteToken's Director, Alex Stewart, said of the award, "We are really pleased that the judges recognised all the hard work and innovative thinking that we put into AirGate and they saw it as being 'Genuinely Innovative'. I look forward to seeing our ticketing technology help shape public transportation, making it a far more pleasant and accessible experience for both the commuter and the casual user."

ByteToken and parent company Bytemark continue to innovate and set the standards for mobile ticketing worldwide, delivering proven, secure mobile ticketing platforms for transit, tourism, and events. Using our open APIs and combining visual, 2D, Bluetooth and NFC ticketing, we offer operators an integrated mobile commerce experience that shapes the future in mobile ticketing.

Enhancing the passenger experience

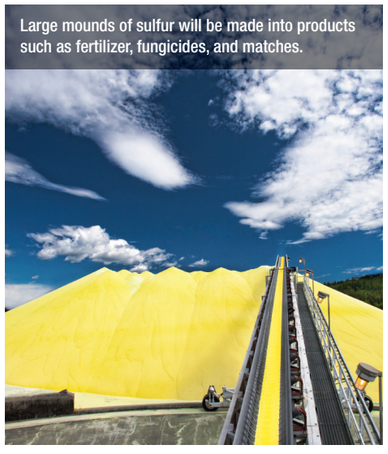
- ***Increased passenger throughput, by removing all physical user interaction with gate***
- ***Enhanced passenger travel experience, delivering hassle-free travel***
- ***Secure; ensures only those passengers with valid tickets are able to pass through the fare gates***
- ***Delivery of a solution that can be configured to fit the requirements of any station***

About Bytemark, Inc.: A New York City startup with offices in the UK, Canada and Australia, Bytemark, Inc. provides ticketing and payment solutions for transit, attractions, and events.
www.bytetoken.com

SHUNT WITH SUCCESS

A Funk PowerShift DF150 transmission delivers four speeds forward and reverse with selectable automatic or manual shift.

Trackmobile rail car movers keep the workflow on schedule in yards and facilities



Large mounds of sulfur will be made into products such as fertilizer, fungicides, and matches.

A Trackmobile rail car mover pulls a train of rail cars filled with yellow sulfur at the Enersul sulfur processing plant near Pincher Creek, Alberta, Canada. A byproduct of oil and natural gas refining, trainloads of sulfur arrive, where it is processed, formed, and eventually shipped out for use in other products.

Enersul moves all its sulfur by rail. Instead of moving rail cars with locomotives that are expensive and confined to track use, Enersul relies on Trackmobile rail car movers offering bimodal flexibility to go on and off the rail.

The company's newest model, the Atlas, features up to 27,306 kilograms (60,200 pounds) of tractive effort, making it possible to pull from 20 up to 50 freight cars under the right conditions. The Atlas is one of four rail car movers manufactured by Trackmobile LLC of LaGrange, Georgia. Since the company's inception in 1948, it has manufactured its rail car movers with steel wheels because of the longevity and consistent traction in varied weather conditions.

The Titan (shown at Enersul) was the largest rail car mover, prior to the launch of the Atlas model, at 22,453 kilograms (49,500 pounds). "The Titan is a muscle machine," says David Puddell, Enersul plant superintendent. "It has all the pulling capacity for what we need to do."

Next in line is the Hercules, a mid-range class vehicle with up to 20,865 kilograms (46,000 pounds) of tractive effort. There's also the Viking, the nimblest of the three, with up to 20,336 kilograms (44,900 pounds) of tractive effort. With a flip of a lever inside the cab, operators can temporarily increase the tractive effort by hydraulically lifting the rail car and transferring up to 22,226 kilograms (49,000 pounds) to the wheels of the rail car mover.

Power is transmitted to the rail-drive axles through a Funk™ PowerShift DF150 transmission with a torque converter mount that delivers four speeds forward and reverse with selectable automatic or manual shift. Trackmobile now offers telematics standard on all these rail car movers, making it possible to monitor the entire Trackmobile system, including the PowerShift transmission, from a remote location via the internet.

While telematics capabilities are relatively new to the rail car movers, PowerShift transmissions are not. Trackmobile has been installing them on its rail car movers for more than two decades and today purchases them from its distributor, Flint Equipment Company. Michael Young, Trackmobile sales and marketing manager, attributes this to years of proven performance. "The powertrain is so critical," he explains "The average rail car loaded with product weighs about 268,000 pounds (121,563 kilograms), which is a lot of weight. Multiply that by 40 rail cars, and the Trackmobile is pulling over 10 million pounds (4,862 metrics tons) of weight — and that comes to bear on the transmission and drive system. It's really pretty incredible what the PowerShift transmission does."

Performance goes beyond pulling heavy loads. Conditions at the Enersul sulfur plant in Alberta are extreme. "It's miserably cold in the wintertime — and the environment is harsh, with large amounts of corrosive chemical," says Young. "It works in a tough environment in a tough application."

Puddell can attest to these harsh conditions, as well as the pressure to keep rail operations flowing day in and day out. "Our partners that we deal with every day are in the oil and gas business. We have a deadline once our rail arrives, and we cannot have anything that can hinder us from accomplishing our goal. If we have any type of glitch that stops that flow, it will shut down the entire gas plant. The Titan performs exactly as we expect it to do."

Enersul has been using Trackmobile rail car movers for years, and most are still running after decades of hard use. "We think it's due to the quality of the components that we have, specifically the Funk PowerShift transmission," says Young. "It's very robust."

The Enersul sulfur processing plant near Pincher Creek, Alberta, Canada, processes sulfur, a byproduct of oil and natural gas refining.

Trackmobile Pulling – A Trackmobile Titan Shunts tank carloads of oil in Saudi Arabia

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