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MAGAZINE

The latest news & reviews from the industry

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– Not all disabilities and conditions are visible

9th – 11th May 2017
NEC Birmingham UK

RAILTEX 2017

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RAILTEX 2017

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9th - 11th May 2017 | NEC Birmingham UK

Railtex is the all-encompassing showcase for technological innovations across all sectors of the rail supply market.

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Letter from the Editor

This year's Railtex will be held at Birmingham's National Exhibition Centre (NEC), Tue 9 May – Thu 11 May.

Railtex, the 'international exhibition of railway equipment, systems and services' was first held in 1993 and has been held every two years ever since. Now in its thirteenth year, the show is expected to build on its successes of increasing visitor numbers and more exhibition space.

Railtex will be officially opened at 10.30am on Tuesday, 9 May, by Paul Maynard, the UK rail minister and former member of the Transport Select Committee appointed in July 2016.

In addition to the exhibition space where you will be able to network and present your products, Railtex will also feature a number of keynote speeches: Paul Plummer, Chief Executive of the Rail Delivery Group; Gordon Wakeford, Chair of the Rail Supply Group; Dr Francis Paonessa, Managing Director of Infrastructure Projects at Network Rail and former managing director in the UK for Bombardier; David Waboso, Managing Director Network Rail / Digital Rail; Professor Andrew McNaughton, Technical Director at HS2 Ltd; David Prout, Director General of HS2, who has held this position for the Department for Transport since January 2013.

Other speakers throughout the show come from a wide variety of industry experts such as RSSB, Arriva, MTR, Siemens and Hitachi.

The Knowledge Hub will be the venue for The Platform, a schedule of interactive discussion forums addressing current and future rail industry topics: Productivity and Industrial Strategy; Infrastructure – this talk will include Lord Adonis, the Chair of the National Infrastructure Commission and former Secretary of State for Transport, who has also been appointed the Chair of Crossrail 2's Programme Board – and, lastly, Midlands Engine.

In 2015 Railtex hosted almost 470 exhibitors and 7500 trade visitors. 2017 promises to be an even better year, as the UK rail industry is currently enjoying a huge amount of investment in major prestigious infrastructure projects such as HS2 and Crossrail, with Crossrail 2 and HS3 also on the cards and with mainline electrification works and signalling upgrades also under way.

As always we will be attending the event and hope to see you there. Please get in touch with us at al@railway-news.com if you would like to schedule a meeting. In the meantime please enjoy our 2nd issue of 2017 packed with in-depth features, interviews and supplier news.

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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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Contents

RAILTEX 2017

To Wifi and Beyond – Getting Online is Just the Tip of the Iceberg

We all want wifi. Free wifi.

By Josephine Cordero Sapién

In restaurants, hotels, bars, airports, stations, trains... basically any time we're away from home. I – that's me, Josie – now won't book at hotels that don't have complementary wifi in the room.

And I'm sure any parent can testify that the question 'what's the wifi password?' has overtaken 'are we there yet?!?' as the number one question coming from the next generation.

So of course we want to talk to companies who're making wifi happen for us. And to that end we chatted with Matt O'Donovan, CEO of WiFi SPARK, and his colleague Claire Bradley to find out what they're up to.

Matt explains what got him going back in 2003:

"I spent a lot of time on aeroplanes, a lot of time travelling around Europe, Middle East and Africa and I decided I'd had enough of aeroplanes; that was about the time that wifi was embryonic. I had a boat in Torquay marina where I wanted to be able to access the internet while I was tinkering with my boat."

He goes on to say that he looked around to find a service that could accommodate what he was after, but came up empty, so...

"...I decided to make one".

Need is the mother of invention.

"Being a techy at heart I got a couple of engineers who were working for me at one of the American companies and said 'OK guys, I want to build this platform to get people on-board wifi networks'. So we did."

Fast-forward through a steady development, project by project in hospitality and healthcare to a company that now employs over 50 people.

***RN:* "So if you set up in 2003 how long did it take you to get into the transport sector?"**

Matt: *"We've been in many different sectors, transport is quite a recent thing for us. It was only really last year that we implemented the Chiltern Railways service. My experience of working in the rail industry is that they're very risk-averse – it's got to be right, it's got to be fit for purpose."*

***RN:* "Did you approach Chiltern Railways and say 'I think we can do something for you' or did they come to you and then you looked into it, thinking 'what are the specific needs of transport sector, can I do that?'"**

Matt: *There was obviously a competitive tender situation for Chiltern but when we looked at Chiltern's requirements it was an obvious fit for the way we had architectured the platform. We've got to get the transport industry up-to-date with technology. The connected journey piece was really good."*

The connected journey is a continuously connected wifi experience for passengers from station to train, train to station.

Matt: *"We had most of the components required in the service to create this connected journey so for us it was an obvious and natural thing to do. I think other companies who don't have such an open architecture would have struggled, some of the monoliths, they've got a very regimented offering: you take this from Sky and you will get A, B and C. If you try and go outside of the box its like 'oh, well that's a big change to our core platform that could affect millions of people, we're reluctant to do that so actually you don't need it you should just take what were offering you'. It's not the right approach. And if you're going to be innovative in any sort of industry you have to approach it from the 'what would you like?'"*

***RN:* "Do you think that sometimes a lot of the train operators and rail operators don't know quite what they want? How would you manage the client to sort of try and get them thinking in a different way?"**

Matt: *"There used to be a term in wifi called monetisation. You have to monetise your wifi. I think that's dying out now but a few companies are still using it. Really you should think of your wifi network as a platform from which to launch other services in the same way that your household wiring, the electricity in your home is your infrastructure – that's quite boring and you pay for it and it works. When was the last time you considered the efficacy of your 13amp outlets? You just never do because it just works but what is interesting is the fact you can go to John Lewis and buy a nice Samsung TV and it's got all these smart things in it and brings you benefit and you can plug appliances and services into it to improve your life and make it a lot better. That's the same thing on wifi so the days of wifi as just being 'I can log on and get on the internet' are pretty much over or they are certainly changing and the important stuff is the services you can run on top of that to bring additional benefit.*

"Now in rail there are some big challenges, the biggest challenge they've got is getting the internet connectivity to the rolling stock – that will only be solved by better 4G and 5G connectivity and it will remain an issue for quite some time but there are ways of improving a lot for the passengers by way of caching local data, certainly for entertainment type services and some operators are starting to do that but there is a gap between the expectation of the customer and their experience when they're sat on the platform connecting to a fibre optic internet connection to when they get on that rolling stock and go out of Oxford Parkway – they're on to 3G, 4G as a best you can get in the middle of the countryside – and it ain't that great. That's the biggest bugbear I think for internet connectivity."

RN: *"So can you talk us through who does what on this connected journey project?"*

Matt: *"So first of all the experience that the passenger gets is they park their car, they walk out of the car and stand on the platform and they take their device out. They see that there is a wifi network available, that's us, so we broadcast that signal on the platform. The passenger then sees a very nice user experience that gives an opportunity for engagement with Chiltern. You get a period of time to validate your email address, if you validate it then great you get a year of internet for free."*

RN: *"That means I have to sign into my email account, see the email that's just come through to me and click accept."*

Matt: *"Yes that is the step that you have to go through but we feel that if we're giving you a year's worth of free internet it's probably worth you taking the time within that 15 minutes free to open your email."*

Matt can see I'm not very excited by this extra validation step for reasons that would end up being rambling, but yes, if I don't have to sign in for a whole year after that, I'd do it and there's more:

Matt: *"Then the passengers at the station are online, they then exit the platform onto the train – at that point there's some magic that happens between Icomera and us where we hand the session over to Icomera, it then continues with Icomera, the train departs, comes all the way down into Marylebone Station and then the reverse happens. So the passenger gets off the train, walks on to the platform, we then see that, we take the session back so you have your connected experience the whole way through. At the same time on the platform we have a connection that allows the train to offload its data, so if somebody comes in to the station, they're on the train, their internet connection when it was out in the countryside will be sub-optimal when they are in the station it will be great, because we allow that train to hop onto the wifi in that station."*

RN: *"You're at stations and you've built a programme that says 'prioritise me if you see me' to the device?"*

Matt: *"Yes. That's how you get a year of internet. As for the TOCs, I will paint some scenarios of what can be done in with regards to big data. This is where I think the TOCs really need to pay attention.*

"So you've collected the data about the fact that somebody has walked on to the platform via the wifi. We can then tell you how long that device has been on the platform so we know what the waiting time is we know what train they got on because we will see a large number of devices disappear from the platform and go somewhere else. So we can then say OK at 9:17 these devices exited and then were next seen at the next station down where they were picked up. We can also determine how long people wait on the platform. You might not think that's very interesting but actually it is because you have concessions on the platforms that rely on people turning up to buy their goods. Starbucks and Costa aren't going to put their brand somewhere where they don't know what the footfall is, where they don't know what the occupancy level is and there's no way of evidencing it. If we can evidence how many people spend what amount of time at which platforms, that's really useful information to give back to concession operators. But lets now take that to the next level and look at data enrichment."

At this point Matt, Andrew – my collegue, who is also there in the room with us, and I have a chat about privacy and consent. Think GDPR – the General Data Protection Regulation – the 'Snoopers' Charter, Brexit, grey areas, lawyers... basically, uncertainty, but we get back to the possibilities.

Matt: *"We can take an external data source such as census data and based on a postcode and say a year of birth, we can say you earn £45,000 a year on average, you drive a BMW, you go on holiday twice a year you tend to go to the Far East, you like shopping for these things – it's incredible all this data that is available through enrichment."*

RN: *"The postcode is one of the things you ask for on your Chiltern sign in page."*

Matt: *"Let's be straight, we're not doing this now. We're putting forward the potential benefits to clients through data enrichment. So all of a sudden not only can you say to you concession operators 'we are going to have busy hours 7am–8am on Wednesdays where 17.5% of the footfall arrive, but actually of that 17.5% a quarter earn more than*

£50,000 a year and drive a Mercedes, so that might be more attractive to a Starbucks/Costa.

"I think we are going to see a movement towards using this data more practically for improving the services, being able to look at your overall infrastructure and what improvements you need to make for the benefit of the passengers to have measurable results – that's really exciting and will get a lot of attention in coming years.

"I cannot predict from your postcode that you drive a Mercedes. But I can predict out of 100 people in your postcode with your age group the probability of ownership of that particular type of vehicle is greater than X. So it is statistical analysis and this is why I say it's analytics. If you hear the term wifi analytics, from most companies what that means is collect data, put it on a pie chart – that's not analytics at all. Analytics is actually taking that data, enriching it, drilling it down putting in other data sources and making informed business decisions based on that data."

***RN:* "So Chiltern run the train service but they also manage the station and that's why you can benefit by having the interconnectivity. There are other franchises where maybe the operating company has nothing to do with the stations and that makes it a bit more complicated. If I think your solution is great, what needs to change so that it can be rolled out without these barriers to continue this seamless experience?"**

Matt: *"Yes absolutely and that is the challenge where we can do it for a micro community or a single TOC that has the ability to manage the platforms, so if it's Network Rail then we've got a challenge. But, as you can imagine we're also talking to the Department for Transport, Network Rail and all the other TOCs about this sort of service."*

***RN:* "So if you can do all these great things with data enrichment, why are you currently only providing the connected journey for Chiltern and not more?"**

Matt: *"You need to watch this space. We're talking to them about it."*

***RN:* "But you're already capturing the data, so when you do roll it out, you've got a year, 2, 3 years worth of data already?"**

Matt: *"Yes, correct. And we can look at seasonal averages we can look at performance one year based on another one, we can look at events – what is Glastonbury doing for Chiltern Railways?"*

Claire: *"I think something that our most successful customers have got in common is that they really want to delight their own customers so their passengers. Chiltern with their passengers don't want to just get them from A to B on time, they want to make sure that their passengers are having a really positive experience the entire way. As soon as they step out of the car on to the station, they are able to check their emails and see what deals are coming up with Chiltern, nice little touches like you get 'welcome back Matt' when you get back into the station – the same thing happens if you visit London City Airport. It's just the personalisation that really drives the consumer loyalty to the organisation that they are travelling with."*

We concluded the interview. We left with a much clearer sense of understanding about the possibilities that companies can access via analysing data and the huge potential for using information about customers to enhance the customer experience, increase revenues for businesses and improve safety and reliability. It is definitely an impressive resource companies have at their disposal.

Wifi is something that all train passengers want and need in today's digital world. It is also the responsibility of the rail industry and governing bodies to make sure this data is used correctly, ethically and responsibly. If that is the case, then some very powerful and exciting developments lie ahead.

Innovation in Integration – Leading the way in integrated passenger information systems

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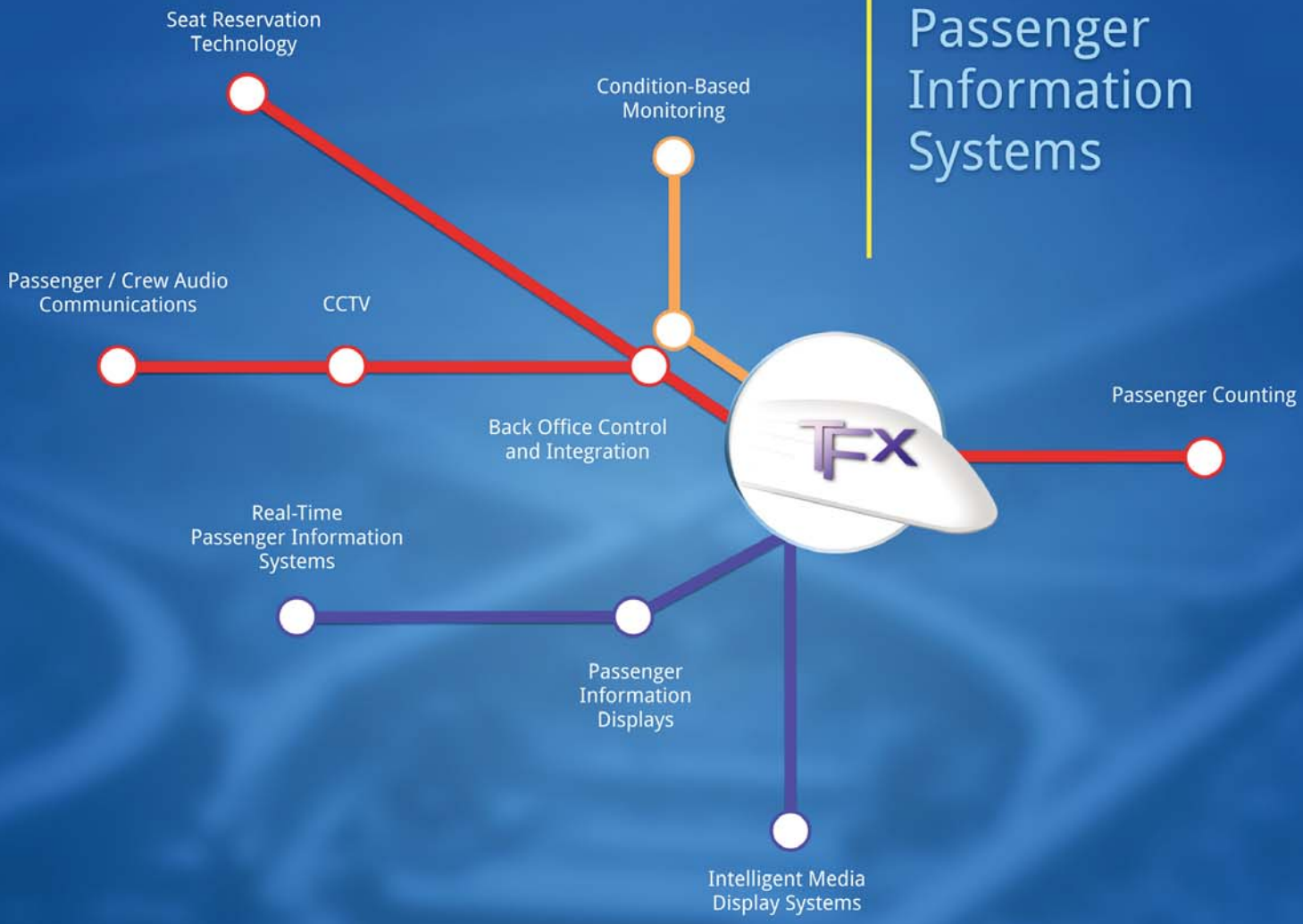

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Smart Lighting

For a Modern 21st Century Railway

David Long, Lighting Engineer at Schréder UK, discusses how IoT lighting technology can help modernise the UK rail experience in line with 21st century demands—from electric charging ports for devices and vehicles, in-built CCTV and PA address systems, to distributing emergency notifications and evacuation guidance, all in one energy-saving lighting column.

Since the birth of the steam engine and the first rail journeys, passengers have consistently wanted three things: the train to be on time; to find a seat and the ticket to be inexpensive. However, in recent years the expectations of passengers have increased. For UK rail operators to be able to meet and exceed these demands, they have the opportunity to invest in innovative technologies to modernise the network.

Lighting plays an important—and often underestimated—role at stations across the country. Lighting columns enable passengers and staff to enter, exit and navigate around stations safely, especially at night or when ambient light levels are low during the winter months. However, they can do much more.

Internet of Things (IoT) connected lighting is one of the fastest growing areas of technology in the UK, although it has yet to be widely implemented across the UK rail network. With British rail passengers making more than 1.7 billion trips a year, new 'smart' lighting columns can help significantly improve the passenger experience whilst acting as an additional security and traffic management tool for station operators.

Smart luminaires are modular interactive lighting columns designed to encourage social connectivity in public areas. They combine energy-efficient LED lighting technology alongside cameras, speakers, internet connectivity and a range of electric charging applications, all in one unified column.

Improving safety and security

The combination of large retail environments and heavy footfall means that criminals have been known to regularly target train stations and the passengers using them. The latest figures from the British Transport Police (BTP) reveal increases in the total number of reported crimes at some of the UK's busiest train stations—including London Waterloo, Clapham Junction and Manchester Victoria.

Smart lighting columns are fitted with embedded CCTV cameras capable of monitoring and recording events and feeding the footage back to an incident control room in real-time. When aligned with passenger notification boards, CCTV can help make positive identifications by facial recognition. The columns also have their own in-built Public Address (PA) system which station managers can use to put out alerts regarding delayed or cancelled trains or speak directly to passengers in one area of a station.

Combined, these features are able to provide an added layer of protection and monitoring so that security officials in an incident

control room have a clear understanding of an event in real-time and can make quick decisions based on accurate information – both inside and outside the station. They also provide BTP officers with the evidence they may need to prosecute criminal behaviour.
In the event of an emergency—such as a station fire or an act of terrorism—the first priority is ensuring passengers remain safe. The second priority is enabling them to complete their journey. Station staff can use the lighting columns to push out important security announcements and remind passengers of emergency evacuation procedures. The PA system when used in conjunction with the column's LED light ring is capable of physically guiding passengers to designated safe-zones.

As one of the core functions of this innovative lighting technology is Wi-Fi connectivity, officials can also distribute emergency notifications via the column's own Wi-Fi network to passengers' mobile devices, making them aware of incidents instantly and providing actions to guide them to safety.

Transforming the passenger experience

Modern passengers have come to expect a positive digital experience when travelling, which presents rail operators with a big challenge. By implementing smart lighting technology, operators can

provide a more dynamic level of service and ensure that passengers using the network have the most enjoyable and hassle-free experience possible. An enhanced passenger experience can significantly improve customer loyalty.

In a retail context, Wi-Fi networks can be used by operators to send out the latest promotions and offers on tickets and refreshments, as well information regarding facilities at a station and the latest updates to train schedules.

With electric charging still not widely available across the UK rail network and only some train operators offering the facilities, passengers would be able to use the electric charging ports in lighting columns to charge consumer devices.

Vision of the future

Whilst smart lighting technology offers several benefits to passengers, it can also provide Network Rail and train operators with advantages. Firstly, by using energy-efficient LED luminaires to upgrade lighting infrastructure across the network, energy consumption can be reduced by between 50 and 70 per cent (in some cases this can be as high as 90 per cent). As a result, the cost of lighting the rail network can be significantly reduced, freeing up vital funds to be used on other regeneration projects.

The most innovative lighting solutions can provide adaptive station lighting, giving operators flexibility in how lighting is used.

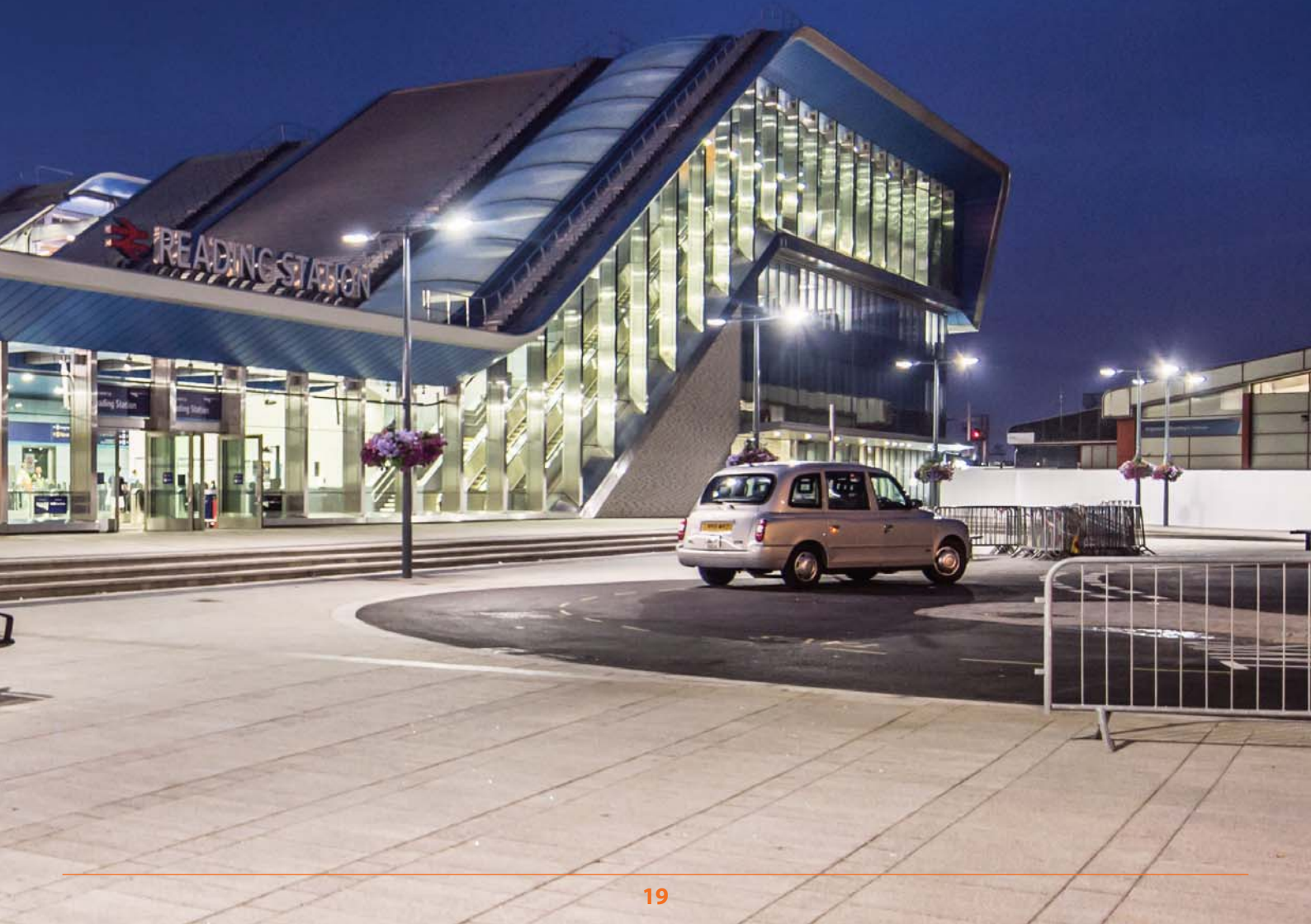
By being able to control the lighting network via an internet connected device, lights can be dimmed based on footfall, fitted with passive infrared (PIR) sensors that activate the lights once movement is detected, or scheduled to remain active during planned engineering works or station maintenance. This not only provides a safe and comfortable environment for passengers but can facilitate further cost savings by only using energy when required.

Already capable of offering electric charging ports for vehicles as well as secure cycle storage, in the future smart lighting columns can be used outside stations to provide traffic alerts, to detect available parking spaces and provide live weather data—all of which will help improve the passenger experience even further.

Conclusion

Smart lighting columns—with their ease of installation and low-maintenance requirements—are an efficient solution to install across the rail network. Not only do they bring vital station infrastructures together in a single cost-effective unit, but they allow stations with limited external space to maximise their outdoor environments by reducing the volume of street furniture; minimising both the environmental impact and cost.

Smart lighting is no longer just a vision of the future but a viable reality. As the UK rail network gears up for its biggest upgrade in a generation, smart technologies can help revitalise train stations and enable them to become the transport hubs that 21st century passengers need.



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Upcoming Railway Events

April, May, June 2017

23 Apr 2017 – 24 Apr 2017

4th Annual Saudi Arabia Transport & Infrastructure

Location: **Marriott - Riyadh, Saudi Arabia**

Discuss the GCC Railways vision in adopting next-generation policy and procedural and regulatory initiatives needed to attract investments in the sector. Platform for exchange of views, ideas and business opportunities among the global/domestic industry and GCC Railway sector. Discuss the state of development and trends in benchmarking for the GCC railways in operation parameters. Highlight latest developments related to freight management and passenger services.

Event website:

http://infraoutlook.com/events/sati2017/

25 Apr 2017 – 27 Apr 2017

The Stephenson Conference: Research for Railways

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

The Stephenson Conference is the premier international rail event that brings together academic researchers and industry experts to shine a spotlight on the pioneering work taking place in railway across the globe. It is unique in providing an opportunity for academia and industry to discuss in detail the latest research developments and the impact it can have on the railways. Attendees will gain a unique overview of the similarities and differences of the rail networks of countries including the UK, the USA, Japan, Germany, Italy, Switzerland and many more, along with exclusive case studies detailing how specific research has been used proactively by rail companies to improve their service.

Event website:

http://events.imeche.org/ViewEvent?code=C6344

25 Apr 2017 – 26 Apr 2017

World Metrorail Congress

Location: **Business Design Centre, London, UK**

The 13th annual Metrorail World Congress will bring together worldwide rail urban experts to deliver the latest insights into groundbreaking strategies and topics set to revolutionise your day-to-day activities. Alongside the main strategic conference the event also running an exhibition where you can demonstrate your solutions to the rail community. If you provide products or solutions for the rail industry, the Metrorail World Congress buyers want to meet you.

Event website:

http://www.terrapinn.com/conference/metrorail/index.stm

26 Apr 2017 – 28 Apr 2017

The 3rd Transport Wireless Rail Conference 2017

Location: **Changsha, Hunan, China**

Transport Wireless Rail leads the development of connectivity on metro and high-speed trains all around the world, and brings together the global leading rail and metro operators, wifi project contractors, telecom carriers, system integrators, rail transit R&D institutes and equipment / technologies / solution providers. After Chongqing Station, the 3rd Transport Wireless Rail 2017 will take place 26–28 April to in Changsha, hosted by Changsha Rail Transit Group Co., Ltd.

Event website:

http://www.jwconsulting.cn/wifi/index.html

26 Apr 2017
25th Annual: Rail Freight Group Conference 2017

Location: Victoria, London | 1 Drummond Gate, Pimlico, London SW1V 2QQ, United Kingdom

The Rail Freight Group Conference returns for its 25th year, convening the entire industry to explore how to respond to emerging opportunities and overcome the biggest challenges facing the sector in 2017 and beyond. Bringing together 140 attendees, including operators, rail freight customers and ports, to review government support and plans for the sector, the conference explores where the areas and opportunities for rail freight growth are, including intermodal and supply chain opportunities. Receive 10% off using code – 320RNEWS

Event website:

http://www.waterfrontconferencecompany.com/conferences/rail/events/25th-annual-rail-freight-group-conference

09 May 2017 – 11 May 2017
Railtex 2017

Location: The NEC, Birmingham, B40 1NT, UK

Railtex provides an unequalled opportunity in the UK for companies serving all aspects of the infrastructure and rolling stock sectors to present their capabilities, meet their customers and be part of the industry's networking event of the year. With the exhibition as its centrepiece, Railtex additionally features a stimulating supporting programme encompassing keynote speeches, seminars and discussion forums all devised to highlight industry trends and – importantly – bring people together.

Event website: http://www.railtex.co.uk

30 May 2017 – 01 Jun 2017
iaf International Exhibition for Track Technology 2017

Location: Messe und Congress Centrum, Halle Münsterland, Albersloher Weg 32, 48155 Münster

Exhibitors and visitors from all over the world are expected to participate in the 27th International Exhibition for Track Technology (iaf) – the ideal opportunity to establish international business contacts and to further enhance your own network of customers and partners. With its combination between professional presentations of machines in the outdoor area, a large exhibition in the halls and an accompanying seminar program, the iaf is the worldwide outstanding trade fair for experts, entrepreneurs and professional visitors. Don't miss it!

Event website:

https://www.iaf-messe.com/en/

13 Jun 2017 – 14 Jun 2017
Africa Rail 2017

Location: Sandton Convention Centre, Johannesburg, South Africa

The Africa Rail conference continues to be the largest of its kind in Africa, hosting the largest gathering of rail operators, government entities and contractors. Bringing the most innovative minds together from across rail, cargo and technology, Africa Rail ignites new ideas and inspires the audience to think differently. You'll be stimulated by innovators, business leaders and entrepreneurs from across Africa.

Event website:

http://www.terrapinn.com/exhibition/africa-rail/index.stm

22 Jun 2017
3rd Annual: UK Rail Station Development and Regeneration 2017

Location: Addleshaw Goddard, London Milton Gate, 60 Chiswell Street, London EC1Y 4AG, United Kingdom

How can you ensure the success of your station development? The UK Rail Station Development and Regeneration conference returns for its third year, with an all new programme for 2017, focusing on practical solutions to help optimise delivery of your project. The day will provide you with the guidance needed to ensure maximum operational and commercial returns from your scheme. Receive 10% off using code – 327RNEW

Event website:

http://www.waterfrontconferencecompany.com/conferences/rail/events/3rd-annual-uk-rail-station-development-regeneration-2017

27 Jun 2017 – 28 Jun 2017
World Metrorail Congress Americas 2017

Location: The Inn at Penn, Philadelphia, PA, United States

The World Metrorail Congress conference and exhibition has been attracting CEOs and decision makers from the global rail industry for 12 years. The conference focuses on strategic discussions between both rail operators and vendors about upcoming metro projects and improvement plans. Discover what challenges lie ahead for rail operators and demonstrate how you can help them overcome those. The conference provides vendors with an opportunity to learn about upcoming projects and tenders before anyone else does.

Event website:

http://www.terrapinn.com/conference/metrorail-americas/index.stm

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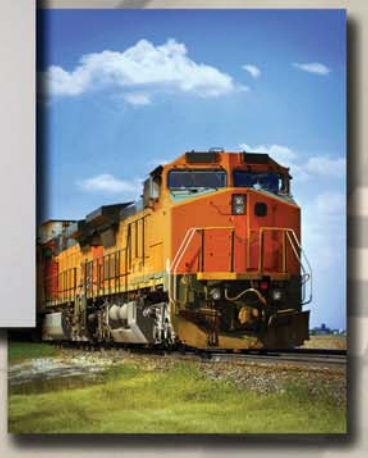

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Cyber Security in Rail

A vital and growing field that companies, infrastructure operators and governments need to embrace. This includes the rail industry.

Critical infrastructure broadly defined refers to assets or systems that are essential for the functioning of society and the safety and security of a population, and where disruption or destruction of this infrastructure would have a significant impact. This includes a nation's energy supply, for example, but also its transport network.

That not only makes critical infrastructure a particularly attractive target, it also means an attack has the potential to bring about especially devastating consequences.

Cyber Security in Rail

With increasing digitalisation in every area of society, cyber security is a vital and growing field that companies, infrastructure operators and governments need to embrace. This includes the rail industry.

Railway-News caught up with Alzbeta Helienek, Lead Systems Engineer at Thales, to talk cyber security in rail, following Thales's presence as lead co-sponsor at the 2nd Annual Rail Cyber Security Summit that was held in London on 14–15 March.

An Accepted Threat

We start by asking her whether rail industry members have all understood and accepted that cyber security is an area that affects them too or whether there is any remaining scepticism. The industry has acknowledged that cyber threats are real, she says. The convincing stage was 5 years ago but taking action to address them are still at different stages, depending on the organisation and country. So now the rail industry is focused on learning about its vulnerabilities and problems and finding solutions.

Actual Cyber Attacks on our Railways

And there have been real cases where rail systems have been hacked. Ms. Helienek mentions Seoul's subway system that got hacked over the course of several months in 2014. More than 60 employee computers were infected with malware, resulting in data and information leaks. South Korea accused its neighbour to the north of having been behind the attacks.

In January 2008 a teenager used a modified television remote to hack into a Polish tram system, causing four vehicles to derail. The incident injured twelve people.

In December 2011 hackers attacked a railroad in the Pacific Northwest, disrupting railway signals for two days.
"This is going to sound naïve but why? What do hackers want?" She's quick to answer: "Attention seeking, blackmail, extortion... they're experts, often it's state-funded". Ms. Helienek explains, the rail industry is incredibly focused on safety; as a cyber hacking threat, an attack on a safety-relevant feature such as a signalling system is much less likely than an attack on a business-relevant feature. There are major barriers to getting into safety-relevant systems. But attacking a business's IT infrastructure is an area that's just more familiar to hackers. They can cause disruption and confusion for economic or political gain. Sometimes, as in the Polish case, it's a kid messing around. The system's highly interconnected and a hacker mightn't even realise the knock-on effects he's causing in such an interconnected system.

Disruption & Distrust

"Just think of the disruption to a city and its economy," she says. If the London Underground stopped running, the whole city would come to a standstill with far-reaching consequences for the economy. It would also cause distrust in public transport and the government.

This is true on both counts. The Daily Telegraph reported in January this year on the disruption caused in London as a result of the tube strike with phrases like "swarms of people rushing", "evacuation [...] due to overcrowding", "chaos", "endless queues" (How much will London's tube strike cost the economy and how will it damage the capital's businesses?). And this is for a strike, where we know when it will be, how long it will last and what the motivations are for the people organising it.

The Telegraph article goes on to mention a number of sources attempting to quote figures for just how many millions were lost to the economy as a result; there seems to be agreement at least that that seems something of an impossibility. It does, however, point out an upside to digitalisation. It allows vastly more people to work from home in such an event, reducing its economic impact.

What are the most attractive targets?

We ask Ms. Helienek whether this suggests that metro systems are much more vulnerable targets than, say, long-distance trains. "You can't say that," she tells us. The attack on the Polish railway was a long-distance train; the Tokyo gas attack in 1995 was metropolitan. She explains, an attack on a high-speed train for example would be an attack on a prestige project, on one of national pride. It would gain a lot of media attention, which is what hackers seek.

Throughout this conversation Ms. Helienek refers to them as "unpredictable and covert", as in, you can't try and guess at what every hacker is trying to do and why – or even where they're operating from. She says that trying to do this is the wrong approach. She says the correct response and best protection is to always monitor your systems so you know what's going on in your network. That way you know what's normal and when you're being hacked. The second goal for industry members is to always keep systems moving and operating despite a cyber attack or get systems up and running again as quickly as possible – resilience is key.

Rail-specific Solutions and Standards

Vigilance and a quick response make intuitive sense of course and that's exactly what the suppliers and customers at the Rail Cyber Security Summit came to discuss. They need to stay informed on cyber security issues. Ms. Helienek tells us she did attend a multi-industry conference on cyber security three years ago as a lot of the threats they face are the same. But, she says, the solutions are different. The avionics industry or the power industry will have their own processes, solutions and standards. She adds, oftentimes when threats are identified, the response is to do patch management, to close the loophole. In the rail industry it can often take a long time to get approval to make changes when you have to bear in mind the safety protocols and reliability requirements.

Governmental Responses

Okay, so different industries working together is of limited value in terms of tailoring solutions. But what about governments? Do they respond well? Does she have experience with different governments? Yes, she says. The UK and Austria are really different. As a global city, the threat to London feels more real than it does in a country like Austria – she is Austrian – and therefore it feels like more of a target.

The UK is a more natural, more likely target, she says. It's part of military operations and it's a military ally, it's a member of NATO, unlike Austria. The UK government is aware and prepared and also quick to fund projects and issue guidelines, she adds. Some may say that it is a leader in deploying solutions to tackle cyber threats, however the threat is evolving and so must governments and industry. The new national cyber security strategy says the government will intervene on the grounds of national security if the industry isn't doing a good job.

Supranational Approaches: the EU

There are positive initiatives on a supranational level too. The European Union's Horizon 2020 programme Shift2Rail funds the CYRail project, which was selected by the European Commission to enhance cyber security in the rail industry. CYRail was launched in October 2016 and held its first workshop in Paris in December of that year. It has a project runtime of 24 months and a budget of €1.5 million. The project objectives focus on assessing the most critical railway services and the most innovative attack detection techniques, find counter-measures and mitigation strategies and to determine resilience mechanisms.

Ms. Helienek stresses the importance of standardisation and legal preparedness for the industry. She points us to ETSI, the European Telecommunications Standards Institute, and CENELEC,

the European Committee for Electrotechnical Standardization, as two further bodies helping to develop and implement industry-wide standards for cyber security.

What can passengers do?

We take all of this in and feel confident that cyber security in rail is an important topic for industry members, rail authorities, national governments and supranational bodies like the EU. But how about passengers? What can passengers do? Ms. Helienek pauses to think about this one. We're all familiar with the signs on the London Underground encouraging passengers to report anything suspicious. We know not to leave our luggage unattended because it will be seized and destroyed. The British Transport Police tell us that if we see an unattended bag or package that could be an immediate threat, we should move away and call 999. It's a very tangible thing. And we know it's justified. We know about the London 7/7 bombings and the 2004 Madrid train bombings.

So Ms. Helienek says, there needs to be more public awareness, definitely. If passengers see something abnormal, they need to report it, but they need to know what abnormal looks like. Suspicious wifi names or too many open networks for example. She says she wouldn't be at all surprised to see such an awareness campaign in the near future. Maybe instead of posters warning us about unattended bags, they'll feature screenshots of suspicious wifi networks.

Ms. Helienek concludes, the railway is not a closed network anymore. It's interconnected. That opens it up to attacks and allows potential attacks to have further-reaching consequences, intended or not. Vigilance, preparedness, resilience and rapid response plans will keep passengers safe, companies protected and nations and their critical infrastructure secure.

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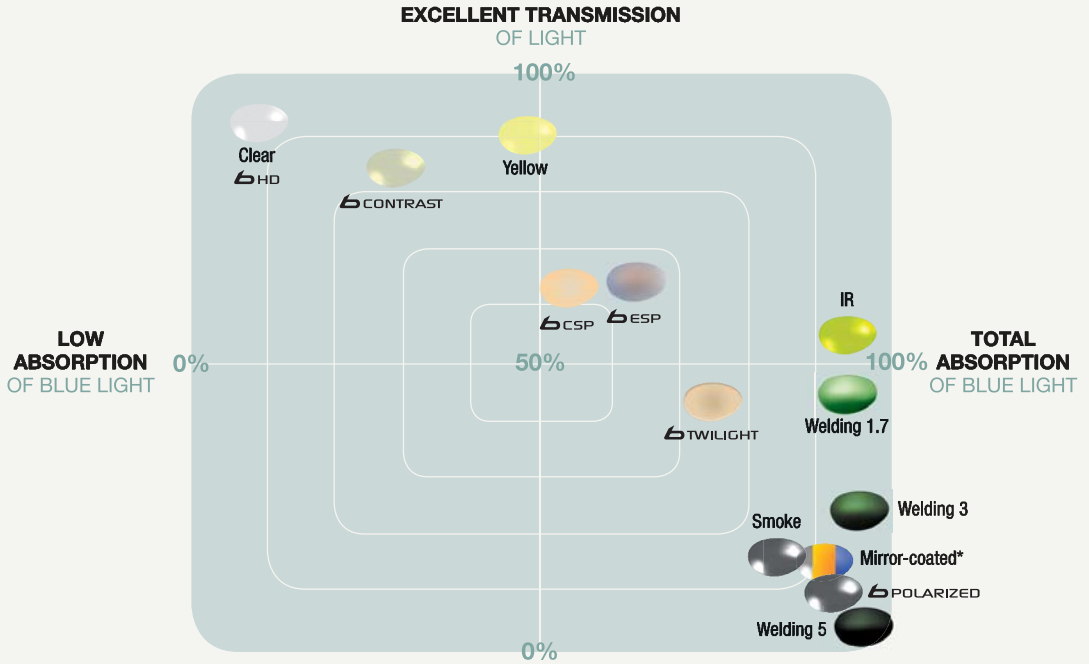

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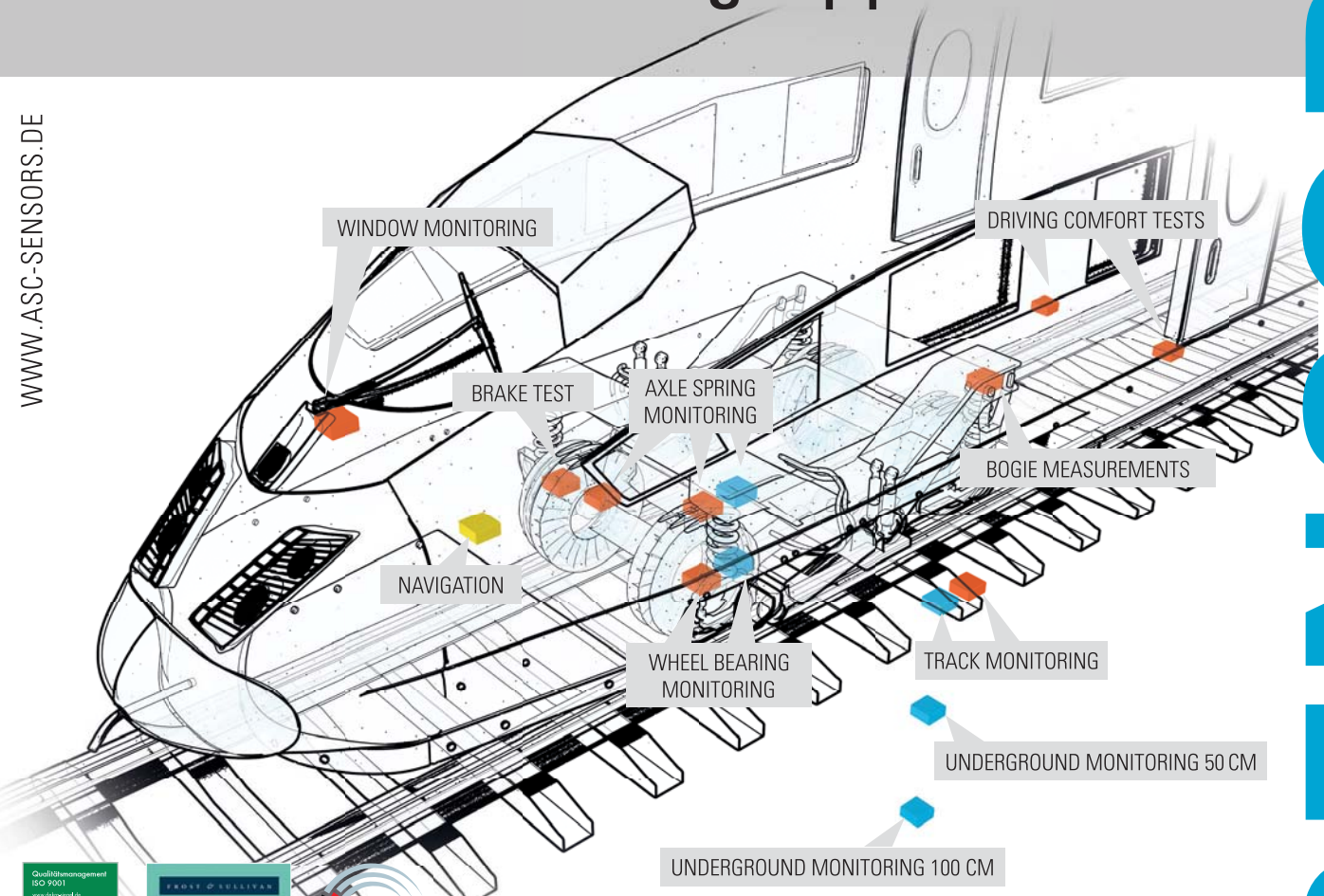

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Parker Hannifin Partners with Tidyco

To showcase motion and control solutions for the rail industry at Railtex 2017

Celebrating its centenary year, Parker Hannifin, the global leader in motion and control technologies, is participating at this year's Railtex exhibition in partnership with distributor partner Tidyco.

Parker's unparalleled expertise in the rail industry means they can offer solutions to address the 4Cs of Cost, Carbon, Capacity and Customer not only from the perspective of train operating companies, but also vehicle builders and owners. With this approach, Parker will be focusing on two main themes for this year's Railtex exhibition:

- **How to keep the existing fleets of rail vehicles in service, drawing upon their extensive experience of the here and now of repair and maintenance operations**

- **How to address the future challenges in the fields of energy recovery, energy storage and management through Parker's technology transfer solutions in electromechanical, mechatronics and hybrid innovations**

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For further information on how Parker can support your application, speak to their experts on Stand S17 at Railtex 2017, or contact them at rail@parker.com or visit **parker.com/rail**

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Women on the Front Line – Emma Gilchrist

Emma Gilchrist is the founder of Motion Rail, a telecoms company that has worked on prestigious projects such as Crossrail and Thameslink.

By Josephine Cordero Sapién

Emma Gilchrist is at the front centre ©Network Rail]

With the International Women in Engineering Day (#INWED17) coming up on 23 June 2017, I wanted to find out how Emma didn't just get into this male-dominated industry, but how she came to run her own successful company.

I put my first question to her: *"how did you come to work in the rail industry?"*

She laughs. (Emma laughs a lot.) *"It was a bet!"*

I like her already.

She explains, she was working in a pub in Devon, waitressing at the time. She was 18 and trying to pay her way, having had a son when she was just 15. There were engineers staying in the pub and they were in the bar talking about their work and boasting about

Emma Gilchrist

how much money they were making. She told them she could do that too. They said, *"bet you can't!"* and Emma obviously retorted, *"I bet I can!"* so they took her to work and she assisted with a fibre joint. The men were impressed with her, saying she had patience and the small fingers necessary to do the delicate work.

Emma absolutely loved the experience and went straight home to tell her mother that she wanted to train as an engineer. Her mother laughed and asked her, *"what do you want to do that for?"* – but not because she didn't think it was a suitable career for a woman. Emma's mother in fact trained as a welder and had worked on the Channel Tunnel.

Emma says she had to convince her mother that she was serious at first because she hadn't really stuck with anything up until then and after having had a child at 15, she needed to prove herself. She went to the Prince's Trust for help who gave her a £500 grant to complete a fibre optic training course. Emma is full of praise for the Prince's Trust.

Once Emma's family believed she was serious, they were incredibly supportive. Her grandparents gave her her inheritance early so she had some money to support herself and her mother looked after her son. Emma took courses with a company called Optical Technology Training in Yorkshire. It was there that she met Richard Ednay, who she says was hugely supportive, encouraging her to go for her chosen career.

She then returned to Devon and went to the Job Centre every day, looking for work. A hospital relocation job came up in Swindon, a four-month project, and she took it. Helpfully, she adds, she broke her arm the day before the Swindon job started. But she was one of a team of engineers, all of whom were helpful. This placement was hard for her because she had to be away from her son. She travelled up on Mondays and back down on Wednesdays to see him mid-week, before travelling back up again early on Thursday mornings.

Emma had also applied for a job with Thales. She actually missed two interview dates, but then got a call from the HR department insisting that she show up for the third one. Emma went and got a job as a railway telecoms maintainer in Wales so she moved there with her son.

Emma had to be on call for this job and it also required her to work nights. Luckily, she had a brilliant childminder, she says, and a great boss. She got training at Thales to apply her skills to the rail sector specifically.

Throughout her journey Emma got a lot of help from family and encouragement from mentors and bosses. She said though that with peers she really had to prove herself as a woman – she had to work harder and be better to be accepted by them, to *"be one of the guys"*. Emma seems to have taken it in her stride. She has always been willing to work hard and from the ground up for what she wants. Her grandfather has been a big influence in her life, she says. He was a commander in the navy but started out peeling potatoes.

Another person who was a big influence on Emma was a man called Lionel Gray. She describes him as old-school, a rail engineer who was a constant source of encouragement to her, a mentor. She tells me he was her boss and they both applied for the same job and she got it and after that they never spoke again. I get the feeling that if she could change anything, it would be this.

Emma moved from engineering to management in Thales, which she found quite lonely in comparison. So in 2009 she left Thales and started working at Track Safe Telecom Ltd. She laughs again. *"I was quite excited because I got an Audi as a company car."* In the end, however, she was made redundant and took a job at a coffee shop.

After some soul-searching she reached a decision. She had had seven years of training and had obtained her IRSE licence. She decided to set up her own company: Motion Rail. Again she started out small, just her in a van, with the company entirely paying for itself. She didn't want to take out any loans. She had had a daughter who was four at this point. She worked long days and relied on the help of au pairs.

Since then her company has gone from strength to strength. She got her first employee, Craig, she has worked on the Severn Tunnel,

Crossrail, Thameslink, the decommissioning of Liverpool Street... In 2012 she became an approved Network Rail supplier and in April 2016 she got her rail contracted certificate.

Her son, who was 3 when she embarked on this journey, is 20 now and also works for Motion Rail. It is important to Emma to give something back. She has had so much help and support along the way, vital encouragement and training opportunities.

Emma has signed up to Jobs Growth Wales, a programme for 16–24-year-olds established by the Welsh Assembly Government to get young people into work. The young people taking part in the scheme get a six-month placement where half the wages are paid for by the company and the other half by the Welsh government. This is how Emma came to hire her first female employee, Lauren, whom she has now taken on permanently to work in finance and tendering. Emma tells me she won't get any more senior in her field so her goal now is to pass on her knowledge. Lauren is getting her driving licence through Motion Rail, as well as her Level 3 accountancy certificate and her Personal Track Safety card. Emma is also about to take on two further young people from Jobs Growth Wales.

But Emma's desire to give back goes further. She is keen to have a rail training academy in Wales. She is in the process of setting up a not-for-profit organisation, a training school for the underprivileged. She says it can be a huge barrier that young people need at least 5 GCSEs to even get started. This mind-set also harks back to one of her grandfather's philosophies. 'Some people are worth saving'. By which he meant, sometimes people need another chance because they will come good.

Emma's career in rail has brought her personal happiness as well. It was on a job with her company Motion Rail that she met the man she would end up marrying, Liam, a Network Rail employee. She describes herself as always having been a bit of a tomboy, and she likes working with men – they're simple creatures, she says, straightforward, so she is clearly a little embarrassed to say that when she met Liam she went a little bit, well, giggly. I like to think of it as being in keeping with her no nonsense attitude. *"That's the one I want, that's the one I shall have."*

I comment that she seems to have received a lot of support and encouragement along the way, particularly from her bosses, whereas maybe her peers have been the toughest on her. I ask her whether she experienced any other challenges by being a woman in a male-dominated workplace. She says she got the 'locker room talk' when she was younger. Not from her own colleagues but when they went on site visits – comments like 'get your boobs out luv' and wolf whistles. But that doesn't happen anymore, she says.

It's another example of how Emma seems unperturbed by the difficulties she's faced, yet she is passionate about making it easier for the next generation. She is involved in several campaigns. She is a registered STEM Ambassador – there are more than 30,000 of them who give their *"time, enthusiasm and experiences to encourage and inspire young people to achieve more and progress further in science, technology, engineering and mathematics"*. She's a technical mentor with the IRSE. The Institute of Engineering and Technology have launched an awareness campaign, #9IsNotEnough – only 9% of the engineering workforce in the United Kingdom is currently female. This campaign, along with International Women in Engineering Day, is one Emma cares deeply about and wants to highlight.

When I started my interview with Emma, I initially envisaged a piece that addressed more of the background of what prevents girls and women from choosing STEM subjects at school and STEM careers later in life and what additional obstacles they face and what makes them leave these fields again (and there's a whole other story on how we should raise and educate the next generation of boys too). But apart from being really rather taken with Emma's story, I am also aware that girls need role models. They need to see women achieving and succeeding in all aspects of life, in particular in fields they might not immediately think of. It's why I have always liked A Mighty Girl, which is *"dedicated to raising smart, confident and courageous girls"* because sometimes we just need to see examples of how it's done. And if there's a girl out there who hears about Emma's life and thinks *"I could do that"*, then that's a victory.

Extending the rail service life

Public transportation networks have special requirements regarding railway infrastructure:

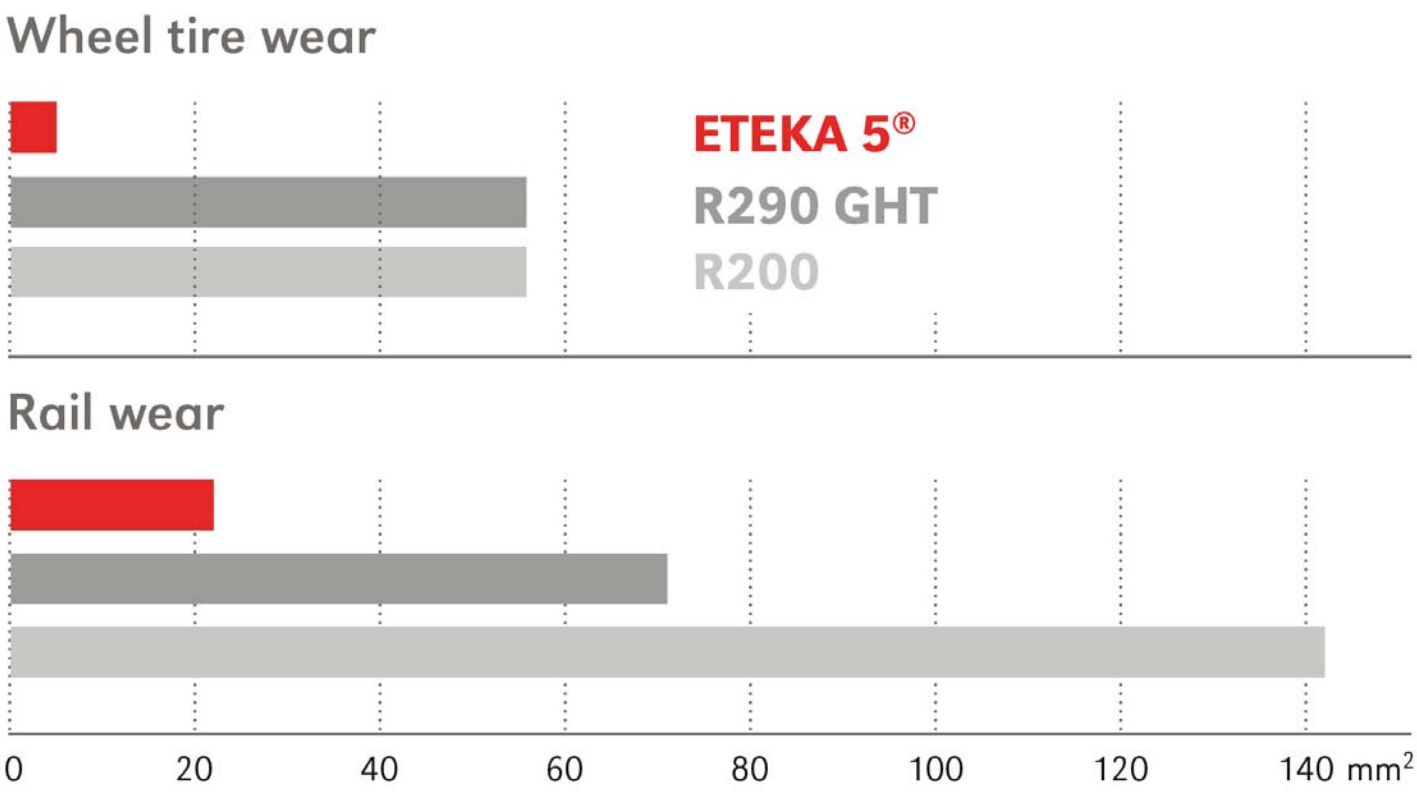
- **tight bends with a radius partly considerably less than 80 m lead to heavy wear on running edges and wheel tires**
- **screeching on bends requires continual maintenance measures to reduce the noise level**
- **heavy wear of grooved rail turnouts (flat groove, gauge face and running edge) lead to increased maintenance costs**
- **street-level track limits the selection of the rail steel grade regarding weldability at a later date**
- **replacement of the rails is considerably more expensive compared to an open superstructure**
- **new vehicle types and low-floor technology lead to changed and heavier wear on rails**

Weld-tempering of running surface and running edge

THE SOLUTION: WELD TEMPERING OF NEW RAILS

Railway tracks subject to heavy loads experience high wear after just a short time. The solution is weld-tempered rails, perfectly prepared and long-lasting. To weld-temper new rails highly wear-resistant material ETEKA 5® is used. A wear test with over 40,000 overruns at DB Systemtechnik Kirchmöser certified that the result is a cost-efficient, comfortable and long-lasting product suitable for all new rail projects and renovation work. The reduced surface roughness less than 6 µm of the used materials reduces wheel tire wear by up to 94%. This leads to long-term benefits with a longer service life for your rails, lower maintenance costs and lower noise emissions. The result is also improved travel comfort and long-term reliability of rail operations.

Tempered rails are manufactured in lengths of 15 or 18 m.



The wear test after 40,000 overruns at DB Systemtechnik Kirchmöser clearly shows: ETEKA 5® considerably reduces the wear of wheel tires and rails (June 2014).

Weld tempering involves work on the running edge, running surface and/or the rail groove. First the rail is milled before new, wear-resistant weld material is applied. In order to prevent the side wear of the rail head in curved sections of the track, the weld treatment **SMARTTRACK EDGE480** was developed. The running edges of the rail are treated with ETEKA 5®, which is necessary due to the resulting hardening of the almost mirror-smooth surface of the weld metal taking effect after a short period of running. The final resistance can attain a value up to 480 HB depending on the density and the intensity of circulation, which significantly reduces the friction between the wheel flange and rail and therefore considerably reduces wear. A particularly special development is also the hardening of the running surface with the high-strength material **SMARTTRACK SILENT** using ET 2000® to suppress squealing which occurs when running on tight curves which provides considerable relief for residents living near the track.

Advantages:

- **Long-term avoidance of corrugation**
- **Improvement of the rail surface**
- **Hardening of all common grooved and flat bottom profiles and special customer profiles**
- **Rails are bent to customer requirements**
- **Low maintenance costs**
- **Increase in the service life of rails**
- **Increase in the network capacity**
- **Lower noise emissions**
- **Longer lifecycle of rails and wheels thanks to lower rail and wheel tire wear**

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Mechan raises Railtex presence

Depot maintenance specialist, Mechan, is returning to Railtex again next month, looking to build on its 2015 success.

The Sheffield-based manufacturer of lifting and handling equipment will be back on stand N10 at Birmingham's NEC from May 9–11 with a full-size, fully functional demonstration jack that will showcase its build quality and market leading Megalink control system.

Megalink combines the latest technology and networking expertise to synchronise an unlimited number of jacks, producing a smooth and safe lift that can be managed by just one person.

From a remote, full-colour touch screen that displays useful data about maintenance and servicing, the operator can choose a complete overview of the lift or focus on a particular jack, making it easier to diagnose faults. The theoretical position of every unit in a chain is broadcast at regular intervals, so each one can make speed adjustments so precise they are undetectable to the eye, correcting any height deviations.

Lifting jacks are vital for access to bogies, wheelsets and underfloor components, offering a reliable yet flexible way to raise complete trains without decoupling. Boasting a design life of at least 25 years, Mechan's flagship products will maintain a load even when power is lost and can be modified to suit wide or tall vehicles, moved around as necessary and configured to support a train of any length.

Information on Mechan's entire range of depot equipment will be available at Railtex, including its popular equipment drops, bogie lifting and storage solutions, undercar handling, underfloor lifters and traversers.

Mechan is the only company in the UK that can demonstrate its ability to design and build bespoke traversers for any size or weight vehicle. For example, the firm was asked to create two 80-tonne units for Hitachi's Newton Aycliffe facility in County Durham to help move the vehicles it is building between 33 tracks inside the facility and out to the test area. Without them, this sophisticated production line would have needed to be three times as long.

In addition to its homegrown products, Mechan will also be using Railtex to highlight the range of third-party products it supplies to the UK and Ireland. These include the handheld CALIPRI laser measuring device from NextSense, which will be on display for delegates to see in action.

Laser measuring is a must for checking wheel, brake disc and rail wear and the CALIPRI is one of the most sophisticated tools on the market. It uses three simple lasers to record all relevant parameters on wheelsets and tracks and is proven to eliminate human error, producing tamper-proof results.

Complete measurement of any object with a complex shape takes seconds, even in hard to reach areas and requires just one operative, significantly increasing productivity. Each CALIPRI is

tailored to the client and ready to operate on delivery, reducing purchasing, calibration and staff training costs.

Undoubtedly, the topic most visitors to Mechan's Railtex stand will want to know more about is its recent acquisition by French group, CIM. The deal sees the firm add its equipment to a portfolio of products and services that includes the design and realisation of railway infrastructure supply and construction projects.

CIM operates in more than 120 countries worldwide, across all continents, working for many of the main rail transportation and public transport operators, as well as for mining companies. The business has grown substantially in recent years, through a programme of procurement and has three divisions – projects, services and equipment.

In the 40 years since its creation, CIM has built lasting relationships with customers, based on its professionalism and expertise. These are attributes it shares with Mechan, whose products are recognised worldwide for their quality, safety and reliability.

Richard Carr, Mechan's managing director, said: "We are sure colleagues from across the industry will have plenty of questions for our Railtex team, not least about CIM's takeover, and we look forward to introducing them to its products and services. We see the link up as key to accelerating our international development, allowing us to build quickly on the reputation we have already gained for innovation and high-quality UK manufacturing."

At the last Railtex exhibition, Mechan saw off competition from a varied field to be presented with the rolling stock maintenance equipment prize, which recognises products and services that enhance rail vehicle availability and reliability. The firm also experienced a 15% increase in visitors to its stand, thanks to greater visibility and recognition within the industry.

Richard added: "We love exhibiting at Railtex and enjoy catching up with colleagues old and new. We were pleased to secure the same stand as last time, close to the main entrance and thanks to our giant yellow jack, you're unlikely to miss us!"

To find out more about Mechan's wide range of depot maintenance equipment or its acquisition by CIM, telephone (0114) 257 0563, email: info@mechan.co.uk, visit: **www.mechan.co.uk** or follow the firm on Twitter, @mechanuk.

The Construction Products Regulation – Are you ready?

As a manufacturer with operations throughout the UK & Europe, BT Cables is impacted by the new regulations that are about to become law for the supply of cables into European markets.

CPR has been on the horizon for some time but from 1 July the requirements become law and compliance is mandatory. BT Cables has been preparing for some time and is ready to meet the deadline but do you know what your obligations are and are you ready?

The Construction Product Regulation (CPR) is intended to ensure reliable information on construction products in relation to their performance. This is achieved by providing a *"common technical language"*, offering uniform assessment methods for the performance of construction products.

These methods are compiled in harmonised technical specifications. This common technical language is to be applied by:

- **the manufacturers when declaring the performance of their products**

- **the authorities of EU Member States when specifying requirements for them**

- **their users (architects, engineers, constructors, etc.) when choosing the products that are most suitable for their intended use in construction works**

In respect to cables, the CPR relates to the "REACTION TO FIRE" performance.

The appropriate harmonised standards are the harmonised Product Standards covering reaction-to-fire products (EN 50575: 2014)

Performance is based on a test SIMILAR to BE EN 60332-3 BUT:

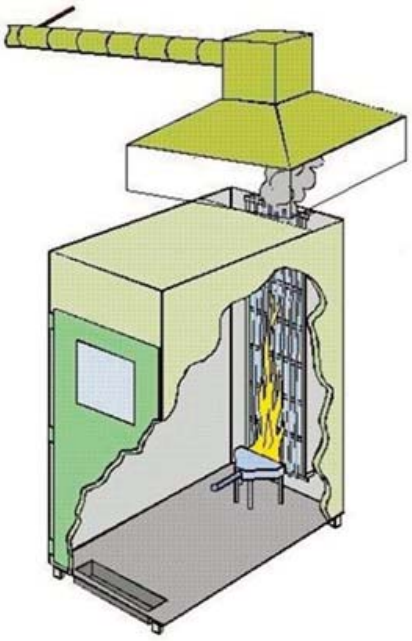
- **different array (based on diameter of cable)**

- **calorimetry/smoke detection equipment in analysis section of extraction hood/duct**

Additional measurements:
Total Heat Release (MJ)
Rate of Heat Release (kW)
FIGRA (W/s)

Euroclass is derived from this along with char height for Classes B1-D, with BS EN 60332-1 (Bunsen burner) for Class E. Class F is a "failure" to meet Class E requirements.

Distributors and wholesalers are strongly recommended to familiarise themselves with the CPR as it applies to cables. In particular they are advised to recognise that they, as well as manufacturers, have legal responsibilities under CPR.
It is especially recommended to distinguish between cables subject to CPR, i.e. those intended for permanent installation in buildings and construction works, and those that are not. For the former it will be essential to check for compliance, most importantly via:



EN 50399 Schematic

- **The Declaration of Performance (DoP): your supplier should provide it. The DoP is permitted to be made available in electronic format.**

- **The CE marking: this should accompany the product and, in the case of cables, should be on a label associated with the particular batch.**

In case of difficulty, the relevant legislation and other guidance documents should be consulted. The responsible government department in the UK is the Department for Communities and Local Government (DCLG).

Overview of the Construction Products Regulation

The regulation is at present within a transition period known as 'co-existence'. With effect from 1 July 2017, i.e. at the end of co-existence, it will be obligatory for cables, having an intended use for permanent installation in buildings and construction works, to be accompanied by a Declaration of Performance (DoP) and to have a CE marking under the CPR. This requirement relates only to the Reaction to Fire performance of the cables.

NOTE: Cables that have Resistance to Fire, meaning retention of functionality during a fire, are currently excluded from these requirements. Requirements for a DoP and a CE marking are under consideration and may be introduced at a later date.

It is the legal responsibility of the manufacturer to provide the DoP and to apply the CE marking. There are two special cases. These are:

- **when cable is imported from outside the EU, where the importer has special responsibilities**

- **when a distributor sells cable using his own brand name (For convenience, the term "distributor" is used in this paper to cover both distributors and wholesalers).**

The CPR covers the way in which the product is placed on the market, typically by the manufacturer, and then made available in the market, typically by a distributor. It does not say how and where a particular product should be used. Crucially it does not say what class of product should be used in any given circumstance.

It should be noted that when a distributor supplies product under their own brand or name, they become subject to the same legal obligations as the manufacturer.

Where are we today?

Since 10 June 2016 it has theoretically been possible for cables to be placed on the market with a CPR Declaration of Performance (DoP), and accompanied by a CE marking. In practice, because the process involves 3rd party testing and certification via Notified Bodies (for instance BASEC and BRE/LPCB in UK), such cables have only gradually been reaching the market.

However, as of 1 July 2017 this will change, and all cables with an intended use for permanent installation in buildings and construction works must then be accompanied by the DoP and have the relevant CE marking.

It is important to note that the DoP may be in paper form or as an electronic version. The CE marking, in accordance with the relevant harmonised standard, EN 50575, must be on the product label or labels.

Particular obligations of distributors

Responsibilities and obligations for distributors derive from the EU legislation (REGULATION (EU) No 305/2011) and in particular Article 14. The full text of Article 14 can be found in Chapter III "Obligations of Economic Operators" of the Regulation. Key points may be summarised thus:

- **From 1 July 2017 a distributor must ensure that if a cable being purchased has an intended use for permanent installation in a building or constructions works, then it must be CPR-compliant. This means the distributor needs to make certain that the manufacturer's product is accompanied by a Declaration of Performance**

Euroclass	THR (MJ)	RHR (kW)	FIGRA (W/s)	Flame Spread (m)	EN 60332-1
B1	10	20	120	≤1.75	H≤425 mm
B2	15	30	150	≤1.5	H≤425 mm
C	30	60	300	≤2.0	H≤425 mm
D	70	400	1300		H≤425 mm
E	No Performance Defined				H≤425 mm
F	No Performance Defined				H>425 mm

(DoP) and has the CE marking correctly affixed, and to ensure that the information is available when making a sale.

- **If there is any suspicion that any cable that claims to be CPR-compliant, i.e. has a DoP and the relevant CE marking, but is not, then you must ensure the cable is brought to conformity, to withdraw it or to recall it as appropriate. If the product presents a risk, the National Authority should be informed.**

"Own brand" cables

Where a distributor has cable manufactured and supplied such that it may be sold on under the distributor's own brand name, he/she has the obligations of both a de-facto manufacturer and as a distributor under CPR.

It is thus essential to ensure that a DoP is drawn up in the name of the distributor.

Issues relating to the holding of stock

Cable that has been legally placed on the market prior to 1 July 2017, and is in the stock of a distributor, does not need to be CPR compliant.

We are currently unaware of any timescales relating to the sale of such stock that has been legally placed on the market before 1 July 2017.

If a distributor has imported cable from outside the EU, and it is held in his stock, he/she should take care to ensure that it has a date that can be verified as to when it is legally placed on the market, i.e. before or after 1 July 2017. This will determine whether it needs to comply with CPR or not.

The distributor as an importer

Cable manufactured within the EU will have been placed on the market by the manufacturer. The distributor, subject to his obligations under Article 14, is not required to do more.

When a distributor imports cable from a non-EU country, he has the same responsibilities as a manufacturer, thus he becomes the person first placing the product on the market. He must ensure that the non-EU manufacturer has verified the performance of the cable, drawn up the appropriate technical documentation and the DoP, and that a CPR-compliant CE marking and label have been applied. In addition, the distributor acting as importer shall indicate on the product, in one of a number of designated ways, their name, registered trade name and their contact address.

Importers also have an obligation, when appropriate, to carry out sample testing of cables and to maintain a register of complaints, of non-conforming products and of product recalls as deemed appropriate.

All the other obligations as a distributor – documentation, action regarding non-compliance, storage – also apply.

The obligations of manufacturers and of importers are covered by Article 11 (Obligations of Manufacturers) and Article 13 (Obligations of Importers) in Chapter III of the EU Regulation. BT Cables is fully prepared for the new regulations and a full breakdown of products affected and timescales for compliance can be found on its website at **http://www.btcables.com/cpr**

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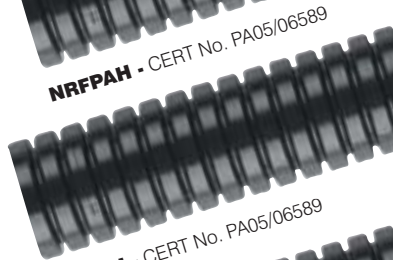

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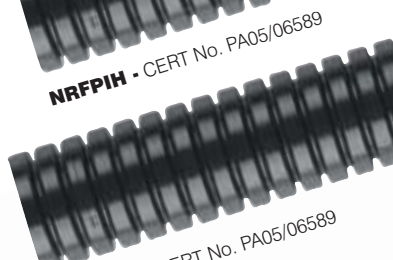

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A Happier Commute

A Happier Commute – how mobile ticketing can ease congestion on public transport

Hundreds of thousands of UK passengers spend over two hours commuting to work each day. Whilst for some, this may be a window of free time to catch up on emails, read a few chapters of a book or listen to a podcast, for many commuters, the daily journey is a blight of recurring delays, congestion and unwavering stress.

For many decades, there has been little in the way of improvement to these issues, through disruptive innovations such as m-ticketing and mobile technology, but there is now some light at the end of the proverbial train tunnel for the harried passenger battling their way to work.

The average consumer uses a mobile device for even the most trivial of tasks, and the benefits of using mobile tickets, be it for convenience, unquestionable security or eradicating the possibility of lost or stolen tickets, are widely recognised in and appreciated by many industries; not least the transport space.
By integrating with an m-ticketing app, for the first time, railway operators have the ability to manage congestion levels subtly but highly efficiently. Through the implementation of mobile technology and beacons, data on congestion levels can be immediately sent back to an operator who can then address the issue appropriately. For example, if a certain number of passengers require transportation at specific times and locations, then the operator can deploy additional vehicles and send a communication to the passengers that tangible measures have been taken to meet demand. Not only does this fix the issue at hand in the first instance, but also creates successful personalisation between an operator and its passengers which sustains customer loyalty in the long run.

For the consumer, having a mobile ticketing app on their device opens up a new, more streamlined and effective channel of direct communication to the railway operator. Customers have the opportunity to contact the operator with positive or negative feedback on the journey, and equally, if not more importantly, the operator can alert the passenger via push notifications to any journey changes or delays in real time.

Aside from the plethora of benefits that comes with widening methods of communication, with mobile developments; rail operators have the ability to manage congestion problems that they have already bee able to alert their passengers to.

By harnessing initiatives such as incentives and reward schemes, railway operators can change the behaviour patterns of its passengers in a mutually beneficial way. If an individual's usual commute home is unusually congested due to an earlier delay, the railway operator can encourage that consumer to wait for a later train or travel from an alternate station all together in exchange for a discounted offer or

free coffee from a nearby retailer. The consumer receives the benefit of the reward and consequently a perceived notion of personalisation and consideration from the operator, and the congestion levels are effectively managed.

If an operator is viewed as a provider of a smoother, quicker and ultimately calmer journey then the use of public transport will consequently increase in popularity, resulting in a knock on effect that benefits the environment.

New research from Core Engine, our m-commerce and data system, shows that commuters spent over £700,000 on mobile tickets on the first full day back at work in 2017; an eight-fold increase on the same day three years ago. With such high numbers only set to rise, it is starkly apparent that mobile ticket operators must embrace the new developments in mobile technology to stay ahead of competitors, attract new custom and sustain the loyalty of their passengers by offering unrivalled services aided by digitisation.

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Morris Line Engineering (MLE)

– delivering whole life value in high voltage switching and earthing

Morris Line Engineering (MLE) – delivering whole life value in high voltage switching and earthing

It's now 35 years since Morris Line first supplied a rotational 25kV isolator to the UK rail network, and with six significant electrification projects supplied in 2016, industry influence and project results are still going strong. Whilst the rail industry still represents the smaller part of their business, innovation around detection and security, coupled with new products for earthing and load break, have elevated the importance of rail within the company.

Morris Line have always designed robust, reliable isolators that aim to offer the lowest cost over the lifetime of the installation, rather than only focusing on the initial procurement price. The lower lifetime costs come from design advantages, reliability, minimal maintenance (every 7 years) and simple operation.

Another way that MLE has offered the client better value without skimping on product quality is by designing with future upgrades in mind. The first rotational isolators were rated at 600Amps and with a fault rating of 6kA. Since that time ratings have increased in line with industry requirements first to their 800Amp product and then to the current 1250Amp. With each of these changes Morris Line has managed to maintain consistency in fixing locations and dimensions, meaning existing bases and operating gear can be left in place with only the top hampers being swapped directly. Not only does this save on capital expenditure but it reduces the time and in some cases plant and structures needed for the upgrade. Upgrading in this manner can see 2–4 isolators upgraded per shift, whereas swapping to a different

style of isolator with new operating gear and potentially new structures required can see a single upgrade requiring several shifts, large plant, and incurring astronomical costs. Equally in the move from the previous British Rail designed Geneva Wheel Mk1 Motor mechanism, to the MLE designed Direct Drive Mk2, the operating gear and isolator can remain in place with only the mech boxes themselves requiring replacement, incorporating mounting point and cabling retrofit.

The latter upgrade has seen increased demand in recent times, with the difficulty in setting up the BR mechanism becoming apparent. As many of these units have now been on the network for longer than their 30 year design life, MLE are offering a trade in program to assist routes in making the move. As well as improved reliability, the MLE designed Mk2 Mechanism also helps routes to achieve compliance with current regulations around isolator design and Electricity at Work regulations.

A new upgrade option available from MLE since 2015 is their 25kV vacuum interrupter head. This unit can be easily retro-fitted to any motorised D1250 rotational isolator, turning it into a load break isolator. With anecdotal evidence of isolators sometimes being opened in error with the overhead line still live, there must be a strong safety argument for this upgrade. In the case that an isolator is currently manual, again the conversion to motorised is designed to be simple to achieve.

One of the key differentiators Morris Line has always offered is the option of an integrated earth post on their rotational isolators. Where earthing is required on an isolator this option means a single manual or motorised mechanism can drive both the isolation and the earthing. As well as the clear advantage of requiring only a single mechanism, this also means a reduced demand on the asset maintenance programme, and the communications network when motorised. Since 2014, Morris Line has also been able to supply a stand-alone simple earth switch for scenarios where the earthing is required separately from the isolator. With a lighter weight mechanism and operating gear this switch can easily be mounted above the tracks and has dual indication for security of the switch position.

Morris Line is not just focused on the best whole life cost, but value as well. This means safety is a key focus and this is reflected in the approach to innovation. Morris Line as a business is very much focused on innovation, but that focus centres around enhanced functionality and meeting clients' needs – not redesigning for the sake of change. The MLE operating gear is essentially as it was 35 years ago and the strength of that gear gives confidence to those working on the railway. This may explain why MLE has survived as a valued rail supplier where other manufacturers have fallen by the wayside over the years. Areas where MLE innovation has introduced additional safety enhancements include: the addition of an earth post detection switch that engages only when the switch blade is safely secured in the contacts; the inclusion of a Castell lock on the mechanism door to meet Electricity at Work regulations; and a flag indicator for visual position confirmation when stood under the isolator.

One final point around the value that Morris Line brings to the UK rail network is a new programme of training modules. Covering subjects from installations to upgrades, assembly to operation, these modules are offered free of charge at MLE's premises in Bridgend, and participants will be certified as having attended. If you see a requirement for training at site, then please contact Morris Line to discuss.

Morris Line Engineering are part of the Morris McLellan group, which brings the financial strength of a £40M+ business plus expertise in consultancy, products and services, as well as low and high-voltage switchgear.

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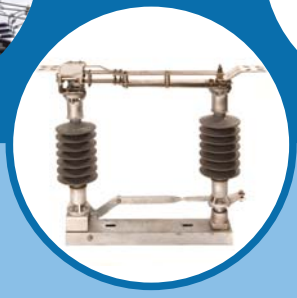

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It's Not Just About Wheelchairs

When we think about improving access to public transport for individuals with a disability, we think about mobility issues. But what about those individuals who have cognitive challenges?

When I was on holiday with a friend of mine last summer, she said to me: 'whenever anyone thinks of a disabled person, they think of someone in a wheelchair'.

Now this friend of mine is a music teacher and an expert in special needs education who has herself adopted two girls with Down's syndrome.

So it really struck me, what she said. It's true. I regularly spend time with her and her girls during the summer holidays in particular – she lives in Germany, I'm in the UK – but I too tend to think of a disabled person as someone in a wheelchair. And as a society we focus on making things 'wheelchair accessible' instead of just accessible – to all in society; and being able to use the public transport system is vital for being able to participate fully in society.

So my friend continues: 'here's an example,' she says. 'When you're at a station in Germany and you look at the train timetable, the times are in digital format – 8.42 – 9.12 – 9.42... but all the clocks at the station are analogue. That's not a problem for you and me, but for someone with a learning disability that's an added complication.'

Now, I remember these station clocks very well. They're the same at every station, at least in the part of Germany where I grew up and Martina still lives (NRW). In particular, I remember always wondering about the strange behaviour of these clocks' second hand, but that's a different story and not one worthy of an article. But at no point did I consider that these clocks could be problematic.

I wanted to know more. What other barriers to accessing public transport were there that weren't plain for everyone to see – like a wheelchair user confronted by nothing but stairs?

I got in touch with Mencap, who

©TfL

call themselves 'the leading voice of learning disability'. Their vision statement is to have all people with a learning disability valued equally, listened to and included. They put me in touch with two people with a learning disability and I asked them about their experience with public transport:

Ciara Lawrence has a learning disability and works for Mencap as a Campaigns Support Officer. She said:

"The whole process of travelling on trains can be challenging. Buying tickets can be difficult. Train ticket websites are not accessible; they can be very confusing. At stations, there's lots of information about all the different types of tickets you can get, it's hard to understand which one I need. The information needs to be clearer and there should be Easy Read information available.

"Train maps can be incredibly hard to understand. Train boards can be confusing when the information changes so quickly. If I'm ever going somewhere for the first time I always ask someone to come with me so that I'm not on my own. After I've been once, I feel confident to go by myself afterwards, which is good because I'm more independent.

"Sometimes, you can get very bad attitudes from staff on trains and at stations. Luckily the staff at my local station know me now and they're really supportive. Training should be given about disability so that every station is accessible and no one has to face negative attitudes.

"Train travel is about accessibility. I don't think all stations are accessible and they should be. It cuts out a whole group of people from being able to travel around the country. There needs to be better access and disability awareness training for all staff and more time needs to be given for people with a learning disability."

It is important to remember that someone suffering from a learning disability might also have mobility impairments as well and navigating those with the additional challenge of a learning disability will be many times harder.

Youssef Abidat has a learning

disability and works for Mencap as a Campaigns Assistant. He said:

"Travelling by train can be very hard. Because I'm disabled, I need more room, for example to be nearer the double doors or sitting at a table. The aisles are really narrow as well so it's difficult to get through. It is stressful. I feel like I have to always explain my disability but people don't always understand. I try to do it in a positive way, and explain how if we just make small adjustments we'll all have a good journey.

"Time can be difficult too. When the platform for your train is announced, you don't have much time to get to the platform and find your carriage and your seat, that can be confusing and stressful. Then when you need to get off at your stop and it's really busy, there's not much time to let you get off. It's also stressful when you have a connecting train to get as you have to find the right platform. People with disabilities should be given more time.

"Travel assistance can be helpful, if someone is there to pick you up at the other end, that's wonderful. But you don't always get that. Sometimes you'll get to your destination, and if the train is late, sometimes the assistance isn't ready and you have to wait on the train. You have to make sure that the train's not going again straight away. I have mobility issues and I always get really frightened when this happens.

"If you're at a station that you're not familiar with, it can be hard to find your way around. I think it's very useful for staff to have travel training and for travel assistance to be available to make sure."

I asked Mencap whether they were currently campaigning for any specific changes to be made to public transport to make it more accessible and they put me in touch with Transport for All, who have been active accessibility campaigners for both people with a disability and older people in the London area for 20 years. In addition, they provide an incredibly valuable service by informing disabled and older passengers about their transport options – an important resource in a less-than-perfect public transport environment. They provided me with a statement from Claire Lindsey, co-founder of Thoughtistic, on what it's like to travel on the Tube as an autistic person.

Here is what she said: *"I am autistic. It's an invisible impairment; I don't look "Autistic" or "Disabled" and most people would be unaware of my impairment.*

Because of my autism I am hyper sensitive to noises. I am completely unable to cut out background noise, lights, movements and odours. I also have balance and vestibular difficulties meaning that I need assistance to travel. Many stations that are accessible to wheelchair users are nevertheless inaccessible to me because of my autism.

An escalator might be turned off or there might be too many people on that day; I am then forced to terminate the journey and go home.

The world is a very unpredictable and confusing place. I need to have a fixed daily routine, so that I know what is going to happen. This routine means always needing to travel the same way to

©Transport for All

and from places. When there are diversions, journey restrictions or cancellations, it doesn't just irritate me, it can feel like the end of the world and it can cause an "autistic meltdown" – an extreme panic attack which causes me to pass out.

I always seek assistance from members of staff especially when I am using the underground but I have also had to ask members of the public, which is extremely difficult for me not only because I find communication stressful but having an invisible impairment means that it isn't always obvious what assistance I need.

Other passengers are also unaware of why someone with an invisible impairment might want a priority seat. That is why I am now using the new Transport for London's Priority Seat Badge and card, but before they came out I wore a badge stating "Autistic" so that people had a visible clue to my impairment. This helped in two ways: The first identified me to members of staff and public, so that I was able to get assistance. The second was to reduce the confrontation that I used to face when asking someone if I could sit down; or if I was in a priority seat, other passengers would think I shouldn't be sitting there and became aggressive and argumentative. This is, I think, because of a general lack of awareness by the public of invisible impairments. This extends to the symbols and posters in the transport network; they only show visible impairments.

Accessibility for me means something other than ramps and lifts. It also includes reducing noise pollution, making signs and ticket machines easier to understand; making stations easier to navigate and staff more approachable and aware. This short list of changes is easy to overlook but they would make a big impact on the way we can access the transport system. Think of the changes that were made to the transport network when we had the Olympics to accommodate tourists, Paralympians and non-English speakers."

I wanted to present the voices of people suffering from learning disabilities and cognitive impairments to highlight their challenges and to raise awareness with both companies involved in the transport network as well as with members of staff and passengers.

It is an area the industry should embrace and always consider when commissioning new trains, designing stations, training staff, providing passengers with information... in all areas because it is the right thing to do.

It is also an area for government to fund and guide the industry to ensure public transport is accessible so all people can participate in society.

Charities like Mencap and Transport for All play a vital role in drawing attention to this issue. On 28 April Transport for All will be protesting the government's decision to cancel their Access for All projects at eight stations around London for example. To find out more about the work Transport for All do, please visit their website at **www.transportforall.org.uk.**

To find out more about Mencap, please visit their website at **www.mencap.org.uk.**

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AC/DC Power Supplies

For the Use on the Train and in Trackside Applications

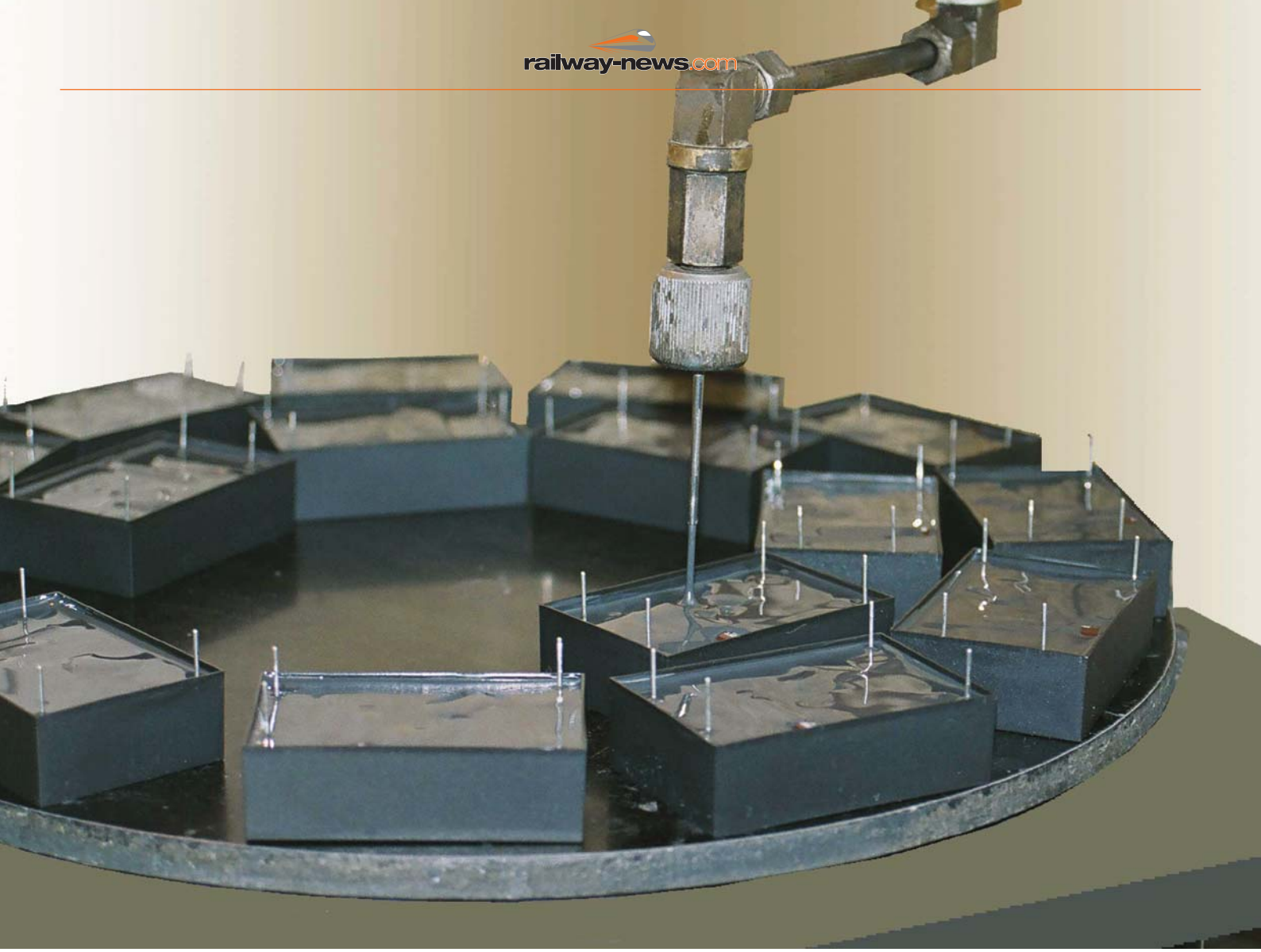
MTM Power has been successfully active on the DC/DC converter market for railway applications. The devices in the power range from 14 W to 2 kW are used in various applications on rolling stock and trackside. In particular, they are suitable for the sophisticated use for the supply of the electric and electronic decentralised systems on board. In addition to the classic installation in electrical control cabinets, the devices are more and more built into containers on the roof and in underfloor areas as well as in driver's cabins, engine bays and in coaches.

MTM Power supplies projects all over the world and is a preferred supplier for the well-known manufacturers of locomotives, high-speed trains, rail cars, light rail, urban and suburban trains. Essential fact is the quality of the innovative products and the flexibility and reliability of the company.

In addition to the extensive portfolio of DC/DC converters and customised power supply solutions, the MTM Power product range includes a wide variety of AC/DC power supplies in the power range from 5 W to 250 W. MTM Power AC/DC modules are used in various industrial applications. The experience and the competence in developing and manufacturing products for railway applications as well as the quality and the reliability of all products have now been used to bring AC/DC power supply units in well-proven technology on the rail.

While MTM Power DC/DC converters are almost exclusively operated on the battery-powered DC on-board system, now the new PCMAT150 series of MTM Power is designed for the use on the 400/230 VAC on-board train power system. The new generation of AC/DC modules series PCMAT150 was originally developed as a decentralised power supply for industrial applications. For the use on rail vehicles, the devices were tested according to the standards of EN 50155 and EN 50121-3-2/EN 50121-4 (pending). In compliance with the conditions of the railway regulations the units can be used on railway vehicles, in trackside applications and in stationary railway systems.

AC/DC module PCMAT150 S24



An increasing number of non-safety-relevant electrical devices or systems in railway vehicles are supplied from the regular AC on-board system, including lighting, infotainment, air-conditioning, USB charging and many more. The PCMAT150 provides a stabilised 24 VDC output voltage which can be used to supply the above-mentioned applications. Furthermore, the use as auxiliary voltage supply unit for electrical auxiliary inverters and battery chargers is possible.

The PCMAT150 has an efficiency of 92.5 % and is resistant against shock and vibration due to the well-proven encapsulation technology and its extremely rugged design. The vacuum encapsulated (EP 1 987 708, U.S. Patent No. 8,821,778 B2) power supplies offer reliable protection against condensation, conductive dust and other environmental conditions.

MTM Power's Thermoselective Vacuum Encapsulation

They are connected via industrial connectors which meet the demands concerning vibration resistance, reduced wiring time and being maintenance-free and thus the use as a plug-and-play solution in sensitive electronic sub-systems is possible. Due to the rugged design in BPC technology, the thermal losses are dissipated via the mounting plate while increasing the lifetime of the devices at the same time.
The short-term (5 s) availability of a power boost of 150 % even enables the supply of critical loads such as motors or halogen lamps. The devices have got an "Output Voltage OK" signal as potential-free contact. While being connected to static inverters, the active PFC avoids the load of the grid and inverter with harmonics. Further electrical features of the PCMAT150 are an operating temperature range from -40 to +70 °C, class TX acc. to EN 50155 and remote control. As a general standard with MTM Power products for railway applications, the power supplies are available with a complete fire protection certificate acc. to EN 45545-2.

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Stäubli Electrical Connectors (formerly Multi-Contact) is specialized in providing electrical connectors that meet the demands of harsh environment. We are offering innovative product solutions for increasing your productivity.

Modular Power Connector MPC

The compact and modular system has been designed to carry out the connections between several functions of the electrical chain of traction as well as the power connection between the cars.

The Modular CombiTac System

CombiTac allows customized combinations of different contact types for countless applications. The new rackable version CT-HE is particularly suited for slide-in systems and fulfills the railway standards for operating temperature, shock, vibration and fire protection.

www.staubli.com/electrical

Multi-Contact MC STÄUBLI

Modular system for railway applications

Stäubli Electrical Connectors presents its optimised Modular Power Connector MPC

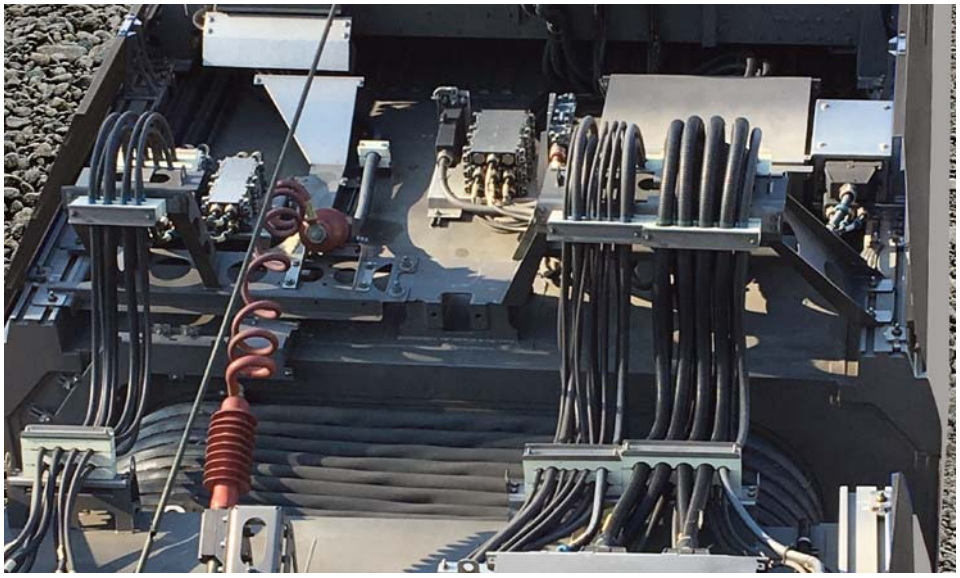
When it comes to the field of multi-coupling systems for fluid and energy circuits, demanding rail customers have come to the right place with the international Stäubli Group. Among Stäubli's strengths are customised solutions for all types of railway vehicles. Electrical connection systems have always been the specialty of the subsidiary, Multi-Contact. This company, which is also based in Switzerland, has now come a little closer to its parent company and since the beginning of 2017, has begun operating under the name of "Stäubli Electrical Connectors".

1. Modules with countless possibilities

The Modular Power Connector, MPC, is an internationally sought-after product for railway applications. The modular system makes it possible to configure application-specific connectors. Various standard modules can be stacked side-by-side and can be easily configured so that they can be stacked upwards. Due to the different contact diameters and cable cross sections, which range from 0.015 to 0.372 in^2 (10 to 240 mm^2), different insulating bodies are available, which can all be combined with one another. Optional coding prevents polarity reversal.

"We need solutions that reduce maintenance and repair times in both railway cars and locomotives. It must be possible to connect and disconnect interfaces very quickly in order to shorten the downtime of a train," said Michel Schmitt, Business Development Manager at Stäubli Electrical Connectors.

The benefit of the MPC system clearly lies in the system's practicality and user-friendliness: thanks to the modular system, only multi-pole connectors are connected instead of several single-pole connectors. With ratings of 3600 V and up to 700 A, the connectors are suitable for many high-current and high-voltage applications. The



The benefit of the MPC system clearly lies in the system's practicality and user-friendliness: Thanks to the modular system, only multi-pole connectors are connected instead of several single-pole connectors.

Figure 1: MPC: A configuration comprising three contacts and clip-on protection plate. The new connectors weigh up to 30% less than the previous version due to improved materials, but remain 100% compatible.

application areas include the connecting of the transformer, traction motor, converters and batteries, as well as the power connection between the cars.

2. Try to make what is tried and proven even better

The engineers at Stäubli Electrical Connectors know the requirements of the market and are constantly working on optimising their products. Of course, this is being done while observing the guideline of guaranteeing 100% compatibility and, as an innovative pioneer, while meeting the latest technological standards and requirements. Insulators made of improved plastic materials are characterized by an increased insulation resistance of up to 15 kV and a lower degree of flammability. The new generation of MPC connectors is suitable for hazard level HL3 R23 and meets the requirements pursuant to EN45545-2. This corresponds to the requirements of many subway operators and other railway operators, e.g. SNCF.
The new insulation as well as the new zinc die-cast alloy, of which the side parts are made, make it possible to achieve a significant weight reduction of up to 30%. Schmitt noted: "The developers of railway vehicles, particularly in the area of the light railways, are constantly optimising the usable space for passengers. That is why they are always looking for components that require little space and have low weight."

Two screw connections with M8 or M10 thread are now available, depending on the size, so that a grounding cable can be connected. The stainless-steel guard, once tightly riveted to the insulators, can now be easily clipped in manually. The mechanical protection can be simply retrofitted or removed without tools at any time.

3. An elegant solution for strain relief

Detail optimisation now includes an entirely new component: the Dynamic Cable Option, or DCO for short. This is the name of the new add-on element, which provides strain relief for movable cables. The DCO is screwed directly to the MPC connector using the lateral elements, and it eliminates any mechanical stress on the screwed cable glands. Plastic inserts ensure that cables having different diameters are equally reliably affixed. The DCO makes the self-assembly of strain relief straps with clips and clamps unnecessary. These specially designed solutions not only require additional space, but are also inconvenient in terms of the need for assembly/disassembly. This innovation therefore saves a great deal of time.

The MPC was developed for the harsh environment of railway applications. The connector is vibration and shock tested in accordance with EN 613731 and is corrosion resistant (240 h salt mist test in accordance with EN 60068-2-112). Furthermore, it has an IP69K protection class when connected. The electrical contacts are of high quality and, in addition to a long service life, guarantee more than 500 plug-in cycles without affecting the electrical values. MULTILAM technology guarantees an efficient energy transfer with constant contact force and low transition resistances. The connection is equally reliable and low-maintenance thanks to the self-cleaning effect.

4. Stress testing in the test lab

Stäubli Electrical Connectors' Competence Center for Railway Technology has been running an in-house test laboratory since 2015, where the products are thoroughly tested on an area of 956 sq. yard (800 m^2). The highlight of the lab is a test stand for shock and vibration tests in combination with thermal loads. In the salt mist chamber, the behaviour of plug connectors on rail vehicles can also be simulated realistically under environmental influences.

"This investment allows us to subject our products to a variety of tests that often go beyond normative requirements," said Schmitt. *"The aim of these tests is to develop products that are ever more compact, powerful and more durable."*

Further information
Stäubli Electrical Connectors
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Internet:
www.staubli.com/electrical

About Stäubli Electrical Connectors
The product portfolio ranges from miniature connectors up to high-power connectors for power transmission, test and measurement, transportation and many other industries. In Photovoltaics, Stäubli is global market leader with its connector components. The core of all Stäubli electrical connectors is the unique MULTILAM contact technology.
http://www.staubli.com/electrical

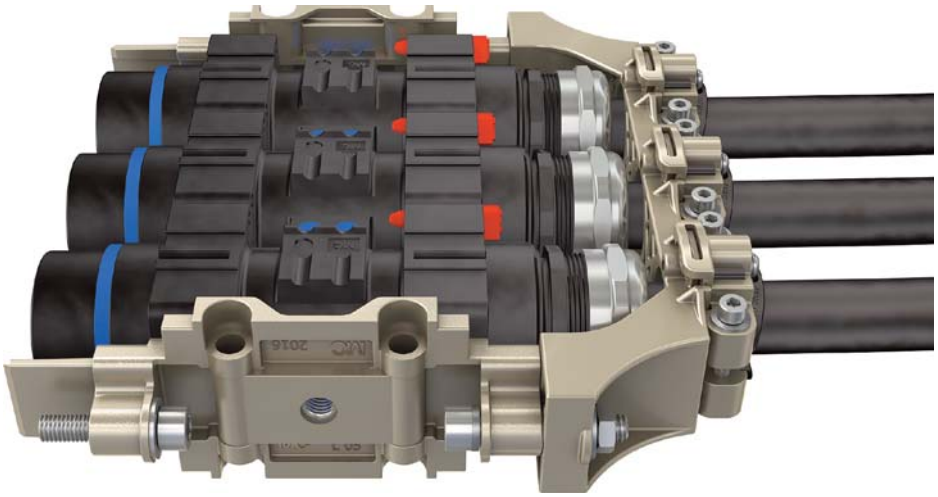

Figure 2: The Dynamic Cable Option, DCO, shown on the right. DCO is an extremely compact form of strain relief for the MPC connector system. Complex self-construction can be omitted entirely.

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A range of end terminations options is available in a variety of materials including mild steel, stainless steel and brass; specialised end fittings to customer specifications can also be developed if required.

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A railway network is a complex environment, with numerous critical and supporting applications – all relying on reliable and stable supply of power to work continuously and keep services running. Eltek's Rectiverter system significantly reduces complexity and increases overview, control and reliability of AC and DC powered equipment in the rail infrastructure.

In recent years, innovations in power technology have improved reliability and driven down cost. However, in rail environments, like everywhere else, there is a need for both AC and DC power. Today, there are a number of separate AC and DC power systems, sourced from different vendors. This entails separate training, separate monitoring systems and separate spares.

AC and DC power combined

The Rectiverter changes this completely. The Rectiverter is a 3-port bidirectional converter that provides both AC and DC power simultaneously. Whereas before you needed many systems or several power stages, now you only need one. This is a fundamental change. With its ability to feed both AC and DC applications, the Rectiverter system can replace many other systems. It reduces complexity, saves space and increases flexibility immensely.

Not only is it dual output, it is also genuinely modular and can be scaled according to future needs. It reduces wasted energy due to its high overall power conversion efficiency of 96% in mains mode and 94% when operating as an inverter.

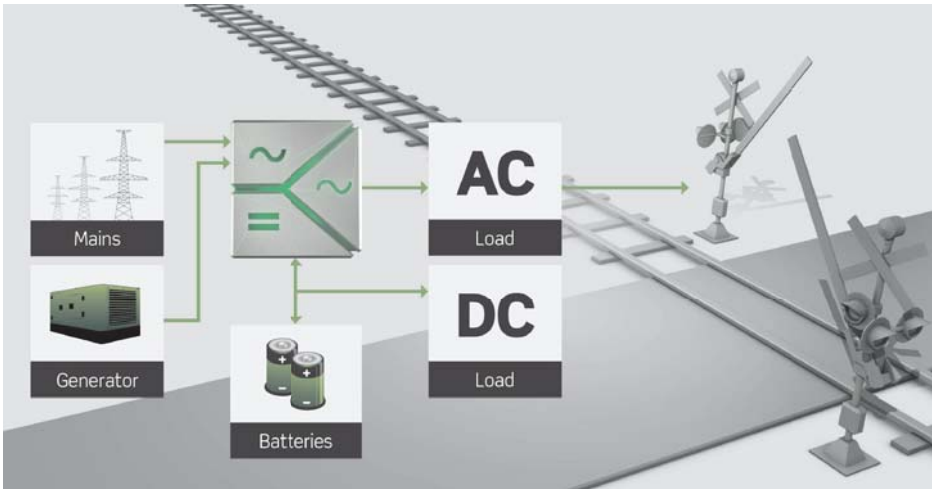
Perfect for Rail & Metro

There are a number of Rail & Metro applications where the Rectiverter is a particularly attractive proposition. One example is level crossings, where, for obvious safety reasons, there are very long back-up times. Rather than using over-dimensioned AC UPS's with extra DC chargers, the DC capacity in the Rectiverter is sufficient to recharge the batteries. The added reliability with the modular design, redundancy and built in transfer technology, also adds to the attractiveness.

Reduced total cost of ownership

The bottom line is reduced total cost of ownership over the product's lifetime, and a future-proof power supply infrastructure for rail & metro environments.

The Rectiverter is one of the the first new major power technology advances in rail & metro power conversion in many years.



For more information you can visit our stand at Railtex 2017, 9-11 May, stand B61.

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By far the market leader, Zonegreen's DPPS™ has an unrivalled reputation as the most advanced, high-quality, reliable, proven and widely-installed product of its kind, with installations both across the UK and around the world. The company boasts unparalleled expertise and experience in depot protection systems and employs an array of highly-skilled specialist engineering staff. Zonegreen is also an experienced and trusted provider of depot interlocking solutions.

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