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M A G A Z I N E

The latest news & reviews from the industry

Inside: EU Commissioner Bulc, Transport Minister Scheuer & the heads of Alstom, Bombardier, DB, Siemens Mobility and GE Transportation

*...all give their views on the state of the
rail industry*



InnoTrans Review – Issue Four 2018

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Letter from the Editor

Now that InnoTrans has been and gone and we have (hopefully!) all recovered from the intensity and the heat so it's time to take a little look back at what exhibitors, CEOs, politicians and visitors experienced at the show. Unbelievably, it was even bigger than InnoTrans 2016. Watch out for 2020!

Violeta Bulc, EU Commissioner for Transport, Dr Richard Lutz, CEO of Deutsche Bahn, Andreas Scheuer, the German Transport Minister, Henri Poupart-Lafarge, CEO of Alstom, Laurent Troger, President of Bombardier Transportation, Michael Peter, CEO of Siemens Mobility and Rafael Santana, CEO and President of GE Transportation all talked about the trends, challenges and the future of the rail sector and the solutions on display at InnoTrans.

Exhibitors such as ASC and Treadmaster Flooring write about their contributions to the sector: Deutsche Bahn AG are using ASC sensors on their trains to detect track maintenance issues, while Treadmaster has provided the flooring for the new Glasgow metro and for rolling stock in Sydney.

And speaking of Sydney, we go on a little Australian detour, with a feature on AusRAIL, which takes place in Canberra on 27–28 November 2018. We have Stephen Lemon, Programme Director, Digital Systems, Transport for New South Wales telling us how digitalisation will improve the safety and efficiency of the NSW rail network. And Richard Wankmuller, CEO of Inland Rail, gives us a key insight into this major Australian rail infrastructure project for the freight sector.

Our next issue, due to be published in March 2019, which will focus on SIFER, which will take place in Lille, France on 26–28 March. It is a show especially for professionals in the rail industry. There will also be associated events in the run-up to the show, such as the official opening, a UNIFE round table, a conference by the French Railway Industries Association (FIF) and a site visit to Eurotunnel's maintenance area and entrance to the service tunnel. As always, we will keep you informed of all the highlights of the show. If you would like to be represented on our website or in our magazine, please contact Andrew Lush at al@railway-news.com.

Please enjoy our 4th issue of 2018!




railway-news.com

ANDREW LUSH

Director
al@railway-news.com

JOSEPHINE CORDERO SAPIÉN

Editor-in-chief
jcs@railway-news.com

NICOLA BROWN

Head of Sales
nb@railway-news.com

AMBER GUY-KEMP

Head of Client Content
agk@railway-news.com

GUY RAYMENT

Graphic Design

ZOE CUNNINGHAM

Editorial Assistant
zc@railway-news.com

A2B Global Media Ltd

Third Floor
11–15 Dix's Field
Exeter EX1 1QA
United Kingdom

Office: +44 (0)1392 580002
Mobile: +44 (0)7432 725001

Email: info@railway-news.com
Website: www.railway-news.com

If you would like to submit editorial content, or you are interested in giving an interview for the magazine, please contact **Josephine Cordero Sapién**.

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November 2018 – January 2019.

Violeta Bulc, EU Commissioner for Transport:

"Multi-modality and mobility is the topic that matters and it's the topic that gives us an incredible opportunity to improve our lives, to improve our competitiveness and to lead, globally, with engagement, co-creation and co-operation."

On the 4th Industrial 'Evolution':

"At the edge of the fourth industrial evolution – I hope it's not going to be a revolution because revolutions cause too many distractions – but evolution, we have a responsibility to lead them and here we are leading into more democratic societies, into a more green and sustainable planet. And let us never forget, the more we connect, the more chance we give to a peaceful evolution of this world. And I really, really want the railways to see that they play a key role in this transformation with more people and especially more cargo using rail as a first option."

On the 2018 Rail Market Study:

"Today we are publishing the results comprehensive, European-wide survey of rail passenger satisfaction. [...] I'm pleased to share the news that almost in all aspects the results are better than five years ago. So congratulations! However, let me share some details. It is really motivating to know that 80% of Europeans take the train at least once a year, 13% every week and 5% – that's around 25.5 million people – almost every day. A huge number of Europeans are counting on trains to get them where they need to go in a reliable and timely manner. Fortunately 75% agree that buying train



tickets has become easier. So digitalisation is coming on board. 66% of European passengers are satisfied with the frequency of train service. A 7% increase since 2013. Here we can do better. And users are also increasingly satisfied, but to a lesser extent with punctuality. 59% of them agree on that. And here we definitely can do better. This shows that our joint efforts, but primarily the work of the industry and all the service providers start to pay off. Rail operators are active preparing themselves to move the competitive environment established in Europe by the Fourth Railway Package forward.”

“Only 38% of European passengers are satisfied with complaint handling, with very little improvement since 2013. [...] And the satisfaction with the accessibility of rail services for persons with reduced mobility is also still problematic. In particular as regards assistance by station staff. And here, this is the social dimension of Europe. I’m calling upon all CEOs: please make sure that this index improves dramatically in five years’ time when we’re going to do the research again. I’m convinced that passengers’ rights can be part of the competitive advantage of the rail sector. And this survey further justifies the Commission’s proposal to strengthen the enforcement of passengers’ rights currently negotiated. The survey also shows that we need to continue efforts to make the integration of different modes of transport easier. Many Europeans continue to find [it] difficult to reach railway stations so promotion of multi-modality is therefore essential. The investment in multi-modality nodes where from railway stations the last mile is provided with the assistance of different services that are emerging today is really essential. So I’m inviting you all: please join forces with those that provide last mile services [so] that these multi-modal nodes are available [...] so that railways are reliable as a point-to-point mode.”

On key points for the rail industry:

“I’d like to point out four key points that we will – together with you – pay special attention to. First: co-operation. When I shared with you the kick-off of mobility week and the kick-off of ITS Congress yesterday, that was intentionally to point out that the co-operation needs to go beyond the railway ecosystem. And on a digital level it’s all about mobility, it’s all about users’ needs, it’s all about user satisfaction. [...] Second: multi-modality, which is a consequence and third: infrastructure. I’m glad to share with you that Commission proposed in the new MFF, new financial period 2021–2027, in spite of all the difficulties increase in the investment in

infrastructure: 30.6 billion euros compared to 24 in the previous MFF, so I hope, ministers, you will give us your full support in order to get it done, to deliver and to really deploy these new financial tools, which are primarily geared towards decarbonisation, 60%, and towards missing links, towards really multi-modal integration and digitalisation, and especially cross-border connections. Next year, the alignment of all European railway rules, with the help of ERA, will be completed, which means that Single Railway Area will finally be delivered.

On ERTMS:

“ERTMS: an incredible European invention. Not yet innovation. It hasn’t really hit the market yet. But there are other markets around the world that are taking full advantage of it. So, if you want to really be competitive, if our industry and especially our manufacturers – I see their CEOs here with us as well today – really want to take full advantage of the growing demand for railways around the world we need to prove that we can deliver in Europe. So I have a full faith in our co-ordinators and in you that we will by 2024 a full-scale deployment of ERTMS. And this will give us an enormous advantage. I’d like to single out those that have made the really brave steps, which is Luxembourg, Switzerland, Belgium and Italy and I know that many others are also putting plans on the paper and they are already starting the deployment so I’m sure that next year many more countries will be joining this group.”

On European innovation

“InnoTrans is a unique opportunity to look into future of rail but also to look into what we do today, what we delivered and what we could do even better. And I’m very much looking forward to seeing the fruits of a great example of European research co-operation: Shift2Rail, which started delivering in record time. Please use this. This is the capacity that can really save investments, that can focus investments and really give you all a competitive edge that the new products and innovations can be delivered to market in the fastest-possible way.”

The future of mobility:

“The future of mobility is clean, silent, efficient and, above all, inclusive and customer-oriented, so let’s co-create, let’s co-operate, let’s engage and the future will be really bright.”

InnoTrans 2018:

- More than 160,000 visitors
- Visitors from 149 countries
- More than 400 innovations
- 155 world premieres
- 155 vehicles on display
- 3,062 exhibitors from 61 countries
- 12,000 additional non-industry visitors at the weekend
- 56.4% of trade visitors came from outside of Germany
- 1 in 5 non-German trade visitors came from southern, eastern and central Asia



Case Study with DB Systemtechnik

Rail section monitoring during running operations

Sensors from ASC help Deutsche Bahn identify track damage early on

The condition of the rail network has to be inspected on a regular basis. For several years, Deutsche Bahn AG have also been using regular trains for monitoring infrastructure as part of their DB 4.0 digitalisation strategy. High-precision sensors from ASC GmbH in Pfaffenhofen, Germany, are used to scan the track bed with

millimetre precision here. Three to four trains, including second-generation ICEs and ICs, are used for *"continuous track condition monitoring"*. The thought process behind this is that, since long-distance trains are already traversing the rail network day in and day out, why not have them collect data at the same time? DB Netz AG, who are responsible for the rail infrastructure, commissioned intragroup company DB Systemtechnik GmbH with the task. Defects in longitudinal level

are the main type of fault recorded, making up round 75 percent of all track geometry defects. Measurement runs help Deutsche Bahn identify deviations in the track geometry before costly damage occurs. They supplement regular inspection with track measurement trains at longer intervals, with high-speed rail sections usually being examined every three to four months and regional train sections once a year.



Dr.-Ing. Klaus Ulrich Wolter was instrumental in developing the continuous track condition monitoring system. Image: DB Systemtechnik/Martin Loibl

Measurement data are often just a few hours old

"Our goal is to monitor a large rail network with just a few vehicles,"

said Dr Klaus Ulrich Wolter, continuous track section monitoring expert at DB Systemtechnik GmbH in Munich who was instrumental in setting up the measurement system from the beginning. The main components of the system are sensors located in the bogie and the interior of the railcar body of a train. A data recording system, a positioning system and a system for data transmission are also used. The positioning system continuously saves the current location of the train so that the measurement values can be allocated to a specific point of the rail section. The data transmission unit, on the other hand, sends all data to DB Systemtechnik in Munich in real time. DB Systemtechnik evaluate the data once a week and make it available to the individuals responsible for the rail system at the respective locations. As evaluation largely occurs automatically, reports may even include data which are just a few hours old at the time they're sent.

Several thousand kilometres of rail network are monitored

At present, around 2,500 km of rail have their condition monitored on a weekly basis. Long-distance trains with special sensors don't just travel the oft-traversed north-south route between Bremen/Hamburg and Munich, but cover the sections between Berlin & Cologne and Halle/Leipzig & Bremen as well.

"Some rail sections are only

traversed by trains with measurement technology every two weeks, while others are covered up to two times a day," reported Dr Wolter. *"On average, though, rail sections are travelled by trains with measurement technology four times a week."*

The quality of the data obtained in this way heavily depends on the sensors used. This is why DB Systemtechnik chose to use acceleration sensors from ASC GmbH in Pfaffenhofen, Upper Bavaria. *"Our colleagues in Minden have been using them for a while and are very satisfied with them,"* said monitoring specialist Dr Wolter in justifying their choice. *"The technical specifications are perfect for the job, and we get outstanding support."*

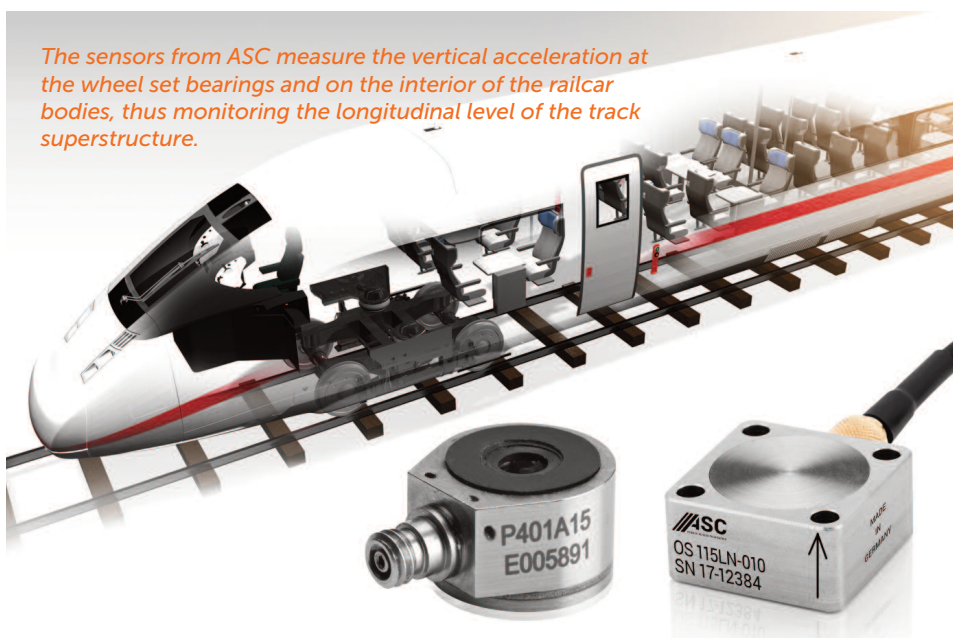
Sensors must be able to withstand hard jolts

In addition to the ASC OS-115LN 050 and ASC OS-115LN 002 uniaxial accelerometers, the ASC P401A15 piezoelectric model is also mounted on the long-distance trains. The latter is a high-frequency IEPE sensor (Integrated Electronics Piezo Electric), characterised by its

extreme ruggedness & impact resistance and hermetic seal. These sensors feature a broad frequency range from 0.5 Hz to 15 kHz and a measurement range of ± 50 , ± 100 and ± 500 g. Their high impact resistance up to 5,000 Gpk is a major advantage for use in rail traffic with its high shock loads. Another argument for the ASC P401A15 is its broad temperature range of -55 to $+150$ °C, as temperatures at the measurement points of the trains can vary from -30 to $+70$ °C.

Measurements prevent track blockages and delays

The ASC sensors measure both the vertical acceleration at the wheelset bearings and the acceleration on the interior of the railcar bodies. In this way, they primarily monitor the longitudinal level of the superstructure composed of rails, sleepers and ballast. The focus here is measurement of the longitudinal level, as it changes the fastest and deviations in this area have the largest effect on operating quality. If there are defects present in the geometry here, maintenance



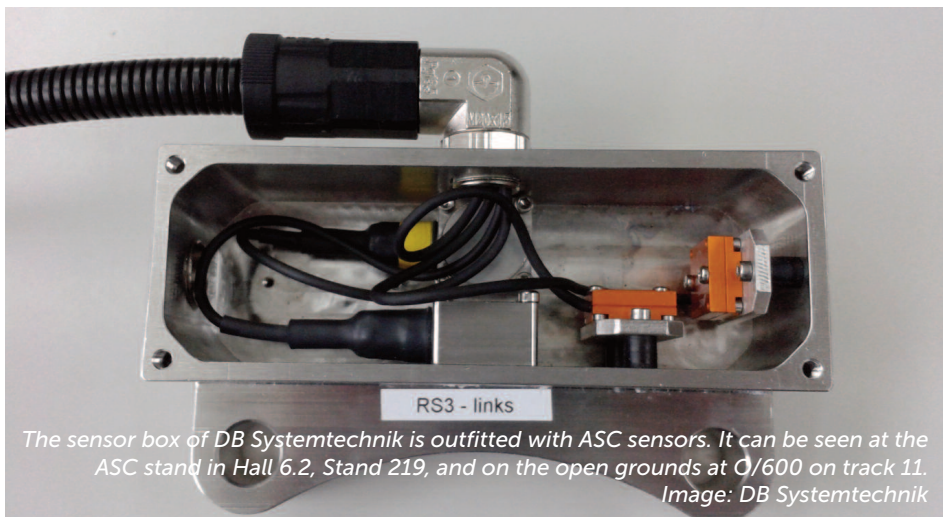
measures must be taken or speed-restricted sections established immediately. This would lead to delays in rail traffic and thus a great deal of inconvenience as a result.

The measurement ranges of the OS-115LN 002 and OS-115LN 050 accelerometers from ASC used by DB are 2 g and 50 g, respectively. The signal-to-noise ratio of the sensors, which lies between 7 and 400 $\mu\text{g}/\sqrt{\text{Hz}}$ depending on the measurement range, is also very good. For continuous track condition monitoring by Deutsche Bahn, the high sensitivity and impact resistance of the ASC sensors are of primary importance. The small size of the measurement systems was also decisive, as the installation space in the so-called sensor boxes on the trains is limited.

ASC also supply custom-made sensors

In addition to capacitive and piezoelectric acceleration sensors, DB Systemtechnik also use gyroscopes of type ASC 271. These sensors are based on MEMS technology (Micro-Electro-Mechanical System) and are specially suitable for measuring track geometry defects in bogies. One special feature of the sensors is their outstanding bias instability of 9 °/hr, and they are also characterised by a very low noise

The ASC 271 gyroscopes monitors the rail section condition in bogies.



density of 0.02 °/s/ $\sqrt{\text{Hz}}$ and a low angle random walk (0.2 °/ $\sqrt{\text{Hz}}$).

It wasn't just the high precision and ruggedness of the sensors that convinced Dr Wolter – he also appreciates ASC's high flexibility: *"A sensor was specially adapted to our needs so that the cable is now permanently connected to the unit."* Strong customer orientation is a trademark of the sensor specialists, who produce a majority of their products custom-made for special applications. As production is carried out at their headquarters in Germany, the quality standards applied are also very high.

Condition monitoring is a great success

Since the introduction of continuous track condition monitoring, the mobile measurement technology has already been used on more than 6,000,000 kilometres. Based on the data obtained, measures were initiated which considerably improved the quality of the superstructure comprised of the rails, sleepers and ballast. This made it possible to reduce the number of speed-restricted sections and track blockages by

an average 95 percent. A further indicator of the success of monitoring is the great interest in measurement data seen by individuals responsible for rail systems. As requested by them, more and more sections of rail will be included for monitoring, bit by bit.

At present, continuous track condition monitoring is still limited to long-distance sections, but Dr Wolter is already considering expansion: *"The technology is definitely also of interest for the extensive rail network of regional trains."*

Contact Data:

ASC GmbH
Ledererstr. 10 85276 Pfaffenhofen
Germany
Phone: **+49 8441 786547-0**
Fax: **+49 8441 786547-9**
Email: **office@asc-sensors.de**
Web: **www.asc-sensors.com**



Rafael Santana, President and CEO for GE Transportation:

Transportation is the backbone of economies worldwide and a requirement for society's progress.

"Transportation is the backbone of economies worldwide and a requirement for society's progress. When you look at life's essentials in terms of healthcare, food and shelter, they ultimately rely on the ability to transport goods and to get materials where you need it. Rail transportation, being a vital element of that delivery, around the world more than twelve billion tonnes are delivered by rail every single day. And rail is by far the most fuel-efficient means of moving goods across land. But railways today really face a challenging environment. In the search for growth, segments like intermodal are finding themselves in a competing landscape where you need to maximise opportunities and efficiencies, not just for cost, but also for improved reliability and visibility. Now more than ever we need to partner with our railroad customers to really help them compete and win in this environment."

GE Transportation at InnoTrans

"At InnoTrans right now we're unveiling what are called the next generation of engines. A new high-speed, high-performance engine that will be a game-changer for the places that need them. Our engine portfolio will deliver the best-in-class weight, performance and maintenance costs [...]. By combining a powerful engine at a smaller size, this is a great platform, ideal for places like Asia, Africa, New Zealand and really the places that require what I'll call a lighter-weight locomotive that respects the limitations imposed by the regional infrastructure. This new high-speed engine, compared to the competition [...] delivers a game-changing benefit

that will include over [...] 40% more power per pound than a medium-speed engine and a 10% savings on service and maintenance costs. KTZ, Kazakhstan Railway, will be the first customer to use this new engine to power 300 shunter locomotives, ordered in the first part of this year, with the first shunter being delivered already in 2019."

GE Transportation in Eurasia

"We're seeing [a trend] in the eastern hemisphere where there's an explosion of growth in rail transportation across the Silk Road. This region is an area with a lot of opportunities and one area that we know well. In fact, earlier this year we deepened our ties with Kazakhstan with a 900-dollar agreement for locomotives, services and digital solutions to further develop the country's railway infrastructure. In Ukraine we also signed a historic one billion dollar long-term framework agreement this year with the Ukrainian Railways that includes the production of GE locomotives. In fact, the first locomotive arrived in Ukraine just last week. And today we're expanding our presence even further, with the announcement of a new order of diesel-electric locomotives from Tüpräs in Turkey. This is the first private operator in Turkey to be ordering locomotives."

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The Future of Rail

A panel discussion with the heads of Siemens Mobility, Alstom and Bombardier

What does multi-modality mean for the rail industry?

Michael Peter, CEO of Siemens Mobility:

"Multi-modality is both a blessing and a challenge. It's a blessing because in our industry we're at the eye of the storm of global trends – globalisation: there will be 2.5 billion more people living in cities by 2050. We're ageing. There will be people who will only want to take public transport in twenty years' time. Our own children won't have their own cars anymore. It's paradoxical: people are moving into cities but their journey times to work aren't becoming shorter. You will travel twice as many kilometres in your lifetime compared to your parents. This can only be solved if you travel intermodally. The blessing is that this cannot be done without rail as the backbone. This is true for urban and long-distance transport.

The challenge is of course that every single segment along this intermodal chain will become replaceable. All rail services are facing competition. There are buses that want to replace local rail travel, there are big fleets such as Uber in cities, who are competitors. That's our challenge and we can master it with digitalisation. We can fundamentally revolutionise rail travel and that's what we're showing at InnoTrans."

Infrastructure and digitalisation: what are the trends? What's important?

Michael Peter, CEO of Siemens

Mobility: "Digitalisation will change everything. That starts with our trains. Imagine, these days we

design trains in a digital way and we now use 30% less energy in a system that was optimised over the past 150 years. So you can see the quantum leaps digitalisation is making possible today. If we look at the core issue of increasing capacity and improving punctuality, improving all predictability, which is absolutely vital for intermodal transport chains, then infrastructure is a key aspect. A typical European country today has 1,000, 2,000, 3,000 signal boxes – that's 3,000 buildings full of electronic equipment. Depending on the country these signal boxes are twenty to seventy generations old. Siemens has special facilities for updating relays from the 1920s. This cannot be the most effective way of operation a railway. Investment is necessary here. Five years ago the imagination how to do this wasn't there yet. We can demonstrate huge progress at this year's InnoTrans. We have intelligent components now: points controlled via the internet – a proprietary, safe internet – which operates in Germany at the highest security level SIL 4. We manufacture it in Norway. That gives us the option of managing the entire country with just one signal tower. We'll demonstrate this at InnoTrans: this signal box can be moved to the cloud. We'll never need spare parts again. [...] My department is now the biggest buyer of Pentium processors that are ten years old because we have to supply spare parts for thirty years. That's a huge effort. All that now becomes completely superfluous. The system will deliver a huge amount of data. The system will be able to predict points failures in Norway. That's no problem when I know how 4,000 points are behaving. We can repair it in advance. We'll have 100% availability and achieve a level of punctuality that's never been seen before. We have to invest now because over the life-cycle the railways will save money."

How can we accelerate multi-modality from the perspective of the rail industry?

Henri Poupart-Lafarge, CEO of Alstom:

"This is probably the most exciting time for the rail industry. We have moved progressively from a defensive move to be at the centre of any priority in the world. Mobility is at the centre of any priority. It gives us a tremendous responsibility. What will be the future of mobility? We talk about shared mobility. We talk about electrical mobility, environmentally friendly mobility, which means by the way and nobody says it [...]: the days of polluting and individual cars are gone, it's gone! It will take time but the days are gone. This puts upon us a huge responsibility as mobility providers to try to find the right system as people delegate to us their mobility. So we will want to be transported from one point to another one smoothly and environmentally and that's when multi-modality takes all the advantage. And the digital technologies are there for two basic reasons: the first one is to ensure 24 hours per day availability and reliability of the systems. You cannot have 24 hours per day reliability of the systems without predictive maintenance, without basic digital technology. The second is precisely to ensure the nice co-ordination, the fluid co-ordination between all the modes of transportation. Not only from a demand side, which is what exists in a number of applications today, but also from the offering side. At Alstom we are trying and promoting a multi-modal control centre, which will allow complete authority to arbitrate between rail, between bus, between other types of transportation. Digital

technology will precisely be at the core of multi-modality. But we need to see this multi-modality, frankly, without any individual polluting cars."

The rail industry is perfect for automation. What is happening in this area?

Laurent Troger, President of Bombardier Transportation:

"Automation has been in the industry for a while and I think we've been the first to move people in a fully-automated train in the metro that started forty years ago. So forty years, imagine that! So we are speaking about it and we are now bringing automation into new applications – to high-speed trains but also commuter [trains]. We start to realise that we can bring automation more into the overall network. So we are getting capacity and safety through automation and what I can say to you is that this is a fantastic job. Now we are arriving at the next level of performance which will be what I call the 'zero-failure system' because the more you want to automate, the more you need to make sure that there is at the end no disruption in your system. Recently I've seen some cities that have faced significant disruption because in fact they have automated at a high level, but then, if your system is not resilient, you are facing a critical issue. So the industry has a challenge not to go to automation but to go to zero-failure for the total system. [...] Looking at the aerospace industry I can see that they have managed that and how we can bring zero-failure to the rail industry will be the challenge for tomorrow."



Continued on page 65



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Schlatter's new mobile rail welder type AMS200 mounted on a road/rail truck

Schlatter is the market leader in stationary rail welding machines for long-welded rail production (LWR) and for welding machines for turnout parts, frog points and crossings. The mobile rail-welding systems are well known worldwide and are widely used for welding continuous-welded rails for high-speed tracks and heavy-haul tracks.

At Schlatter rail-welding machines the focus is on quality. This encompasses both the quality,

long life-span and low operating costs of the machines and the quality of the final rail welds. For good quality welds, Schlatter has developed the designated Schlatter Weld Processor (SWEP) which controls the main parameters 'current', 'force' and 'travel' and their correctly timed interaction.

These three parameters are constantly supervised by the new Schlatter Weld Analyzer which records every weld. Setting

tolerance fields makes it possible to decide whether the parameters are in the desired range immediately after the welding process.

Mobile rail welding machines and systems

Schlatter offers various mobile rail-welding systems for in-track welding of continuous-welded rails (CWR). The latest development produces closure-welded tracks without separate pulling devices for de-stressing. Customers can choose between three different mobile rail-welding machines: Supraflex type AMS200, AMS100 and AMS60. All these mobile welders offer the same high welding quality but they have different rail end aligning systems. AMS200 and AMS60 align on the running edge (left or right side selectable) and are most suitable for high-speed railway tracks for passenger transportation. AMS100 aligns the centre of the web and is

mainly designed for heavy-haul and conventional railway tracks.

The AMS200 has an autarkical deburring system, which makes it possible to deburr the whole rail profile automatically directly after welding, even when both rail ends are in a clamped position. Our AMS100 and AMS60 rail-welding machines also have an incorporated deburring system which deburrs automatically directly after welding around the complete rail profile.

Two alternative rail-welding systems are available:

- 1. Supra roadflex, the truck-based system for road / rail operation with very high flexibility.**
- 2. Supra multiflex, consisting of standardised containers which can be mounted on to flat waggons or can be used semi stationary at the job site.**

Welding short rails into long-welded rails with Schlatter GAAS80

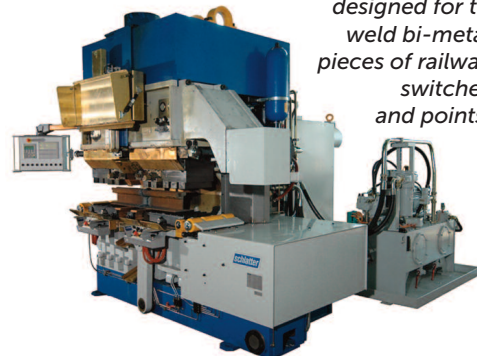
The renowned Schlatter rail-welding machine GAAS80 is in operation daily in rail-welding factories worldwide. It features a DC weld current, precise alignment of the rail ends (on running edge, selectable left or right side), precise vertical alignment including 'crown-position', outstanding weld quality and automatic deburring only seconds after welding. The rail ends remain clamped during deburring which contributes to quality. The small amount of remaining burr around the rail profile results in easy and cost-effective grinding.

For complete production lines, Schlatter co-operates with experienced partners for the additional machines like rail end brushing machines, straightening presses and rail profile grinding machines.



Schlatter's renowned GAAS80: the stationary rail welding machine that guarantees for highest welding quality.

The strongest of Schlatter's rail welders type GAA100: designed for to weld bi-metal pieces of railway switches and points.



Railway switches and crossings welded with Schlatter GAA100

The Schlatter GAA100 flash butt welding machine has an extremely compact housing that is open at the front so that work pieces can be easily loaded and positioned. A total of four clamping presses, each with 1000kN clamping force, ensure that there is no slip. Railway turnout parts, points and crossings as well as switch blades are exposed to very high loads. For a long service life, manufacturers use hard manganese and high-alloy steel which is welded to conventional rail steel with the Schlatter GAA100. This requires complex weld programmes and special processes.

Major manufacturers of turnouts and switch blades successfully use the Schlatter GAA100 because of its flexibility, its high-quality welds and its geometrical accuracy.

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Treadmaster Flooring at InnoTrans 2018

InnoTrans is one of the most important shows for Tiflex Ltd, the Cornwall-based manufacturer of Treadmaster Flooring.

Tom Collins, Operations Director says *"InnoTrans is always a great opportunity to see customers, colleagues and competitors. It also allows our newest member of the team to see the size and scope of the industry. For a first visit the show is a real eye opener."* Treadmaster may be made in the beautiful southwest of England but it now has a global reach.



Tom Bigland at InnoTrans 2018



Inside the Waratah Series 2 train

Treadmaster Flooring in Sydney's Waratah Series 2 Trains

Treadmaster now has a global reach and recently installed its products on the Waratah trains in Australia. The photographs show the first of Sydney's Waratah Series 2 trains delivered by Downer EDI and constructed in China by CRRC Changchun Railway Vehicles, with Treadmaster as a supplier. The double-decked air-conditioned trains feature Treadmaster TM8 throughout, incorporating inlaid safety signage and pictograms for disabled users. The first of Sydney's new Waratah Series 2 trains has now entered service on the network following the completion of testing. All of the new trains are expected to be delivered, and in service, by early next year – part of the state's \$1.5 billion More Trains, More Services programme.

The Chief Executive Officer of Downer, Grant Fenn, said the Waratah Series 2 trains further improved the passenger experience with their superior design and technology. ***"Downer is continuing to work with Transport for NSW, our delivery partners and suppliers to provide safe, reliable and comfortable world-class transport solutions for the people of New South Wales,"*** Fenn said. ***"Importantly, we***

have built on the success of the original Waratah train fleet to deliver Sydney's newest trains in record-time. We understand the transport challenges in New South Wales and the need to increase capacity as quickly as possible with improved passenger comfort and the highest standards of safety." Features on the new trains include improved air-conditioning systems with advanced temperature control; over 90 internal and external CCTV cameras; high-definition passenger information screens; wheelchair spaces, priority seating and hearing-aid loops; and improved interior LED lighting.

Treadmaster Flooring in Glasgow's New Subway Trains

Tom Bigland, the newest member of the Treadmaster team, was particularly interested to see the new Glasgow Metro Trains built by Stadler. At InnoTrans this year Stadler presented its first four-car driverless metro trainset for use on the Glasgow Subway to its client Strathclyde Partnership for Transport. The carriages constructed by Stadler have Treadmaster flooring of two colour variations. It was the first public presentation of one of the 17 new trains ordered by the Strathclyde Partnership for Transport in 2016.



Waratah Series 2 train

The Glasgow Subway order represents the first time Stadler has supplied trains for a driverless underground metro system. The design of the train also differs as they need to fit a track gauge of 1,219 mm and tunnels that are just 3.4 metres in diameter. While the new trains are the same length as the vehicles they will be replacing, they are four cars long rather than three.

Treadmaster Flooring on the London Underground Inspires Overground Design

Treadmaster are proud of their materials technology team, where their fire retardant flooring was developed. The research and development laboratory is based in Liskeard in Cornwall and have a dedicated team of technologists working on new and innovative flooring materials. This product has now been in service for over 20 years. It was initially developed to meet the stringent requirements of the London Underground rolling stock. In recent times the importance of fire safety has been reinforced, but that is not the only critical feature of this flooring. After 20 years the floors are as good as ever, resistant to the trials and tribulations of daily life on a busy underground system. The



colours remain strong, and as the product is homogenous the pattern does not wear thin or wear out. It is perhaps time to think of Treadmaster Flooring as an iconic material. Designers Loris Jaccard and Livia Lauber fell in love with the speckled flooring of the London Underground carriages.

"We love the speckled flooring of the London Underground carriages; each line has its distinctive colour code and corresponding flooring combinations. The look and durability of the material inspired a range of original table mats. Produced from heat resistant rubber, the coasters and pan mats bring underground sparkles to overground lifestyle."

The WONDERGROUND range has been developed in collaboration with Transport for London and is available in two sizes and three colourways: VICTORIA, PICCADILLY and WONDER, a custom made colour."

See the range here: <https://shop.lorisetlivia.com>



treadmaster
flooring



Signalling Change:

How New South Wales is Digitalising its Rail Network



Stephen Lemon



The Rail industry in Australia is expanding rapidly. Major projects under construction include the Sydney Metro and Inland Rail. In May 2018 the federal government announced AUD \$7.9 billion in its budget for 2018–19. In its own budget for the same period the government of New South Wales, the largest state in the country, directed AUD \$14.4 billion towards upgrading its public transport networks. In July 2018 Transport for New South Wales (TfNSW) received state funding for the installation of a Digital

Systems Programme on its heavy rail network, which provides services for 300 million passengers per year. In this article **Stephen Lemon, Programme Director, Digital Systems, Transport for New South Wales** tells Railway-News how digitalisation will improve the safety and efficiency of the network.

“The backbone of Sydney's transport system is its heavy rail network, with over 960 kilometres of track connecting communities

in Australia's biggest city. Over 340 million customers travelled on the Sydney Trains network in 2016–17, a 5.6 percent increase on the previous year. This growth is putting enormous pressure on a network that is ageing, complex and reliant on out-dated technology.

One way we're tackling this is through Digital Systems – a program that will replace legacy signalling and train controls with modern, internationally proven, intelligent systems based around

European Train Control System (ETCS) Level 2 technology. The program will allow us to put more trains on the tracks and provide more frequent and reliable services to meet the needs of a growing global city.

Digital Systems will harness technology that enables future network enhancements and raises the bar in performance and efficiency to benefit our customers.

The Digital Systems journey

In June 2018 the NSW Government announced an \$A880 million investment in technology improvements to modernise the Sydney Trains network, including the development of Digital Systems.

Our program consists of three main elements:

- *Replacing trackside signalling equipment with the latest European Train Control System (ETCS) Level 2 technology*

- *Automatic Train Operation, which will be used to assist drivers, who will still remain in control, to provide faster and more consistent journey times*

- *Introducing a Traffic Management System for more effective incident management and service regulation across the network*

These elements will deliver significant performance, cost and safety benefits. The modern technology will allow for data-driven operations such as dynamic timetabling, and lead to reduced maintenance possessions and increased passenger and freight capacity.

The broader context

Digital Systems is a core element of More Trains, More Services – a portfolio of works needed to deliver the major timetable upgrades required on the Sydney Trains network over the next decade.

It also builds upon other Transport for NSW initiatives, including:

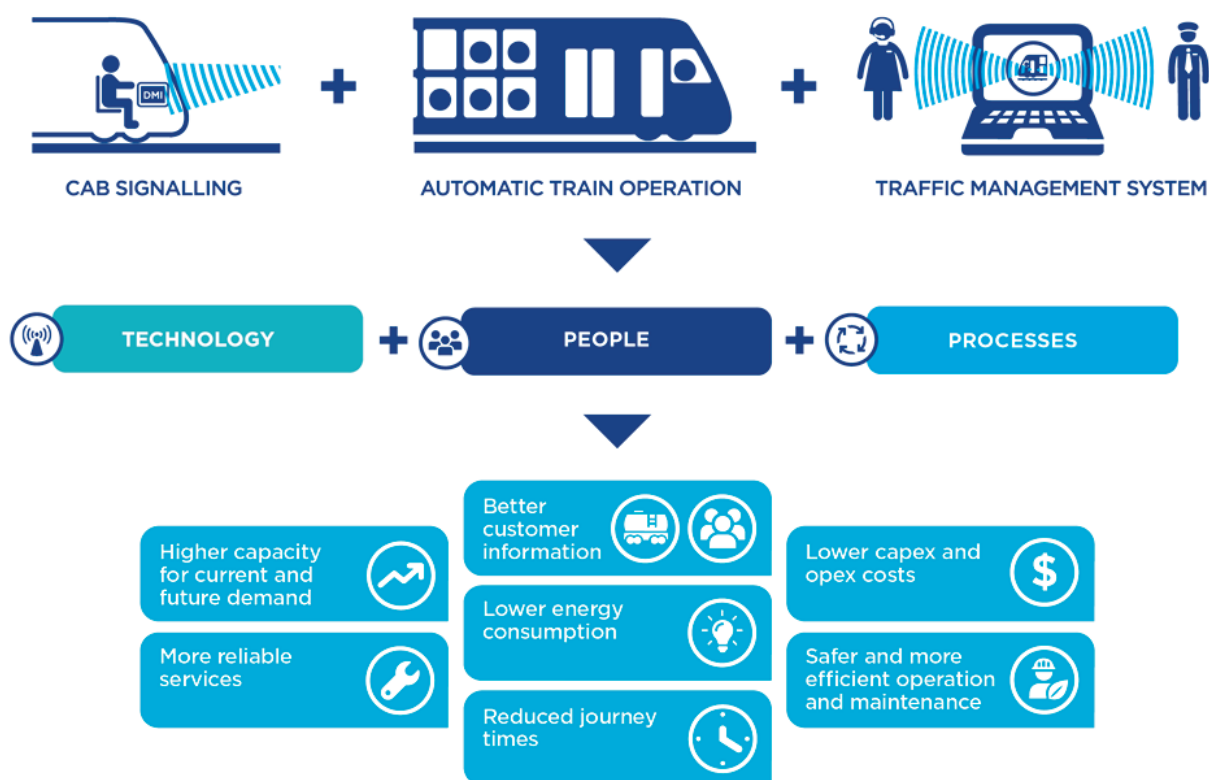
- *The completed Digital Train Radio System project, which has provided complete GSM-R coverage to the network, and included ETCS Level 2 compatibility and readiness as part of its scope*

- *The current Automatic Train Protection project, which is deploying an optimised form of ETCS Level 1 to deliver rapid safety benefits across the network, prior to the deployment of ETCS Level 2, and also includes ETCS Level 2 compatibility and readiness as part of its on-board cab fitment scope*

- *The current Rail Operations Centre project, which centralises the co-ordination of Sydney Trains' operations and control functions, and includes provision for the future transition to the Digital Systems 'Traffic Management System' capability within its scope*



Sydney metro station / artist's impression © public domain



Digital Systems also aligns with Future Transport 2056 – the NSW Government’s strategic vision for the next 40 years of transport across the state. Digital Systems will help achieve a number of goals in the strategy including investments to support ‘turn up and go’ services and technology to drive advanced safety systems and removal of trackside equipment.

Procurement underway

In August, 300 people gathered in Sydney for an industry briefing where we outlined to our future delivery partners the context, scope and procurement methods for the Digital Systems program. Collaboration with the industry is key to the program’s success and we’ll be holding many more briefings in the future as Digital Systems develops.

The industry briefing also coincided with procurement for the System Integrator contract. A Request for Proposals has been released and we’re expecting to award the contract later this year.

The System Integrator will be our key partner in delivering Digital Systems and integrating it on to the Sydney Trains network. Procurement on other contracts including ETCS/Signalling and Traffic Management System will continue in 2019.

Internationally, Digital Systems is nothing new. ETCS Level 2 technology has been delivered on various networks around the world so we’re not looking at reinventing the wheel. We’re taking on board lessons learned from other nations, which is an on-going process.

Transforming the future of Sydney’s

rail network

Our existing heavy rail network has served the city and surrounding regions for more than a hundred years. Over that time, it has grown incredibly complex and requires significant investment to continue to serve us in the long-term.

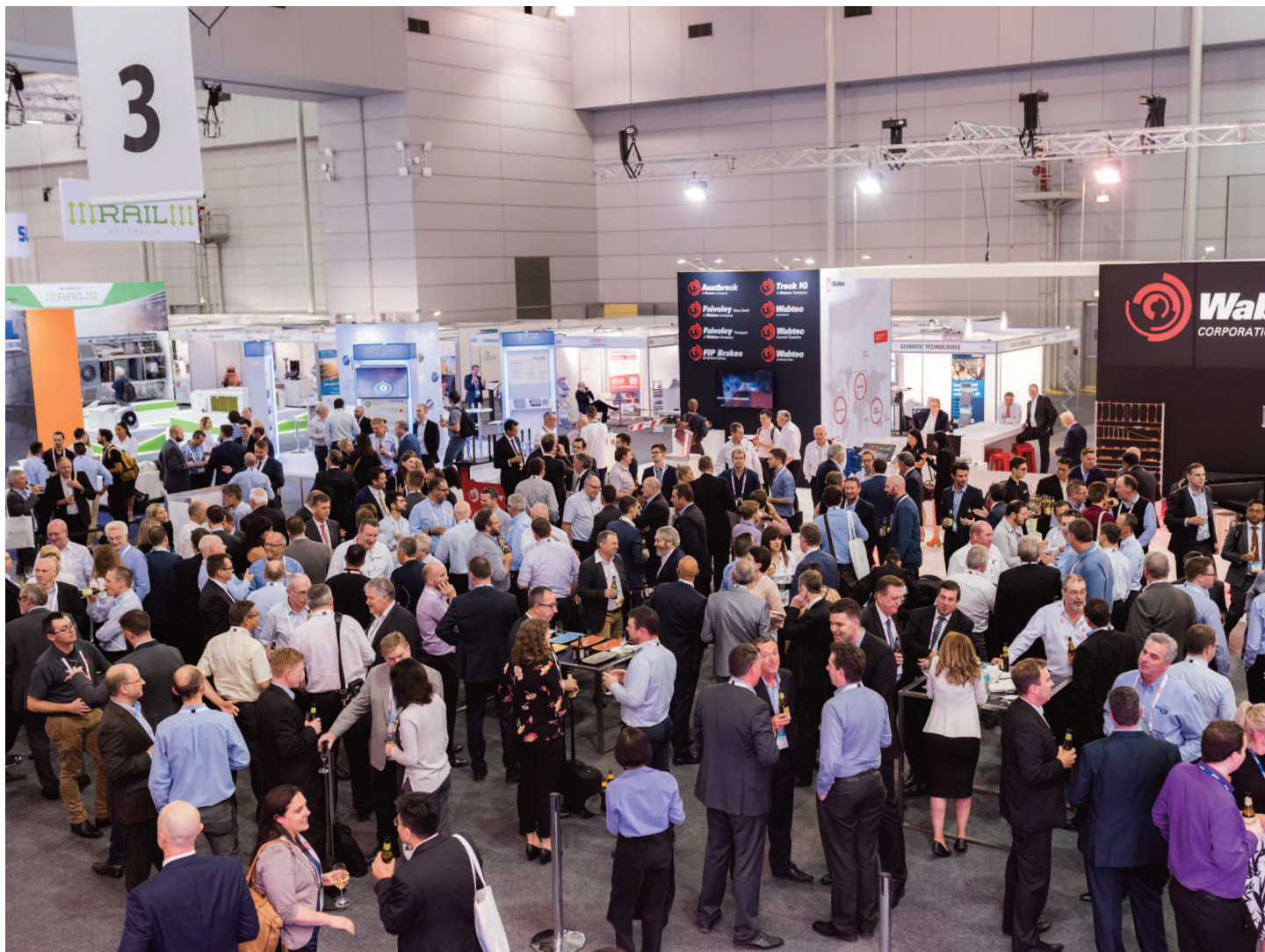
We’re responding by continuing to simplify the heavy rail system and by introducing a new wave of technology through Digital Systems. This program will bring our rail system into the 21st century – it’s the largest transformation that Sydney Trains will see in our lifetimes. By harnessing technology improvements we can meet the needs of Sydney as a growing global city.

We are starting to build momentum on a game-changing program that will transform how Sydney’s railway is managed and controlled forever.

Australasia's largest rail event

Australia's capital will play host to the rail industry's premier event in the region for the year – AusRAIL 2018. It will take place over two-days, 27–28 November, at the National Convention Centre in Canberra.





The largest rail event in Australasia, this year's AusRAIL theme **"Rail – For a better Future"** is an appropriate one given how the industry is booming with big ticket items under way or planned across the country.

The event, which is hosted by the Australasian Railway Association (ARA), has attracted more than 700 senior attendees to the conference programme which includes plenary sessions, technical streams and forums with well-respected industry leaders and CEOs.

The "Rail – For a Better Future" theme delves into the economic, social and environmental benefits and future opportunities of rail in

developing a better integrated, liveable and prosperous society.

Speakers confirmed to date include:

- **The Hon Michael McCormack MP, Deputy Prime Minister, Minister for Infrastructure, Transport and Regional Development**
- **The Hon Anthony Albanese MP, Shadow Minister for Infrastructure, Transport, Cities and Regional Development, Shadow Minister for Tourism**
- **Frances Valintine, Founder, Tech Futures Lab**
- **Dr Polly McGee, Author of 'The Good Hustle', Digital Strategist**

- **Tilo Franz, General Manager, Operations and Maintenance, Canberra Metro Operations**

- **James A. Moore, Principal, Advanced Planning Group, Jacobs (USA)**

- **And many more!**

100+ Rail Industry Organisation Exhibition

AusRAIL 2018 will feature the largest rail exhibition in Australasia running concurrently with the conference. With more than 100 organisations on display you'll need the full two days to check it out! Entry to the exhibition is free should you wish to browse.

Not just a conference! Take advantage of the networking events.

AusRAIL 2018 features a number of networking events headlined by the Gala Dinner to be held in the Grand Hall at Parliament House sponsored by Downer. Other events include the Exhibition Networking Drinks, sponsored by McConnell Dowell, the Welcome Reception sponsored by Australian Rail Track Corporation Inland Rail, as well as a Sponsor and Exhibitor Networking Breakfast.

Young Rail Professionals Pitching Competition

Since its launch in 2016, the AusRAIL Young Rail Professionals Pitching Competition has been a popular and much welcomed addition to the conference



agenda. The competition sees finalists pitch their revolutionary ideas to the AusRAIL attendees with the winner announced at the Gala Dinner. The audience plays its part by voting for their favourite pitches!

AusRAIL has attracted the major

companies involved in the industry as sponsors including Downer, Thales, John Holland, McConnell Dowell, ARTC Inland Rail, CAF and Jacobs.

To register and for full event information, please visit

www.ausrail.com



INLAND RAIL:

The Future of Freight in Australia



Richard Wankmuller

The Inland Rail link between Melbourne and Brisbane which is currently under construction in Australia is designed to transform the capacity, productivity and interoperability of the freight network in the country by improving intermodal transport between the two port cities. The route will transect the states of New South Wales, Queensland and Victoria. The 1,700km line is designed for freight services but passenger trains might operate on it as well. 1,200 km of the route will be existing track upgraded to meet the requirements of the project. Services are expected to start in 2024–25. Construction on the first section, between Parkes to Narromine, was formally

approved in September 2018. In this article **Richard Wankmuller, Chief Executive Officer of Inland Rail**, tells Railway-News why the project is so important for freight transport in Australia.

“ One of the greatest transport challenges Australia faces is to service its fast-growing east coast with a freight network that has been optimally configured to handle the future freight task.

The east coast of Australia is home to more than 70 percent of the population and contributes about 75 percent of the nation's gross domestic product. During the next 40 years the population is expected to more than double, while the volume of freight

moving in Australia is also expected to double or even treble in the next 50 years.

Continued reliance on road transport, which today handles around 74 percent of the inter-capital freight moving between Melbourne and Brisbane, would pose significant impacts in terms of safety, energy efficiency and the environment, particularly as road transportation increases to accommodate growing freight volumes.

One of the key drivers of Inland Rail is to provide a service that is competitive with road, enabling the rail market share between Melbourne and Brisbane to increase from 26 percent in 2013–



14 to 62 percent by 2049–50. The development of the Inland Rail programme scope, which is being delivered by the Australian Rail Track Corporation (ARTC) for the Australian Government, has been shaped by market needs and stakeholder feedback as much as engineering requirements. Following extensive consultation with train operators and the freight logistics industry, ARTC developed a detailed service offering and established four key parameters – 98 percent reliability, road competitive pricing, less than 24 hours' transit time, and freight availability in line with market needs.

Transit time is key for operators and the Inland Rail route will reduce the journey from around

32 hours to a road-competitive 24 hours or less, allowing freight to move between the Victorian and Queensland capitals without having to thread its way through the congested Sydney region. Customers also want provision for longer trains to improve productivity, while also providing interoperability with the interstate mainline standard gauge network. Inland Rail isn't just about a single railway line that runs between Melbourne and Brisbane. As a result of Inland Rail, Australia will have a very resilient freight rail network with multiple pathways that will build contingency and flexibility.

This is not just an engineering project – what it does is link together intermodal terminals,

regional areas and capital cities with a rail backbone that is world-class, that is efficient, and that can deliver cost benefits to our customers and broader economic benefits for the nation.

Sharing the journey

Inland Rail will serve a variety of freight markets, not just Melbourne to Brisbane, with significant demand to link in with regional commodities and interstate freight.

Inland Rail is an enabler for an innovative, entirely new supply chain. This innovation is made possible because Inland Rail drives the speed, the reliability, the consistency, the predictability and the efficiency to allow that supply



chain to flourish. It takes us to a new way of doing business – a new reality of how and where to source products – a new reality of how and when we can send them to market.

Inland Rail will be a catalyst for other complementary investments in the supply chain including new intermodal terminals, processing facilities and distribution centres. For this major infrastructure “spine” to optimally support productivity improvements and for freight to be moved around in the most efficient manner, a substantial commitment is required to the integration of rail infrastructure with associated intermodal facilities such as terminals and adjacent warehouse precincts.

Government at all levels and different political persuasions understand this and are making provident investments and planning for complementary developments.

We have State Governments stepping up and spending on their respective rail networks and thinking ahead as to how additional investments can be made to optimise further the benefits from those already underway.

We have great leadership at the local government level thinking ahead about inland ports – they’re being proactive trying to drive investment in their communities. They are thinking about how to engage the private sector, where

the needs are, how to get things going, and how their communities can participate and benefit, both in the short and longer terms. There’s also leadership in the private sector driving intermodal terminals and shifting added value activities from where they are today out to the regional areas. Value-adding activities like food processing and others that can be done in these lower cost areas and provide a complete product for the market.

Planning for new or expanded freight hubs is well advanced in key regional centres on the alignment such as Parkes and Wagga Wagga in New South Wales and Toowoomba in Queensland.





ARTC will continue to work closely with governments and the private sector providing relevant advice and technical support to help ensure the benefits of complementary investments are maximised for local economies and the national freight network.

Reaping the benefits

Currently, Adelaide, Perth and Darwin are the only capital cities in Australia that can receive and dispatch 1.8 kilometre trains with double-stacked containers. However, Inland Rail will transform that interoperability. It provides a consistent standard which enables freight operators to use the same rolling stock anywhere on the national rail freight network. Inland Rail has been designed to pass through four of Australia's most productive farming regions, offering supply chain benefits and cost savings for agricultural producers, boosting competitiveness and flow-on

effects to regional communities. It will also stimulate new demand and create opportunities thanks to improved accessibility and greater efficiency.

Inland Rail provides a highly efficient, inter-capital trunk rail line that regional and branch rail lines connect into, opening up regional producers to domestic markets as well as export ports right around the country. As Inland Rail will improve those connections and provides a cheaper, long-distance transport network to road, farmers will reap end-to-end supply chain improvements.

Bringing the private sector on board

The most complex section of Inland Rail, involving large-scale tunnelling between Gowrie and Kagaru in Queensland, will be delivered through a Public Private

Partnership (PPP). This will enable ARTC to harness innovative design solutions and more efficient construction methodologies on this section.

One of the most exciting projects will be the construction of a 6.4km long tunnel near Toowoomba to carry the line under the Great Dividing Range west of Brisbane. It will be the largest diameter diesel freight tunnel in the Southern Hemisphere.

This section of the Inland Rail not only comprises tunnels, but numerous viaducts are also required throughout southern Queensland. Some of these viaducts will be up to 40m high and others over 1km long in order to traverse mountain ranges or to span floodplains.

Completing the link

For our cities to remain liveable, our roads to be safer, our environment to be better protected – a world-class freight supply chain is a non-negotiable. It will re-balance modal share between road and rail to optimal levels akin to best practice elsewhere, making our country more productive, transport more efficient, and Australian businesses more competitive.

With Inland Rail we will have completed a key missing link. ”





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Full order book signals positive future for Mechan

Following another successful visit to InnoTrans 2018, Mechan has a burgeoning order book and even more fans of its high-quality depot maintenance equipment.



Mechan's 2018 InnoTrans stand

(From L-R) CIM Group's Andrew Mott and Alain Lovambac, Mechan's Martin Berry and Jean Gourp from CMI.



The renowned lifting and handling specialist invested in its largest stand to date in the UK Pavilion and was rewarded with a steady stream of visitors wanting to learn more about its portfolio of products.

A fully working version of Mechan's flagship lifting jacks formed the eye-catching centrepiece on its stand, attracting clients old and new, keen to learn more about the progress the firm has made in the last two years. It now has a wealth of orders and a factory working at full capacity for the next 12 months.

Martin Berry, Mechan's engineering director, said: ***"It has been an eventful period for us since the last InnoTrans exhibition and we had much to talk about with colleagues from across the industry, not least our buy-out by France's CIM Group and the launch of a new range of jacks, designed specifically for the tram and light rail markets."***

Mechan was bought by the CIM

Group early in 2017, adding to its portfolio of products and services, which includes the design and realisation of railway supply and construction projects. The group subsequently became part of global infrastructure experts, CMI, at the end of the year, creating a worldwide network of contacts from which all parties benefit.

This has led to the recent restructuring of Mechan's board of directors, with Martin bringing his technical expertise to the leadership team, alongside qualified mechanical engineer, Andrew Mott of the CIM Group, who has been appointed managing director and Jean Gourp, vice president of CMI. He will facilitate opportunities for the firm with other group companies, helping them work together and utilise their collective expertise.

CMI provides advice and support to public infrastructures about assembly, operational management and maintenance of facilities. It operates in a wide range of sectors, including rail,

which it has identified as a growth market. Capabilities include the design and supply of equipment, locomotives and the full reconstruction of all kinds of rolling stock.

Celebrating a half century

Now InnoTrans is over for another two years, Mechan is looking forward to its 50th anniversary. To mark the occasion, it has embarked on a charity mission.

The team has pledged to raise at least £5,000 for Sheffield's Children's Hospital by undertaking a range of fundraising endeavours. Finance director Zahir Altaf kicked off the initiative by cooking a lunchtime treat for colleagues who were willing to donate.

A sponsorship page has been set up (<https://uk.virginmoneygiving.com/MechanLimited>) and the firm is hoping suppliers, clients and colleagues at its parent companies will dig deep to show their support. The money raised will be handed over to Sheffield Children's Hospital Charity prior to Mechan's anniversary dinner in February.

Marketing executive Fran Piotrowski is co-ordinating the fundraising. She said: ***"We are very proud to have reached our half century and want to celebrate this special occasion by giving back to the community that has supported us throughout this time. Sheffield's Children's Hospital is a very special facility that our city is privileged to benefit from and I am sure it will strike a chord with staff and local suppliers, many of whom will have needed its services at some point."***

Marketing executive Fran Piotrowski with some of the Mechan team.



Product innovation

Spotting an opportunity to develop new products that improve productivity and automate lengthy manual processes has been the focus of Mechan's work throughout the last 50 years.

It started out in 1969 supplying Sheffield's traditional manufacturing industries and now serves the rail sector almost exclusively.

Development is what drives its expert engineers and following several requests from end users, this has most recently resulted in the creation of a new line of lightweight lifting jacks.

Light rail customers require a different jack specification to their heavy rail counterparts, so the firm has created a cost-effective, smaller product with a different base arrangement and built-in assembly for ease of movement around a depot. They have a lower lifting height to cater for the proximity of car and rail, yet still retain all the features that make Mechan products so revered, including its control systems,

which can synchronise sets of up to 60.

Using portable touchscreen panels, Mechan's jacks can be set up, raised and lowered by just one operator, who has the freedom to move to the best location to monitor the lift. The remote handset has a full colour display that provides constant feedback, making it easier to diagnose faults and analyse data about maintenance and servicing.

Like all Mechan innovations, reducing the cost of rail operations is at the forefront of its development process. Its jack designs exert less load on the floor than competitor products, minimising civil expenditure, while lower capacity motors are fitted to draw less power. The controller also uses a combined power and data cable and inverter technology to minimise installation costs and produce further savings.

The first order for Mechan's new lightweight jacks came via its first collaboration with CIM, who required a set of 20, among other products, for a new build depot in

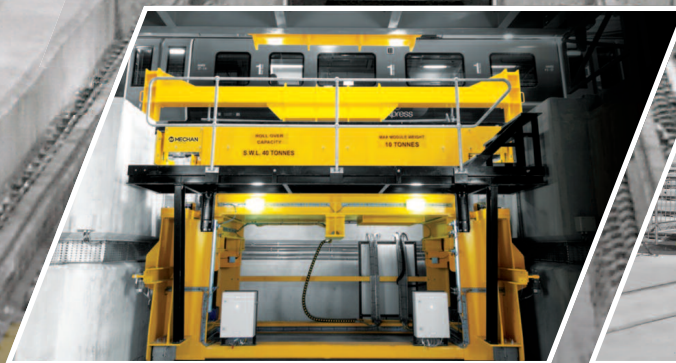
the Nuevo Tocumen area of Panama City. The group has been commissioned to install and maintain 50 kilometres of track, catenary and workshop equipment, as part of the Line Two project, linking the western district of San Miguelito with Felipillo in the east. The 12-tonne jacks left the UK in July, following successful factory acceptance tests and were commissioned on site some weeks later.

The Panama order was the firm's maiden delivery to the Americas – the only continents it had yet to supply – and its export fortunes continue to rise under CIM. But what really underpins Mechan's longevity is the personal service this highly specialised, highly professional team provides to clients, which keeps them coming back year after year.

For more information about Mechan's product portfolio, telephone **(0114) 257 0563**, email: **info@mechan.co.uk**, visit: **www.mechan.co.uk** or follow the firm on Twitter **@mechanuk**.

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Davy Industrial Park
Prince of Wales Road
Sheffield S9 4EX

mechan.co.uk 

info@mechan.co.uk 

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Germany at InnoTrans

Andreas Scheuer, Minister of Transportation, and Richard Lutz, CEO of Deutsche Bahn give insights

The EU recently took Germany to court over air pollution. This aspect too highlights that strengthening rail is more necessary than ever. Can you address the government's plans for rail with regard to our climate and sustainability?

Andreas Scheuer, German Transport Minister:

"The federal government and I are always a bit sceptical when the European Commission sues and tells off countries. It would be nicer if we could engage in positive developments together. [...] Political decisions are very important and we're very close to transport bodies, we're involved in joint projects and we have meetings together so we can improve the transitions from one system to another. I think this area is key. A high-speed train is useless if the surrounding system doesn't work. There's also no point in increasing funding if the regional politicians can't properly deploy it. The complexity of the rail system has to be brought into the digital age. Combining mobility and digitalisation – that'll be the upcoming task. DB AG won't just be a mobility provider in the future, it'll be a digital provider as well. That'll be the next leap. There's enough funding available. The framework conditions have been set correctly. There are enough attractive players and now we have to act. And we have to say positive things when things go well."



What is Deutsche Bahn doing when it comes to sustainability and protecting the climate?

Richard Lutz, CEO of Deutsche Bahn:

"We can say this here without blushing: taking the train is a proactive step to help protect the climate. There's no other mode of transport that protects the environment in such a powerful and effective way. For other mobility providers the subject of electric mobility is a vision for the future. But in rail that's been our reality for more than ninety years. More than ninety percent of rail operations are powered by electricity. That shows that we've been innovative for a long time. But we don't want to rest on our laurels. Deutsche Bahn has set itself ambitious goals for 2030: we want to more than half our CO2 emissions and we want to increase the percentage of renewables from around 44% now to 70%. That's part of our contribution to the federal government's plan for protecting the climate and it's part of the decarbonisation by 2050 that is necessary because we've only got one mother Earth."

There is discussion whether the majority of the railway lines in Germany can be digitised. Is that a realistic scenario?

Andreas Scheuer, German Transport Minister:

"We make an effort with all the services we provide and we need a good-quality network. We must close the gaps in mobile phone coverage. It has to be possible to have quality of life and be able to



have a good working environment on trains. That's the benefit of trains: you can work, you can make phone calls and relax and much more. We have to engage in mobility management. Citizens need to stop just getting in their cars in the morning to get to work. There will be different combinations and we have to explain that this will bring about time savings and an increased

quality of mobility. We're currently in that transformation process. By comparing the options out there, rail becomes so attractive that switching to rail is enabled. To achieve that we need a network that's cutting-edge. It mustn't be that passengers on the train treat "I'm on the train" as synonymous with losing coverage. That annoys everyone. We want to reduce that annoyance."



DAR

VISIONARY IDEAS NEED POWERFUL SOLUTIONS: DARI® BY GOLDSCHMIDT.

Our database solution DARI® – Data Acquisition for Rail Infrastructure – enables us to make our products smarter, more effective and sustainable. Goldschmidt has therefore taken the next logical step and combined a collection of modern, high-performance stand-alone solutions into a digital network consisting of intelligent products. This innovative edge, based on the future-oriented technology of DARI®, is the special and unique added value offered by our Goldschmidt products. Experience new dimensions at the track construction site. With DARI® by GOLDSCHMIDT.

New standards for quality, reliability, transparency and efficiency place increasing requirements on the construction and maintenance of modern railways every day.

The digitalisation of work processes has become indispensable on the track construction site. In the course of our digital product initiative GOLDSCHMIDT GOES DIGITAL we have further developed our ideas and solutions into a digital network of intelligent devices: DARI® BY GOLDSCHMIDT.

Our database solution DARI® – Data Acquisition for Rail Infrastructure – enables us to make our products smarter and more effective and your track construction projects sustainable, more efficient and safer.

Our modern, high-performance stand-alone solutions create a digital network of intelligent products with completely new advantages and added value for your track construction site. All DARI®-compatible products from Goldschmidt, which will include the access to our database solution, will still use the GOLDSCHMIDT DIGITAL APP for your convenience.

- » **DARI® centrally archives work and measurement data in real time.**
- » **Linked measurement and control data allow immediate forecasts and automated inspection processes.**
- » **Intelligently linked devices create a globally accessible network of knowledge and key figures.**
- » **The always available track history, the “the life story of the track”, enables the predictive supervision of tracks which are subject to intensive maintenance.**

OUR DARI® COMPATIBLE PRODUCTS

SMARTWELD RECORD



The SMARTWELD RECORD captures and documents the preheating parameters for THERMIT® welding via the GOLDSCHMIDT DIGITAL APP. The welder is given the specific individual steps for the THERMIT® welding process in a user-friendly way and without errors. This ensures both optimum use of welding materials and that the welding work is performed to standard. Process parameters can be saved centrally using the GOLDSCHMIDT DIGITAL APP. The data is uploaded directly to our database solution DARI® so that data can be analysed and accessed globally.

SMARTWELD JET



By automating the preheating stage and working without compressed oxygen, the propane-air torch SMARTWELD JET optimises your work process. Without the logistical workload, the avoidance of execution errors and the documentation produced on site by means of the GOLDSCHMIDT DIGITAL APP, the economic efficiency of your welding activities increases. The data is uploaded directly to our database solution DARI® so that data can be analysed and accessed globally. SMARTWELD JET ensures safe and reproducible execution of the preheating process – guaranteeing high weld quality.

RAILSTRAIGHTS



The RAILSTRAIGHT precision measurement devices with the variants COMPACT, WAVE and DUAL allow for the highly precise measurement of the straightness and surface quality of rails and local corrugation of the tracks. They are connected to the GOLDSCHMIDT DIGITAL APP via Bluetooth. The data is uploaded directly to our database solution DARI® so that data can be analysed and accessed globally. In addition to the high precision achieved using a micro-magnetic measurement process, the devices also have some other impressive features: their robust design suitable for use on railway tracks with high mobility, a high-performance internal lithium ion rechargeable battery and automatic calibration at 30-second intervals.

TRACKGAUGE DIGITAL



The portable measuring device TRACKGAUGE DIGITAL (TGD) evaluates the track and switch geometry. The device is lightweight, reliable, easy to use, and measures very accurately the track gauge, the cant, horizontal and vertical irregularities and the left and right flangeways in switches; it also checks gauge values. It is operated by an application

on an Android smartphone. The measurement data is displayed immediately, additional information on the infrastructure, including the results of the visual inspection, is recorded in a digital format. The measurement reports are created on the smartphone by the GOLDSCHMIDT DIGITAL APP. The measurement data is uploaded directly to our database solution DARI® so the data can be analysed and accessed globally.

TRACKSCAN COMPACT



The TRACKSCAN COMPACT (TSC) trolley measures track geometry automatically. The measurement results include values of track gauge, cant, horizontal and vertical irregularities along with the calculated gradient and twist parameters. Thanks to its user-friendly and modular design the trolley can be transported by one person and fixed on a track in less than 5 minutes. The device is operated with an Android application on a tablet, on which all measurement data is displayed immediately. Not only the measured data but also the covered distance, the GPS position and the visual inspection of the track condition are recorded by the GOLDSCHMIDT DIGITAL APP. The measurement data is uploaded directly to our database solution DARI® so the data can be analysed and accessed globally.

RAIL DRILL 330 B



The battery-driven rail drill makes it possible to drill rails with zero emissions and without fuel. The extremely low noise and vibration emissions as well as a battery which makes over 100 drill holes possible per cycle make the RD 330 B one of the best machines available on the market. Moreover, the machine has a digital Bluetooth® interface for communicating with the GOLDSCHMIDT DIGITAL APP. The Android application is used to record machine data, such as number of holes, GPS tracking, time stamp per hole, indication of maintenance intervals, battery statuses and machine hours. This makes it easy to keep track and document the work done. These data is uploaded directly to our database solution DARI® so the data can be analysed and accessed globally.

SMALL POWER UNIT SPU 400 B



The battery-powered hydraulic aggregate SPU 400 B offers a compact, emission-free drive for hydraulic tools and machines. Among other things, you can use the power unit for our U-L, U-L4, U-LW, U-LS and U-L-RK hydraulic shearing devices. The low weight and compact dimensions ensure easy and user-friendly handling. With the GOLDSCHMIDT DIGITAL APP the machine data as well as the process parameters are saved centrally. The data is uploaded directly to our database solution DARI® so the data can be analysed and accessed globally.

Contact

Goldschmidt Thermit GmbH
Hugo-Licht-Str. 3, 04109 Leipzig, Germany
Phone: **+49 (0) 341 355918-0**
Fax: **+49 (0) 341 355918-99**
info@goldschmidt-thermit.com
www.goldschmidt-thermit.com



GOLDSCHMIDT
THERMIT GROUP

Where style meets functionality



The Swiss company Lantal returned to InnoTrans in Berlin this year with its latest product developments and innovations, showcasing once again why it is a leading supplier of railway interior textiles.

As a provider of textiles and services to all major rolling stock and seat manufacturers and as a partner to over 80 rail network operators around the world, Lantal has successfully implemented countless projects.



Stand 233 in Hall 1.1 gave visitors the opportunity to dive into Lantal's world of high-quality interior textiles, parts and services.

Stylish and modern interiors

Attractively appointed interiors play a significant role for the well-being of passengers. With this in mind, Lantal's design team regularly presents its new Conceptual Forecast collection for seat cover fabrics, carpets and leather, which is based on the

company's acclaimed Trendletter. The Trendletter in turn is influenced by the relevant trends for the railway sector as well as the different philosophies and styles of Lantal's customers. The designers' creations provide glimpses of the future in rail travel. Whether pure material-inherent surfaces, optical illusions or crisp patterns, the three trend vectors of the collection – Genuine Matter, Trompe l'oeil and New Romanticism – showcase inspiring ideas for the interior design of every travel class.

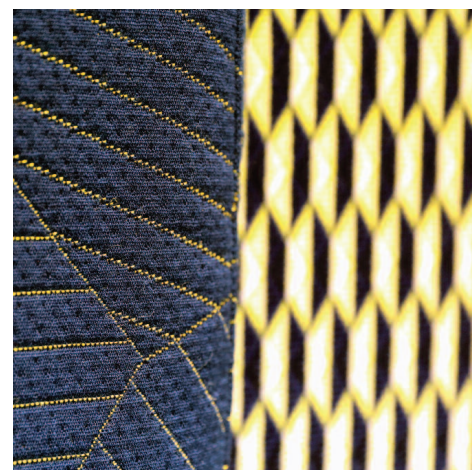
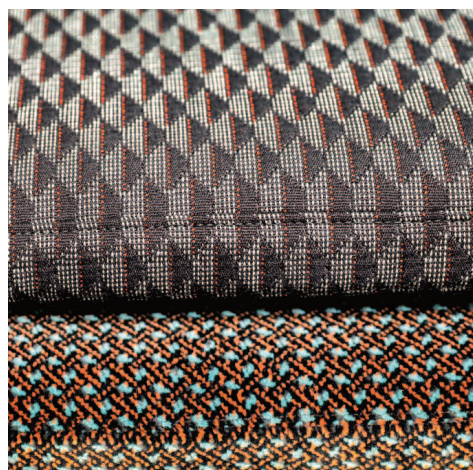
Expansion of the carpet portfolio

Lantal also introduced new qualities to its carpet portfolio for railways. For each customer, carpets must fulfill a range of requirements, including comfort, durability and footfall cushioning. Lantal's extensive carpet portfolio addresses all of these requirements. A noteworthy debut is the introduction of printed carpets. This technology offers the customers many benefits. On the one hand, minimum order quantities are very small and on the other, the process supports swift sampling and production turn-around times. Customers will surely appreciate the broad spectrum of design options. Even photorealistic motifs can be implemented.

More sustainability

For Lantal, sustainability is not just a trend, it is an integral part of our corporate culture. With this commitment in mind, four of the new carpet qualities are made of Polyamid Econyl®. The material is a recycled polyamide yarn that consists of 100% regenerated resources such as fishing nets, yarns and fabric waste.

The company strives to be a role model as regards the sustainability of products and business





practices. Lantal respects nature and does everything to protect the ecological integrity of our environment. At the Swiss production site, the two most important aspects are the water reconditioning system in the dye house and the reduction of CO2 emissions throughout all manufacturing processes. For the latter purpose, Lantal co-operates closely with the Swiss government's energy agency to set and attain clear targets.

EN 45545-2-compliant

All products in Lantal's railway range comply with the EN 45545-2 fire protection standard. This also applies to TEC-Leather, which attracted considerable attention at this year's InnoTrans. At the stand, customers could attend live demonstrations of the material's advantages. Its exceptional cleanability was rated as phenomenal by many visitors. The

ingenious alternative to artificial leather also offers good thermal properties, while the suppleness of the soft surface delivers enhanced comfort for the passenger.

Lantal also has a certified in-house laboratory equipped with the necessary resources to test interior components for compliance with the EN 45545-2 standard. In addition to the fire tests, the laboratory also carries out further qualification tests in the areas of wear resistance, pilling, light fastness and colorfastness. The laboratory is accredited to ISO 17025. All qualification tests are available to third parties on a contractual basis as well.

Single-source convenience

The decisive advantage of collaborating with Lantal is the competence in handling comprehensive all-in-one solutions. Whether ready-to-install seat covers featuring exquisite flat weaves or robust velvets, pre-cut carpets or design, laboratory, and engineering services, all this is available from Lantal with single-source convenience. This all-in-one approach allows Lantal to implement customer projects quickly, efficiently, and to high-quality standards



Upcoming Railway Events

November, December 2018 & January 2019

Rail+Metro/Tunnel China 2018

07 Nov 2018 – 09 Nov 2018

Since its debut in 2002, Rail+Metro China has established itself as one of the largest and most respected business-to-business platforms for trade, procurement and promotion in the inter-city and metropolitan rail transit industries in China and the Asia-Pacific. Rail+Metro China is dedicated to conveying the most practical industry information and to building on its leading reputation as a fully integrated B2B platform.

Event website: <http://www.railmetrochina.com/en/>

Location: Shanghai New International Expo Center, Century Park, Pudong, China, 201203

World Rail Festival

13 Nov 2018 – 14 Nov 2018

Now in its 8th year, the World Rail Festival continues to grow and attract a large audience of rail, bus and urban operators, disruptors and transport thought leaders from around the world.

The event brings international rail executives together to discuss the digitisation of the rail business model, how commercial growth can be achieved and how rail could prepare to meet the demands of the travel ecosystem of the future.

Event website:

<https://www.terrapinn.com/conference/rail-festival/index.stm>

Location: Amsterdam, Netherlands

East Africa Rail

20 Nov 2018 – 21 Nov 2018

The East African railway market is booming. The recent spike in investment for railway projects has had a massive impact on the region's economic growth prospects.

East Africa Rail was recently borne out of Africa's

longest-running and most successful railways event, Africa Rail. It has been designed to replicate 21 years of success of stimulating relationships, partnerships and business across the railways sector.

It serves a very important need for East Africa's railway community to meet, learn and do business.

Event website:

<https://www.terrapinn.com/exhibition/east-africa-rail/index.stm>

Location: Nairobi, Kenya

HackTrain Conference 3.0

22 Nov 2018

The best RailTech conference is back for another year! In the words of one of last year's attendees: "It was the first conference I have attended in a long time, where I didn't get bored, didn't fall asleep! And was totally entertained and informed throughout the whole day."

This year, the HackTrain Conference 3.0 will be a one-day event on 22 November, which will provide insight on the outcomes from our annual 48-hour hackathon on a moving train.

Use promotional code RAILWAY-NEWS25 when booking to receive a 25% discount!

Event website:

<https://www.eventbrite.com/e/hacktrain-conference-30-tickets-47255678005>

Location: Inmarsat, 99 City Road, London, EC1Y 1AX

AusRAIL 2018

27 Nov 2018 – 28 Nov 2018

Australasia's premier rail industry event is set to take place on 27–28 November 2018 at the National Convention Centre, Canberra. AusRAIL 2018, hosted by the Australasian Railway Association (ARA), will attract over 700 senior attendees to the conference programme, which includes plenary sessions, technical streams and forums with well-respected industry leaders

and CEOs. The conference theme for this year is 'Rail – For a better future', delving into the economic, social and environmental benefits and future opportunities of rail in developing a better integrated, liveable and prosperous society.

To register and for full event information, please visit the AusRAIL 2018 website.

Event website:

https://www.ausrail.com/?utm_source=Media_Link&utm_medium=Advert&utm_content=Railway_News&utm_campaign=P18M01

Location: National Convention Centre, Canberra, 31 Constitution Avenue, Canberra ACT 2601

Kuwait Infrastructure Congress

03 Dec 2018 – 04 Dec 2018

As developing and modernising national infrastructure to improve the quality of life for all citizens forms one of the key pillars of the Kuwait's National Development Plan 2035, the Kuwait Infrastructure Congress will be your platform to gain access to mega project updates and investment opportunities in Kuwait.

Don't miss your chance to join government authorities, project owners and other stakeholders working towards transforming Kuwait's infrastructure sector for a prosperous and sustainable future.

Event website:

<https://kuwaitinfrastructuresummit.iqpc.com/>

Location: Kuwait City, Kuwait

Rolling Stock Maintenance Europe

04 Dec 2018 – 05 Dec 2018

Rolling stock maintenance has reached an exciting phase, where new technologies are allowing fast optimisation of maintenance strategies. Traditionally rolling stock maintenance was reliant on regular checks, often conducted unnecessarily, leading to lower reliability, reduced availability of assets and exposure to human errors. The introduction of use-based strategies allows for more targeted maintenance, based on real time data, and consequently operators are able to achieve more efficient maintenance, saving cost and improving rolling stock availability.

Event website: <http://www.rolling-stock-maintenance.com/>

Location: London, UK

Urban Rail Networks – Building Sustainable Cities

14 Dec 2018 – 15 Dec 2018

UITP and Delhi Metro Rail Corporation (DMRC) together organizing the event in New Delhi and cordially invite the delegates to the "UITP India Seminar on Urban Rail Network – Building Sustainable Cities" to be held in New

Delhi, India on 14 December 2018. Delhi Metro Rail Corporation is delighted to be the local host for this event. The seminar will provide an insight into the current status of metro projects in India and its roles for developing better mobility system and liveable cities in the country.

Event website: <https://india.uitp.org/uitp-india-seminar-on-urban-rail-building-sustainable-cities>

Location: New Delhi, India

NRCMA Annual Conference

06 Jan 2019 – 09 Jan 2019

Each year, the NRC hosts its conference where all stakeholders of the railroad construction and maintenance industry are encouraged to attend. The conference typically encompasses more than 1,000 attendees, 150 exhibitors, and 25,000 square-feet of meeting space with a unique programme agenda lined up with chief engineers from the major freight railroads and other key speakers covering up-to-date topics of importance to the rail industry.

Event website: <http://www.nrcma.org/2019conference>

Location: Marco Island, Florida, USA

4th Rail Expansion Asia 2019

17 Jan 2019 – 18 Jan 2019

It is forecasted that in coming 20 years the demand for rail transportation in the Asia and Asia pacific region is expected to double. In order to meet this demand the major stake holders especially rail and metro operators have solve the internal and external challenges, especially improve the financial and operational efficiency so that they can maximise the utilization of available resources for the future expansion.

Event website: <http://www.railexpansion.org/>

Location: Jakarta, Indonesia

Transport Ticketing Global

29 Jan 2019 – 30 Jan 2019

Transport Ticketing Global 2018, the annual get together for the entire public transport community involved in smart ticketing, will take place on 29–30 January 2019. Through a number of case studies from operators from each continent, in-depth industry debates and panel discussions, this gathering will act as a platform for transport executives to set the agenda towards the global vision for transport with a focus on transport ticketing & fare collection, passenger information systems and smart cities.

Event website: <https://www.transport-ticketing.com/>

Location: London, UK

**The people. The products. The process.
A maintenance partnership that goes the distance.**



With 60 years of industry leadership, railroads worldwide rely on LORAM® people, products, equipment and track maintenance services. We are committed to the safety of your operation, extending the life of rail assets and increasing operational efficiency.

THE GLOBAL LEADER IN MAINTENANCE OF WAY SERVICES AND EQUIPMENT **LORAM.COM**

RAIL GRINDING • BALLAST MAINTENANCE • OEM • FRICTION MANAGEMENT • PROGRAM MANAGEMENT

LORAM ®
SPEED PERFORMANCE RELIABILITY

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Precision Grinding with Loram Maintenance of Way, Inc.

Loram Maintenance of Way, Inc., continues to lead the industry with offering the latest technology to satisfy the most restrictive precision grinding needs.

LORAM



Grinding is one of Loram's core competencies and we continue to make significant investments in R&D to maximise value for our customers. Loram's R&D efforts push the boundaries of available technology to ensure that our products lead the industry in terms of speed, performance and reliability.

Railroads heavily invest in rail management programs to extend the life of rail, and managers deploy exhaustive efforts to ensure rail health is attained while also meeting

the various regulatory compliance needs.

Loram's Asset Management Team works hand-in-hand with customers to collect and store data from various sources into a centralised location. Loram then leverages this data to complete analytics for the customers to manage their rail exceptions through rail grinding scheduling and redeploying rail testing resources. Pulling all data sources together with near real-time analytics and also leveraging the power of GIS reporting gives customers the ability to seamlessly manage their program instead of pouring through terabytes of information to ensure they have adequate rail health.

Ultimately, production and efficiency begins with a good pre-inspection that utilises the latest technology. Loram's Rail Inspection Vehicle and Asset Management

services provide the most advanced production rail measurement tools and analysis on the market. The combination of these services ensures the removal of the least amount of metal needed to reshape the rail to the desired rail profile and remove the adequate amount of fatigue metal. Artificially removing as little metal as necessary through rail grinding allows for more of the rail head to wear naturally, which extends the life of the rail. Removing less metal allows even faster speeds, fewer passes, less time spent in a block and a lower cost per track mile.



ADLINK Delivers Leading COTS Solutions for Train Control, Rail Signaling and Automation

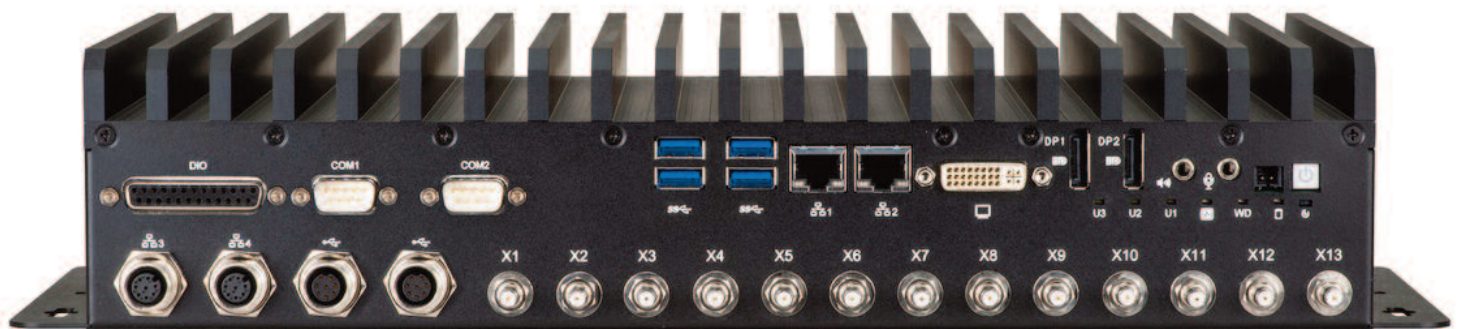
Today's Rail Market Requires Smarter, Safer and More Reliable Operations

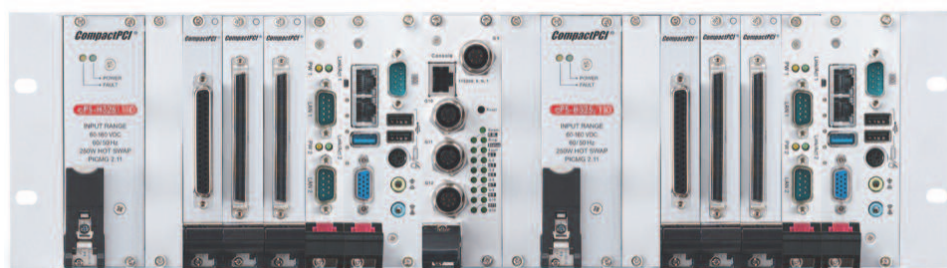
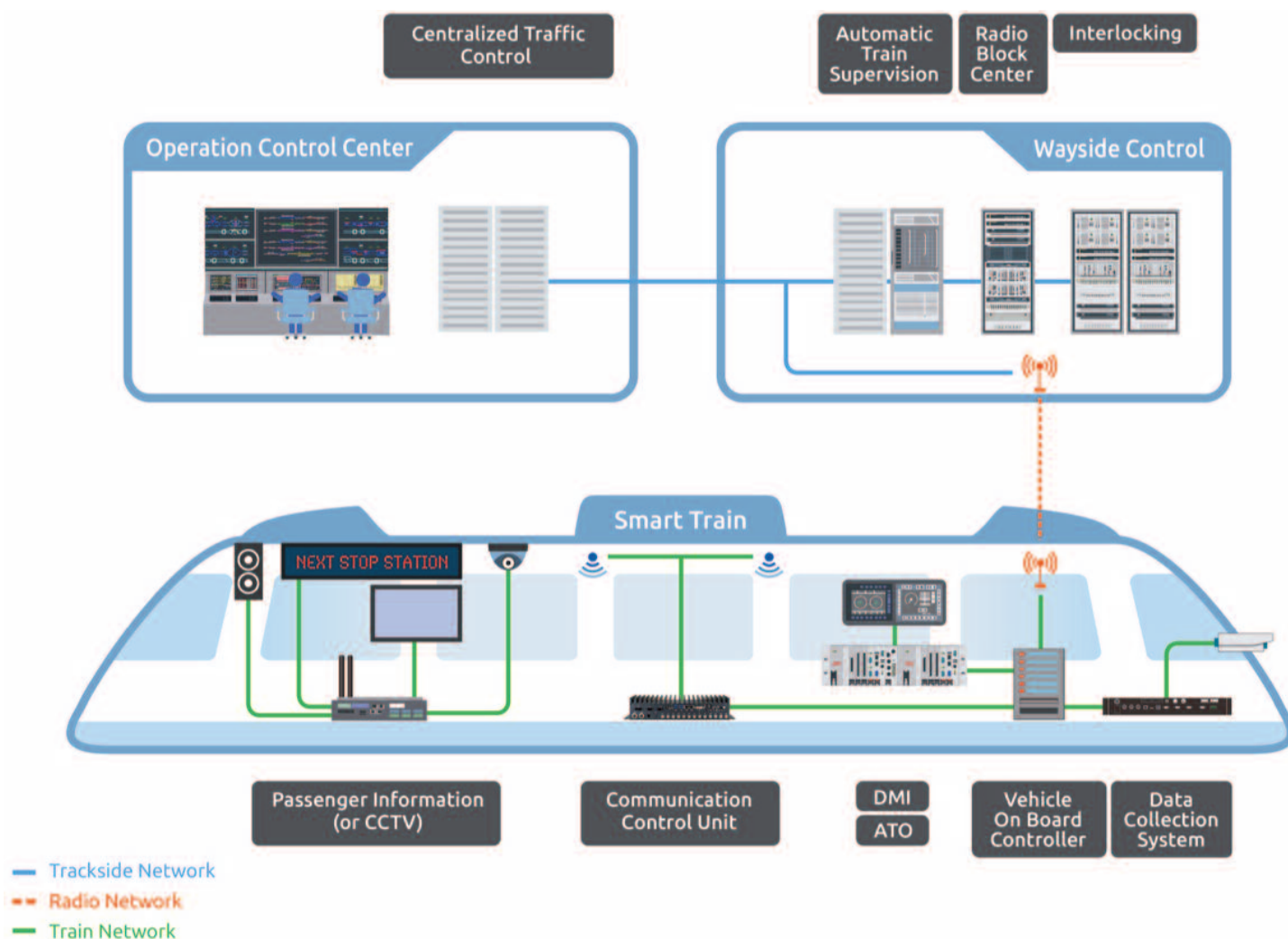
Regarded as the most sustainable means to transport passengers and freight, railway transportation effectively cuts carbon emission, reduces human dependence on fossil fuels and automobiles, and greatly improves mobility in both developed and developing countries. The global rail market is expected to continue its stable growth in the coming decades as investment in rail infrastructure remains one of the top priorities for governments worldwide. As the largest demand remains in the mainline sector, the highest

growth rate is in urban transit driven by growing populations and increasing urbanisation. Enormous investment in rail infrastructure not only builds larger railway networks, but also encourages countries to adopt strong regulations to mandate smarter, safer and more reliable railroad operations, significantly improving the passenger travel experience and raising the bar for rail application developers and solution integrators.

New Requirements Represent Challenges for Solution Integrators

The fast development of the rail market inevitably brings manifold challenges. Firstly, smarter and safer operations require better products with regard to functionality, reliability and availability. Any incremental improvement could represent formidable technical challenges as rail applications are uniquely





Field-Proven, Cost-effective COTS Solutions Help Address Tough Challenges

demanding for system integrators, with extended deployments requiring always-on operation for up to 100,000 hours in exposed environments, extreme temperatures in desert or snow, or under conditions of high vibration. Secondly, while governments emphasise maximising return on investment and experience budget constraints, ever-increasing competition imposes more downward price pressure on rail integrators in both domestic and overseas markets. Thirdly, the fast

growing rail market naturally drives tight project schedules as well as high refresh rates. Especially in emerging markets, it is critical for rail integrators to keep up with the pace of regional development in order to stand out from fierce competition. Lastly, rail integrators face many obstacles when addressing upgrades and interoperability with traditional closed, proprietary systems, from both technical and cost perspectives.

By leveraging more than 20 years of expertise in developing highly reliable and available embedded computing systems, ADLINK is a premier supplier to the rail market that offers not only an extensive industry-leading and cost-effective CompactPCI®-based portfolio, but also a wide range of rugged fanless embedded computers and custom solutions enabled by its best-in-class ODM capabilities. ADLINK's railway products and platforms meet global railway industry



requirements for on-board train control and wayside signalling systems, remote video surveillance and monitoring, broadband internet access systems and a wide range of passenger information and entertainment systems.

ADLINK's long-held support of COTS (commercial-off-the-shelf) technology and open-standard systems enables flexible platforms that are modular, scalable and rugged enough for extended deployment in both brown and greenfield projects. ADLINK's railway solutions are optimised for the development of intelligent railway transportation systems, meeting space and performance demands, severe environmental restrictions and specialised industry standards, such as EN 50155. This ensures their high performance and reliability, capacity to solve complex issues in high-performance data processing, suitability for mobile

connectivity and networked communications, and ability to enable safe, secure and connected travel. Solution integrators can effectively reduce risk and total cost of ownership (TCO) with the ideal combination of low power consumption, a small footprint, optimised features and high reliability in a standards-based platform. And importantly, adopting ADLINK's application-ready and industry standard-compliant platforms enables customers to significantly shorten the development cycle and accelerate time-to-market.

Best Practice Ensures Supply Longevity and Business Flexibility

By leveraging its long-standing strategic partnerships with major hardware component and software vendors, ADLINK ensures best practices in product

obsolescence and life-cycle management to deliver the supply longevity required by the industry. In addition, ADLINK offers design services in every major geographic region, benefiting customers with increased responsiveness, short delivery lead-times and ease of doing business.

For application developers and solution integrators, ADLINK is an ideal partner for the supply of railway transportation products, including systems that provide robust, fault-free connectivity, as well as the high-speed I/O required to support the broad and growing spectrum of railway systems and applications.

Extensive, Field Proven Embedded Solutions Ensure Safe and Reliable Railway Operations

- **CompactPCI / PlusIO / Serial Platforms**
- **Driver Machine Interfaces**
- **Fanless Embedded Computers**

ADLINK is committed to continued development towards building an even more comprehensive and cost-effective product portfolio, with the goal of enabling customers to effectively mitigate budget constraints, and smoothly and seamlessly take on the challenges of technology migration and system integration. ADLINK is well positioned to help customers gain great competitive advantages by allowing them to focus on their value-added offering for end solutions.



Leading COTS Solutions for Train Control, Rail Signaling and Automation

- Extensive, growing, rugged portfolio enables wayside and onboard applications
- Open standards based, modular and scalable design accelerates development and deployment
- Cost effective COTS products mitigate budget constraint and maximize investment return
- Highly reliable, field proven solutions ensure safe and uninterrupted operation
- Extended lifecycle management ensures supply longevity
- Global presence enhances customer proximity, support and service



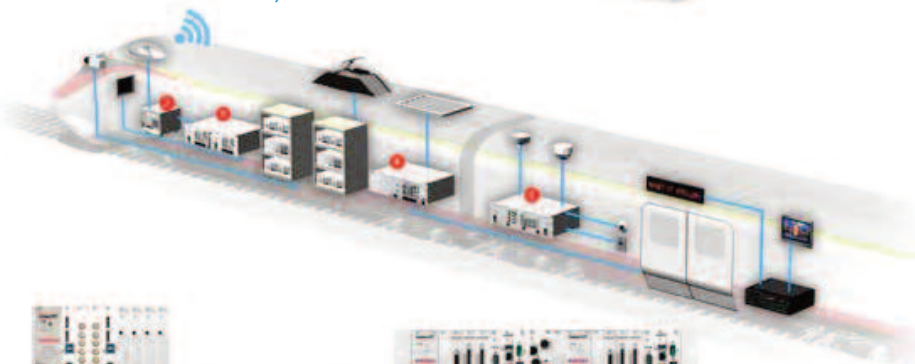
1 Wayside Non-safety Applications
(Train Dispatching and Command,
Centralized Traffic Control)



Onboard Video Analysis System



Passenger Wi-Fi Platform



2 Train-to-Ground Communications
Control Unit (CCU)



3 Automatic Train Operation (ATO)



Compact Network Gateway



Driver Machine Interface
(DMI)



4 Train Control & Monitoring System
(TCMS)



5 Onboard Rugged Storage Systems
(Passenger Information or CCTV)



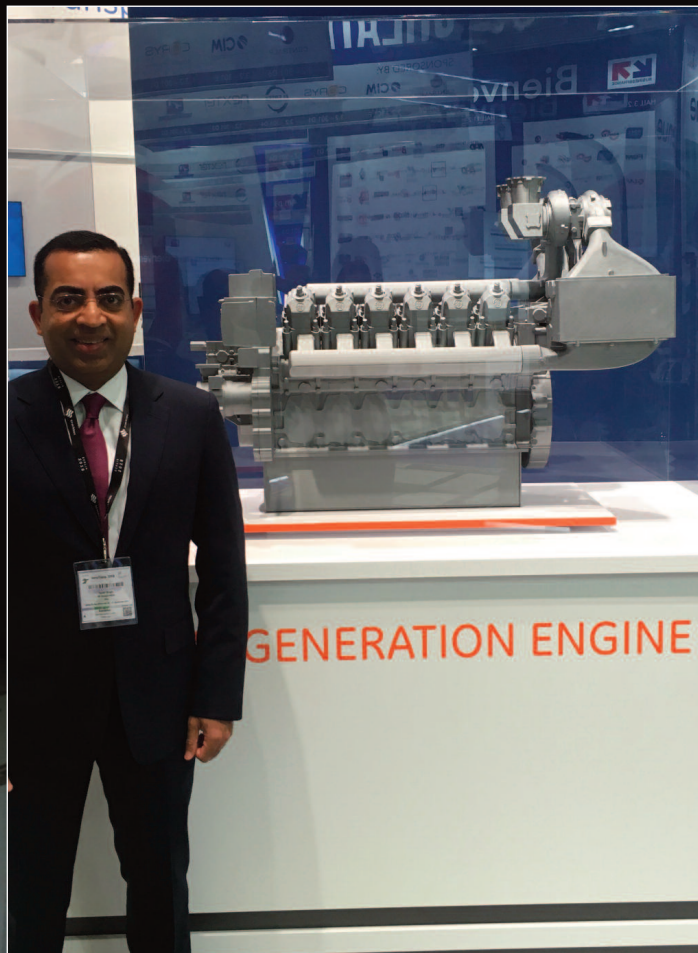
Extreme Rugged Computer



3U cPCI Processor Blades
and I/O Boards



Continued from page 13



Beyond Locomotives

"A locomotive is just one small part of a railroad operation. Today, even with incredibly intelligent and reliable locomotives, railroads still experience hundreds of thousands of unexpected delays each year, costing the industry billions of dollars annually. This has been the catalyst for expanding our focus well beyond the locomotive and taking a bold move to link both the engine, the railcars, the track, the yard, and even ports in a way that's never been done before. To understand the magnitude of this impact you need to view it in terms of efficiencies gained from digitisation. Just a 1% improvement in efficiency of fuel and asset use, car dwell and network velocity saves nearly six billion dollars a year across the industry. That's a game-changing impact."

Digitalisation

"Digitisation also triggers cultural change. Rail operators today grasp and appreciate the power of information collaboration because they can now monitor and respond to dynamic conditions instantly. Said simply, digitisation will change how we work, it empowers workers with fresh capabilities that are really transforming the delivery of freight and enhancing planning and productivity. The announcements we are making this week here at InnoTrans will serve to accelerate this [development]."





All rails lead to Berlin

Wayside sensors: foundation for the future

Under the motto "Discover intelligent sensors. Innovations to simplify railway operations", Frauscher Sensor Technology took stock at this year's InnoTrans: the technology leader proved that wayside sensors will continue to play a central role in the railway industry in the future – if they start harnessing digital ideas. Christian Pucher, CMO Frauscher Sensor Technology, says: *"We are essentially pursuing two strategies: On one hand, we are further developing existing products with ideas arising from digitalisation. On the other hand,*

we are building on completely new approaches that only became possible with digitalisation. This includes, for example, the use of distributed acoustic sensing in the railway sector. Thereby we are able to solve key challenges faced by railway operators today."

The stream of visitors at InnoTrans showed that this concept is well received. *"The demand for precise data is increasing – especially with the rising introduction of digital solutions such as cloud-based systems. To this day, wayside sensors are the*

most reliable source for this. The ideal of many operators, however, is to reduce the number of components on the track at the same time. At InnoTrans 2018, we were able to present several solutions that meet the requirements of this field of tension," says Pucher, explaining the lively interest.

Smart device on the track

A highlight that the technology leader came up with in Berlin was the innovative SENSiS system with

its new sensor: the SENSiS Detection Point SDP. The design of the device and the associated rail claw made it a crowd-puller. The properties of the system caused astonished reactions. The sensor not only detects trains reliably, but does even more: The SDP evaluates the wheel sensor signals and digitises them. It also collects a number of other data, such as acceleration and temperature. These are also evaluated in the sensor, processed and made available to a network in the form of useable information.

With this revolutionary sensor concept, all the requirements for modern axle counters are met – and the entire indoor equipment is eliminated as far as possible. The SDP is only connected to a newly developed SENSiS Processing Unit SPU via a specifically developed bus system. The bus enables the establishment of a ring architecture instead of star-shaped cabling – and therefore has massive cost savings. Pucher sums up the launch: ***“The possibility of sending data from***



the indoor system to the sensor is also particularly promising for the future. What we showed at InnoTrans is the prototype, which will now be further developed on the basis of initial installations. All innovations can then simply be distributed to the sensors in the field by means of software updates. In 2019, we will implement the first projects with this system and go through the approval process – there are already very concrete enquiries.”

All trains at a glance

With the further development of Frauscher Tracking Solutions FTS, the company presented more highlights. For improved train tracking, the focus was on accuracy and reliability in the detection of a train's front and rear end, travelling speed and direction. This enables an accurate and continuous calculation of the arrival time at a specific point. Various applications, such as passenger information or platform

announcements, can thus be optimised. The on-going information on train position and speed profiles enables more efficient traffic management. The type, year of construction and origin of the track vehicles detected are irrelevant.

The track on the screen – in real time

Additionally, the further developed FTS provides railway operators and service companies with an interface that maps the condition of track and infrastructure in real time. Changes in the condition of various components – track, track bed, sleepers, wheels and more – are detected and displayed on a user interface in a clear form for the first time. In addition to the optimised possibilities for train detection, this solution attracted a great deal of interest.

“We already have around 30 FTS installations in use worldwide.





Various applications are being tested there, including condition monitoring. We see particularly great potential in this field," says Pucher, explaining the latest developments. *"Therefore, we have focused heavily on this when optimising the system – and have made exciting progress. We now want to work more closely with operators, system integrators and partners. As announced at InnoTrans, we are already doing this with Vossloh and Siemens Mobility. Their expertise in the maintenance sector and our know-how in the detection of trains and various events along a track will rapidly drive the development of condition-oriented maintenance strategies further."*

Standing out from the crowd

Frauscher caused a sensation at the InnoTrans 2018. Not an easy exercise with more than 3000 exhibitors. *"With our axle counters and wheel sensors, we are the global market leader. In order to secure this position, we want to continue to offer the best solution for all scenarios in the future. Availability, functionality, quality, service and economy are always in focus. In addition, new requirements are constantly being added, such as increased network capability and options for flexible adaptation by means of software updates or the integration of additional sensors."*

It is clear to us that we – as well as the whole industry – have to maximise the use we make of digitalisation. At InnoTrans 2018, we demonstrated how we approach this: we combine proven features and sound know-how with new possibilities. And after the numerous discussions that I had – also at the great Frauscher booth party on Tuesday, by the way – I am sure: we are on the right track," he sums up the week in Berlin.

Impressions from the stand, reviews and details on Frauscher's highlights at InnoTrans 2018 can be found under innotrans.frauscher.com or blog.frauscher.com

Innovative RF Interconnect and Over Voltage Protection for your Demanding Rail Transit Applications

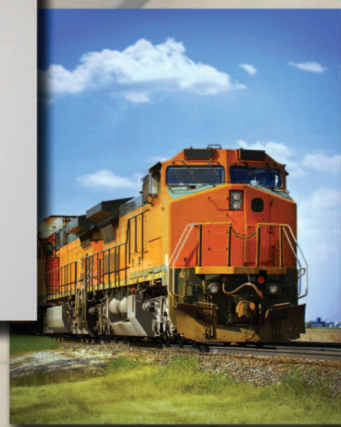
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- *Easy Field Termination*



Continued from page 17

What role will hydrogen play in powering trains in the future?

Henri Poupart-Lafarge, CEO of Alstom:

"I think it's important to notice the evolution of our industry. Ten years ago Alstom was breaking the record of speed in rail – 574.8km/h. Today it looks extremely remote. Frankly, nobody cares. The trains are running at 300, 320 so why should we break another record at 600? We don't care. What was important was to show how environmentally friendly would be the trains. And yesterday, as you know, we put in service with passengers and this morning with passengers on the train for hydrogen train. So the future is not like the absolute performance in speed, the future is to make sure

that our trains are CO2 free. And of course hydrogen has fantastic advantages. It has 1,000 kilometres of autonomy, so it can replace very easily any diesel train so we need to progress with it. It will take time but for any type of operation – in terms of operation it can match exactly what does the diesel train. And of course it has been also pinpoint that the cost of infrastructure is high. So of course the cost of installing catenaries is high, the cost of installing substations are very high and so forth so it's also a very light way, in terms of infrastructure investments. So again, I think sometimes we don't see the move of our industry but clearly the move is to be environmentally friendly, autonomous [...]. The trains will be more and more autonomous, which will help in low-density areas."



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Tunnel Vision: Excavating Subsea Roadways with Rugged Technology

Norwegian tunnelling crews use rugged mobile tablets to automate surveying and minimise downtime



Workers who blast tunnels 290 meters below the ocean's surface have plenty of "what ifs?" to consider. Technology failures and project budgets shouldn't be among them.

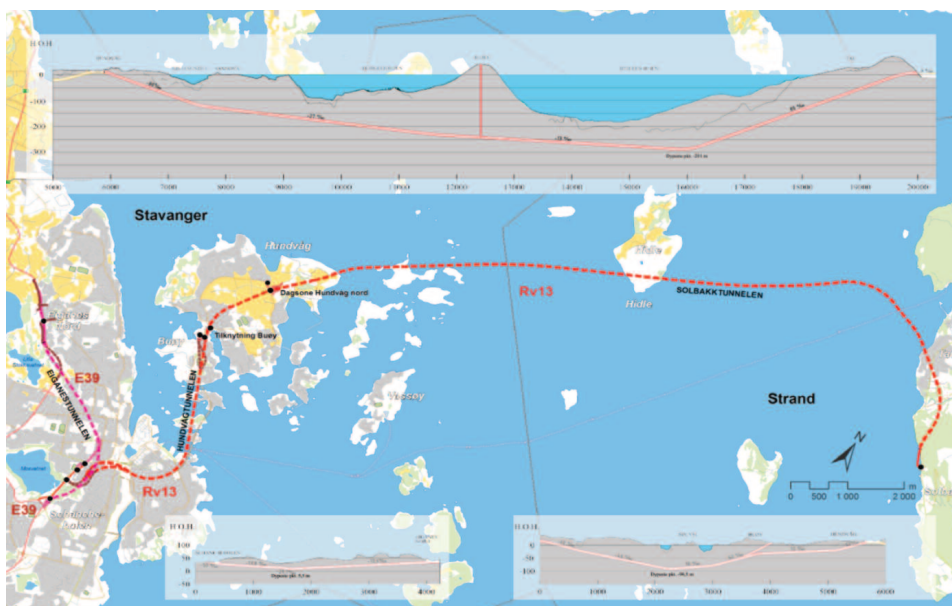
So contractors working on Norway's Ryfast tunnel megaproject are using rugged mobile technology to ensure a reliable, safe and efficient excavation process that minimises downtime and reduces personnel costs.

Crews are using the Amberg Navigator from Swiss company Amberg Technologies AG, a solution that packages Amberg

Tunnel surveying software with Handheld Group's Algiz 7 rugged tablet PC. The solution allows tunnel workers to take precise measurements, generate tunnel profile graphics in real-time, and compile detailed reports, eliminating the need for separate surveying crews. Best of all, workers can perform these tasks with no prior surveying experience and very little computer training time.

A tunnel beneath the sea

Norway's west coast is made up of hundreds of small islands and fjords — areas where seawater reaches into narrow, deep valleys with high cliffs formed by glacial erosion. People travelling to and from the coastal city of Stavanger, the country's fourth-largest metropolitan region and the hub of



its offshore oil and gas industries, currently use bridges and ferries to access areas separated by water.

The new Ryfast tunnels will connect Stavanger to Norway's Ryfylke region, replacing a ferry between the two areas and cutting travel time by two-thirds. One tunnel segment will link Stavanger's Hundvåg borough to a small island called Hidle, and a second will connect Hidle to the town of Solbakk in Ryfylke.

Upon its 2018 completion, Ryfast will be the world's longest, deepest subsea roadway tunnel, spanning 14.3 kilometres (8.9 miles) and reaching 291 meters (955 feet) below sea level at its deepest point. Swiss tunnel construction company Marti IAV Solbakk DA won a contract to build the Solbakk segment, which will include the tunnel's deepest point. It will also feature a seven percent gradient slope – the maximum tunnel gradient allowed.

A rugged technology breakthrough

To extend the tunnel through hard rock beneath the sea's surface, Marti workers drill holes through the material in precise locations using enormous semi-automatic drill rigs. Explosives placed in those holes blast the rock away, and conveyor belts remove this material from the site.

Traditionally, hole placement for the "drill and blast" method of tunnel construction has been determined by surveying crews, who measure tunnel profiles and use this data to mark hole patterns or geo-reference drill rigs. But using the Amberg Navigator's automated surveying software has eliminated the need for these extra surveyors; the tunnelling crews

themselves can quickly and easily perform surveying tasks with detailed real-time analysis.

"The Amberg Navigator helps avoid unnecessary waiting times because the measurements required can be integrated directly into the work procedures," says Jürgen Wilhelm, a Marti surveyor engineer.

Of course, such highly precise work requires a reliable computer. For Solbakk tunnel workers, reliability means two things: adequate speed and memory to process profile data, and exceptional durability in tough environments.

The engineering challenges workers face in the tunnel are amplified by the frigid, wet environment where they perform their work. The tunnel's surfaces can range from muddy and slippery to rough and jagged; temperatures can drop to below freezing; and humidity, dust and potential drops all pose threats to ordinary technology. Every piece of equipment at the construction site must be able to withstand very harsh conditions.

With these requirements in mind, Amberg Technologies chose the Algiz 7 as the ideal complement to its Amberg Tunnel software. The Algiz 7 rugged tablet features a powerful Intel Atom processor, along with massive 128 GB storage capacity and 4 GB of DDR3 RAM. It runs Windows 7 Ultimate and compatible software, providing a seamless office-to-field experience.

The Algiz 7 also meets stringent MIL-STD-810G U.S. military standards for withstanding humidity, vibration, drops and extreme temperatures, and meets IP65 standards for sealing out dust and water. But despite its brawn,

this rugged tablet is compact and portable, weighing only 1.1 kg (2.4 pounds). Its vivid 7-inch touchscreen displays data clearly; its ten function buttons and an on-screen soft QWERTY keyboard make operation easy and intuitive.

A one-tablet control center

With the Amberg Navigator, crews can measure tunnel profile data quickly and easily, display visualisations of that data in real time, and save detailed data logs. This solution is extremely simple to use, even without any previous knowledge of surveying. The software automates all measuring tasks, which workers can select and manage with one touch by tapping large, easy-to-interpret icons with illustrations.

"Workers can control and verify an entire tunnel project with a single tablet," says Oliver Schneider, Amberg Technologies product manager.

To take measurements, workers use a total station — an electro-optical scanning tool that measures angles, distances and co-ordinates. They position the total station on a tripod or console aimed towards the area to be measured. Then the Amberg Navigator communicates with the total station using Bluetooth, automatically adjusts the total station's viewing area, and initiates profile data collection.

The Navigator can automatically profile a tunnel at pre-defined stations; it highlights areas where a blast has taken away too much or too little material; and it evaluates surface-layer thickness and displays the data graphically on the screen. With this information, workers can use the Navigator to set precise blast patterns and

control drilling machinery.

"The rugged tablet makes it possible for personnel from other sectors to carry out simple, routine surveying tasks reliably,

efficiently and independently,"
Jürgen Wilhelm says.

Smart solutions from Handheld and Amberg are helping the Ryfast project progress smoothly and

efficiently. And that's a good thing, because subsea construction workers have much better ways to spend their time than waiting around.



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Keeping health on track with SKF Insight Rail

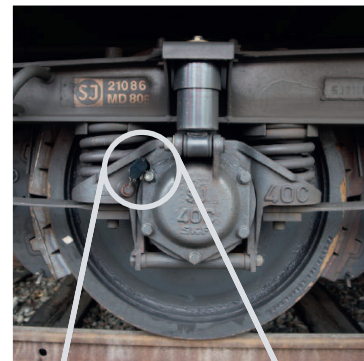
For train operators, the main challenge is to keep trains running without unplanned stops. Maintenance operations are critical cost drivers, and interruptions can be extremely costly. Both in terms of money and reputation.

But what if you could avoid downtime by anticipating rotating part issues on your train fleet? And what if there was a way to schedule maintenance based on real conditions?

SKF Insight Rail is an IoT condition monitoring solution for passenger rail train bogies. It's wireless and self-powered with an associated remote analysis service. It can send warning signals about potential issues, preventing unexpected failures. Knowing real bearing conditions also helps extending maintenance intervals. And the system takes only a few minutes to install.

Obtaining smart and flexible maintenance can't get much easier.

Find out more at skf.com/skfinsightrail





SKF partners with Siemens to improve railway reliability

Condition monitoring and cloud-based data acquisition platforms are set to revolutionise the way railway operators address their asset management obligations.

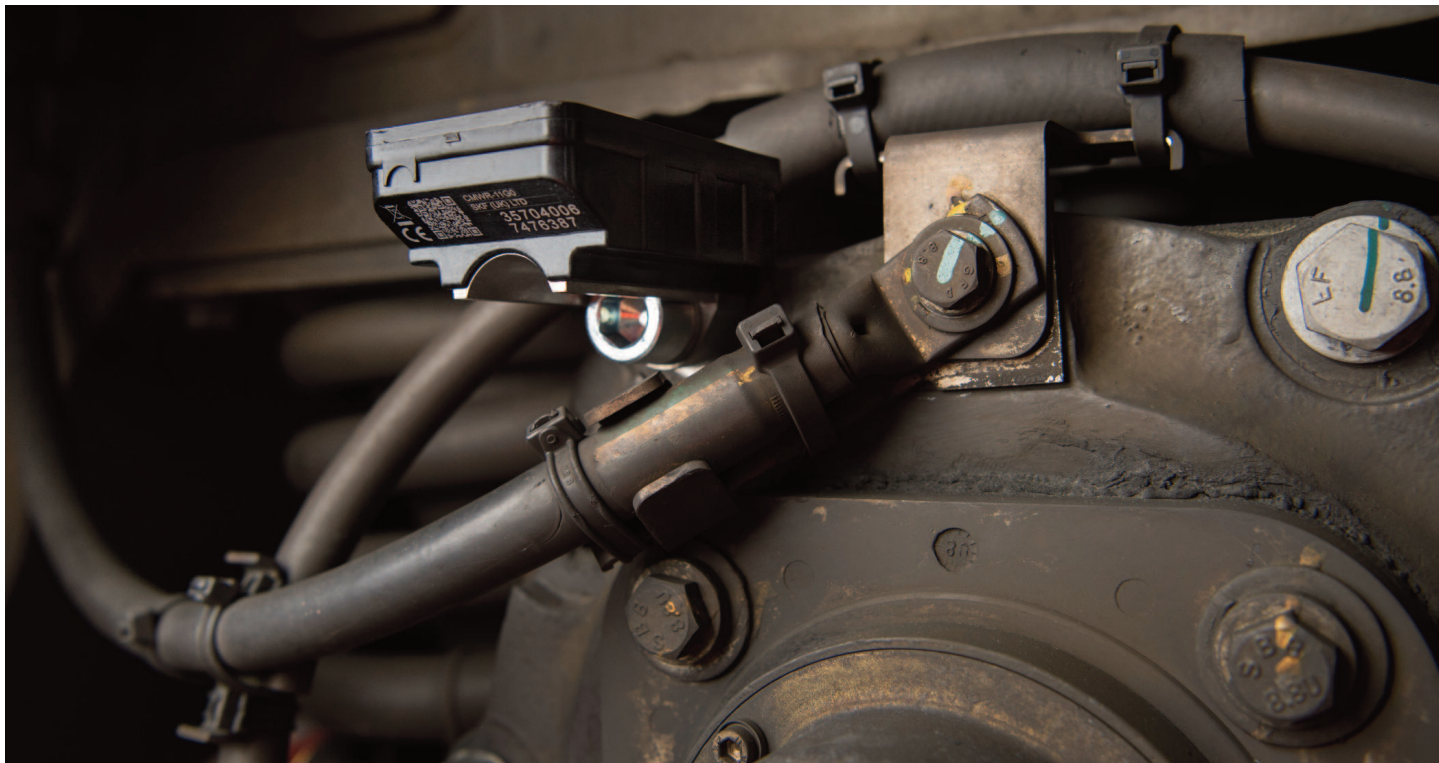
Leading up to InnoTrans 2018 SKF and Siemens signed a partnership agreement that will focus on improving train operators' asset management efficiencies. The partnership will see the implementation of SKF's Insight Rail condition-based maintenance solution in combination with Siemens' Railigent application suite that is linked with the Internet of Things operating

system MindSphere.

This new co-operation between SKF and Siemens, which leverages the resources of SKF's digitalisation initiative, will facilitate online monitoring of several important components such as wheelset bearings and wheels via Siemens' Railigent Application Suite for mass transit and infrastructure operators. The

goal of this project is to help customers anticipate issues with individual components, and allow them to schedule maintenance only when it is required using one single monitoring system.

SKF Insight Rail is SKF's first fully wireless, condition-based monitoring system for railway rolling stock operators. Easy to install and operate, the solution



provides local measurement, data analysis and display of actionable information via an intuitive app. Railigent is a Siemens cloud-based application suite that provides a single interface for data collected from many different infrastructure and vehicle system components. Dubbed the 'Internet of Trains', Railigent gives operators the tools required to increase train availability by leveraging the power of the Industrial Internet Of Things.

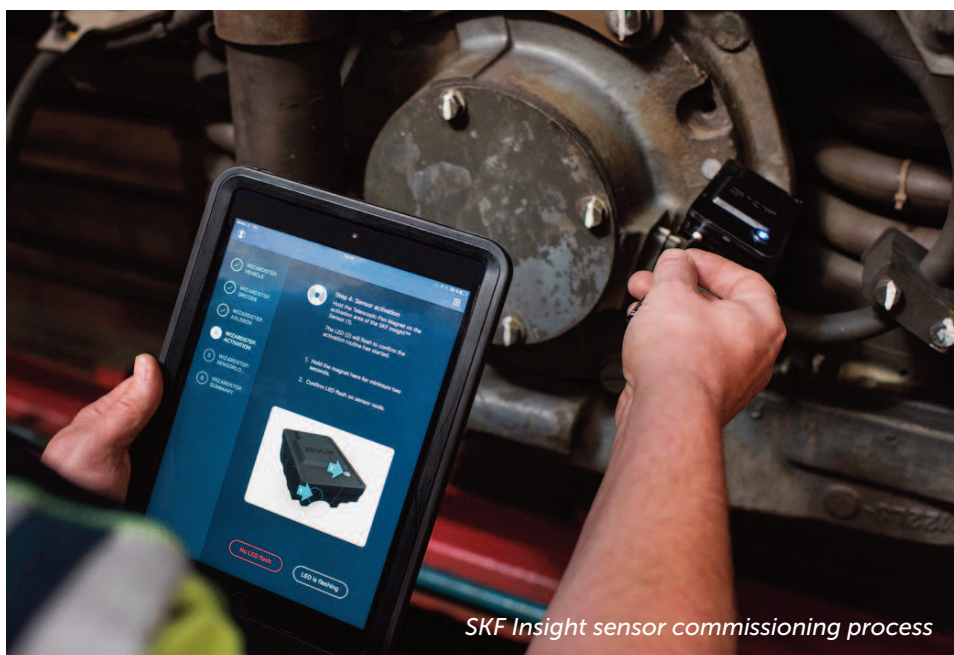
Filip Rosengren, Director, Railway Industry at SKF commented: ***"With Railigent, Siemens offers a powerful platform for a multitude of digital services. In particular, the system simplifies data access, enabling operators to gather essential data about the condition of their rolling stock components from a single access point."***

Johannes Emmelheinz, CEO of Customer Services at Siemens Mobility Division, said: ***"Wheelset bearings are critical components for any rolling stock operator."***

Together with SKF we seek to move the industry toward the objective of one hundred percent availability with safe, efficient service."

SKF is a world leader in the bearings business and we are delighted to be able to offer SKF's innovative Insight Rail solution to customers via the Railigent application suite. SKF is a provider of solutions and services,

including the design of axlebox and drive system bearings and condition-monitoring systems for the railway industry. The Siemens Mobility division is a leading global provider of rail solutions, including vehicles, infrastructure and automation solutions for all passenger rail segments. This new partnership between the two companies was signed in March 2018.



SKF Insight sensor commissioning process

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Railway Trends and Technology

Trends and technology in the rail industry can emerge and change quickly, placing significant pressure on manufacturers to stay abreast of what can feel like a moving target. Ensuring consistency across their global brands, using process-friendly products and increasing efficiencies at multiple touchpoints is no small feat, but it's attainable with the right partner.

3M's network of global resources and expertise has helped rail operators and designers solve the big challenges in production, safety and performance for decades. With solutions rooted in science that work both better and faster, you can create a safer and more enjoyable experience for passengers.

Superior Productivity

Sometimes increasing productivity is about changing the small things, and sometimes it involves rethinking your approach all together. *What if you used tape instead of rivets? What if you used a vinyl film instead of paint?* For rail designers and manufacturers, there are several ways to increase productivity and optimize efficiencies from start to finish while making your final product even more appealing.

In the assembly process, replacing mechanical fasteners, like rivets or bolts with a tape or an adhesive, has multiple benefits.

First, it cuts out steps, eliminating the need to punch holes or drill screws in preparation for application. These products can also be used to bond dissimilar materials like metals and composites, while securely holding together multiple areas of the coach including walls, panels, floors and seats. Utilizing industrial adhesives empowers manufacturers interested in light-weighting, as using tapes to assemble parts results in lighter components overall.

Metalworking and grinding is another step of the manufacturing process where there is opportunity for increased productivity and efficiency.

A simple way to revitalize output is to use abrasives that cut faster and last longer.

3M developed the concept of putting into its abrasives Precision-Shaped Grain—sharp, angular structures that continuously fracture to form sharp points. These clean, sharp points mean an abrasive that slices faster, runs cooler, and lasts much longer than conventional abrasives, which generate excessive heat buildup and have a shorter life.

Completing the finishing touches on rail, and establishing a cohesive look and feel, can take up a lot of time. Graphic films are quick to install and maintain and provide OEMs with alternatives to paint while offering the ability to achieve superior visual elements for rail design.

When the films are covered with a protective 3M over laminate, they last longer and are easy to clean.

Safer Solutions

Keeping passengers, operators and pedestrians safe is of paramount importance for rail. 3M has solutions that not only enhance security, but also provide peace of mind that the possibility of accidents and mishaps are minimized. For windows, floors and more, there's a product you can use to further promote safety.

Safety and security window films are an effective method for mitigating glass break.

The films help keep broken glass in place to reduce risk of injury from shards or jagged edges until the window can be replaced. Utilizing floor products with anti-slip

3M™ Exterior Wrap Film being installed.



ratings are ideal for the tops of rail cars to help maintenance workers keep their footing, as well as on the inside of coaches for riders. In the event of a fire, 3M's flame-retardant tape and films can slow the spread of flames and gives emergency personnel more time to respond. Ultimately, that is always the goal: ensuring a comfortable experience for passengers and transporting them safely to their destination.



3M™ Safety & Security Window Film

Better Results

By implementing solutions that reduce weight, improve the rider experience, and protect the interior and exterior surfaces from damage, it's possible to achieve a better end result that is vastly enhanced, aesthetic and reliable.

For manufacturers, utilizing lightweight materials has many benefits, such as improvements to the overall manufacturing process, lower maintenance costs, and a positive impact on the environment.

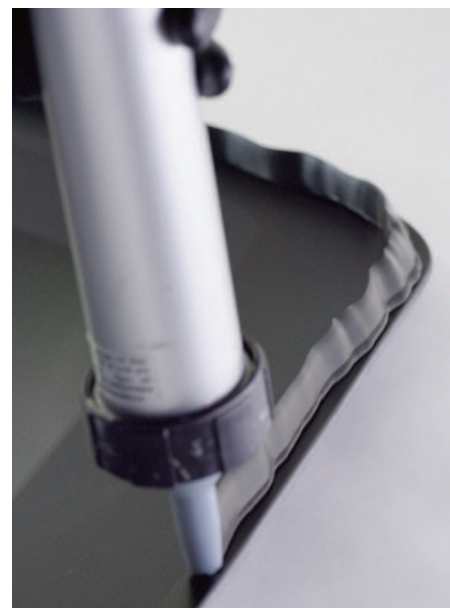
Adhesives and tapes are fundamentally lighter than traditional mechanical fasteners, while also providing a smoother and more aesthetic look. They can also reduce the likelihood of corrosion and deterioration occurring within the materials, which increases the entire life span of the railcar and keeps your assets looking top-notch.

For passengers, aesthetic solutions can help deliver a more comfortable experience.

From the noises and vibrations that riders hear and feel, to the interior design of the railcar, the sights and sounds that riders are exposed to are crucial to their overall enjoyment of their trip. By controlling and reducing noise, vibration and harshness with products such as vibration damping tapes and acoustic absorption insulation, a smoother and quieter trip is possible.

The interior design of the train is another crucial aspect of the rider's experience. Wrap films and interior finishes with rich textures can be used to create colorful and unique designs, ensuring that the final result is a pleasing and enjoyable environment for all rail passengers.

Rail cars travel across the world through many unique terrains, which means they require products that can withstand a variety of climates and circumstances. 3M specifically designs products and offers the 3M™ MCS™ Warranty to provide peace of mind our solutions last the life of the vehicle wherever it may be traveling, with environmental resistance ranging from Japanese mountains to Latin American deserts. Anti-graffiti overlaminates keep railcar exteriors looking clean and fresh, as they can be easily wiped down and maintained, and protect the underlying graphics.



3M™ 595 Window Bonder Adhesive Sealant

Conclusion

From increasing productivity, to providing safer solutions and reliable results, 3M is a global leader in the rail market. With application engineers available across the globe to serve as a dependable resource, 3M not only provides high-quality and long-lasting products, but also a support system unmatched by any other. These experts are on-hand to provide answers whenever questions arise, allowing 3M to solve unique challenges and demonstrate that along with great products comes great support.

**To learn more, visit
3M.com/rail.**



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Office Tel: +44 (0) 1392 580002 | **Mob:** +44 (0) 7432 725001 | **email:** al@railway-news.com

A2B Global Media | Third Floor | 11-15 Dix's Field | Exeter | EX1 1QA | United Kingdom

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