

Railway-News

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ISSUE THREE 2025



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Letter from the Editor



Dear Readers,

This issue coincides with **AusRAIL PLUS 2025**, the largest rail event in the Asia-Pacific region, taking place this November in Melbourne. As always, the Australasian Railway Association is bringing together leaders and decision-makers from across the industry – from passenger and freight operators to infrastructure suppliers and policymakers. With more than 600 exhibitors and 7,000 attendees expected, the event offers a comprehensive overview of the region's rail landscape.

Australia's strong pipeline of projects and the government's ongoing commitment to rail investment provide fertile ground for innovation – a theme echoed throughout this issue.

ABB, exhibiting at AusRAIL PLUS, shares how its traction technologies – including regenerative braking and integrated control systems – are helping cities worldwide reduce emissions, improve

reliability and deliver a better passenger experience. The company's efforts in Adelaide, as well as its work in India, demonstrate the global reach of its solutions.

HEXAGON, another exhibitor, offers a case study from ÖBB in Austria, where its CALIPRI C42 handheld measurement tools have revolutionised wheelset inspections.

Meanwhile, **Trelleborg** explores its growing role in Australia's light rail expansion. With its Vector™ encapsulation solution, the company has supported major tramway projects across cities like Adelaide, Newcastle and Sydney.

We also **take a look beyond the region to Riyadh**, where mass transit is gaining ground in a traditionally car-centric city. The Riyadh Metro, which began operations in late 2024, has already carried over 100 million passengers and boasts a 99.78% punctuality rate.

If you'd like to receive our rail news straight to your inbox, you can subscribe **here**. To be featured in an upcoming issue or on our website, **email Andrew Lush** or call +44 7432 725001.

Wishing you a successful and engaging AusRAIL PLUS!



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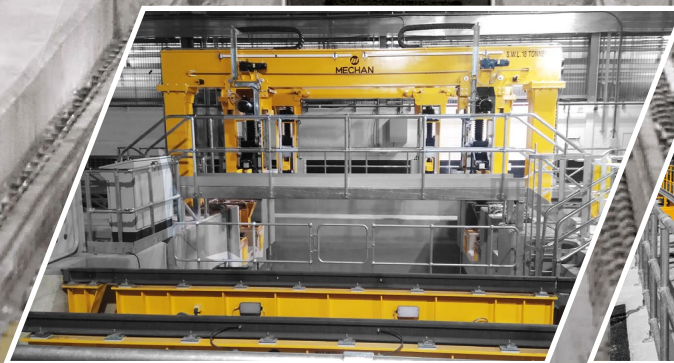
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COVER: © Royal Commission for Riyadh City

RAIL DEPOT & WORKSHOP EQUIPMENT

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- TRAVERSERS
- TURNTABLES
- BOGIE WORKSHOP MACHINES
- UNDER CAR EQUIPMENT HANDLING
- LASER MEASURING
- SANDBOX FILLING
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- UNDER FLOOR WHEEL LATHES



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The largest rail event in the Asia-Pacific region is set to take place this November.

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A look at what key railway events are taking place between November 2025 and March 2026.

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Rail in Riyadh: Transforming a Car-Centric City

By Tiana May, Principal Journalist

The city of Riyadh, Saudi Arabia, is typically characterised by sprawling highways and a heavy reliance on private cars. However, in recent years, the Royal Commission for Riyadh City (RCRC) has commenced a transformative shift towards mass transport.

The Riyadh Metro

The Riyadh Metro is central to the city's transport transformation. Launched in **December 2024**, the service is helping to redefine urban mobility in the capital, offering a fast, efficient and environmentally friendly alternative to car travel.

The network consists of six lines spanning over 176 kilometres and connecting 85 stations, which integrate with bus networks and taxi services. The service

offers modern, air-conditioned stations and vehicles, smart ticketing systems and real-time digital journey planning.

In August this year, the Royal Commission for Riyadh City celebrated serving 100 million passengers on the network, highlighting the successful uptake of ridership in the first 9 months of service. Passenger data showed that the Blue Line, running along the Olaya Road axis, had been the busiest, carrying around 46.5 million people. Meanwhile, the Red Line, serving King Abdullah Road, carried about 17 million passengers, while the Orange Line along Madinah Road carried 12 million.

Aiding this success, the metro recorded a punctuality rate of 99.78 percent since the start of operations, making it a reliable and effective transportation option for both visitors and residents.



All images: © Royal Commission for Riyadh City



Metro Extensions

To further extend the reach of the city’s Metro network, several expansion projects are currently underway. Earlier this year, a contract to extend Line 2 was awarded to the Arriyadh New Mobility Consortium, which consists of Webuild, Larsen & Toubro, Nesma & Partners, Hitachi, Ansaldo STS, Bombardier, Idom and WorleyParsons. Riyadh Metro Transit Consultants (RMTc), comprised of Parsons, Egis and Systra, will supervise the extension work.

The Line 2 extension will span an additional 8.4 kilometres, with 1.3 kilometres of elevated line and 7.1 kilometres underground. It will serve 5 new stations: KSU Medical City, KSU West, Diriyah East, Diriyah

Central and Diriyah South. The new Diriyah Central will also serve as an interchange with the planned Line 7. The construction of the new Line 7 is currently in the planning and tendering stages. The line is expected to be 65 kilometres long with 19 stations, 14 of which will be underground. It will link Qiddiya Entertainment City, King Abdullah International Gardens, King Salman Park, New Murabba, Misk City, and Diriyah Gate. The current tender for its design and build runs until 30 November.

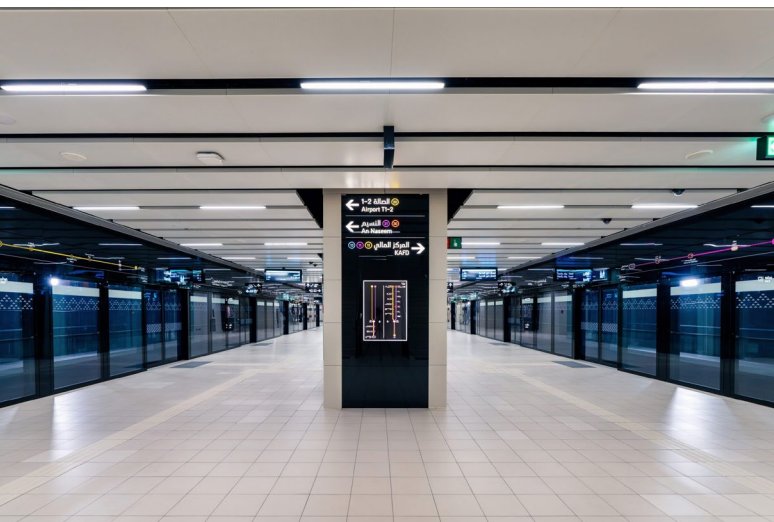
Qiddiya High-Speed Rail

In addition to expanding its urban rail network, the Royal Commission for Riyadh City is also developing a high-speed rail line connecting King Salman International Airport, the King Abdullah Financial District, and Qiddiya City at speeds up to 250km/h. The end-to-end travel time between those points is expected to be approximately 30 minutes.

In September, 2025, the Expression of Interest (EOI) phase for this project was launched in collaboration with the National Center for Privatisation & PPP and Qiddiya Investment Company.

Existing Rail Networks

These new developments complement long-standing rail services in Saudi Arabia, such as the East Train service between Riyadh and Dammam, which has been operating since 1981 and remains one of Saudi Arabia’s



All images: © Royal Commission for Riyadh City



busiest intercity routes. Managed by the Saudi Arabia Railways (SAR), the line spans around 450 kilometres and connects Riyadh with Al-Hofuf, Abqaiq and Dammam.

To improve service quality and increase capacity on this line, SAR has recently invested in fleet modernisation. In 2024, Stadler signed a contract to supply **ten new FLIRT Intercity trains**, designed specifically for the Riyadh–Dammam corridor. These trains will enhance passenger comfort with modern interiors, higher seating capacity

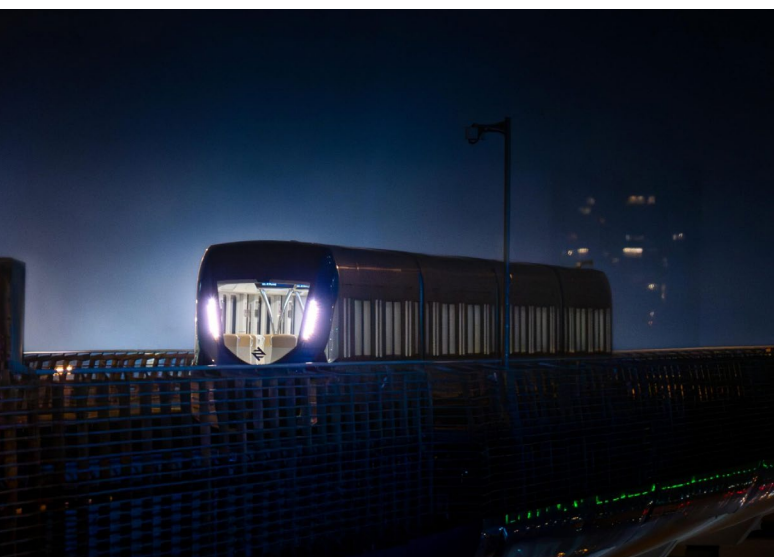
and advanced safety systems, while also reducing travel times and boosting operational efficiency.

Alongside the East Train, the North-South Railway (the world’s longest continuous line at nearly 2,750 kilometres) connects Riyadh to the northern mining regions and extends towards Al-Haditha near the Jordanian border. This line provides links between Riyadh, Majmaah, Qassim, Hail, Al-Jouf and Qurayyat. Together, these established intercity routes and the planned rail expansions position Riyadh and Saudi Arabia as pacesetters in advancing rail infrastructure. This drive aligns with Saudi Arabia’s Vision 2030, which seeks to modernise infrastructure, reduce congestion and promote sustainable urban growth.

Challenges

Notably, constructing rail links in Riyadh’s desert environment has not been without challenges. Engineers have had to innovate solutions for extreme heat, sandy soil and sprawling urban layouts.

For instance, the Riyadh Metro required the installation of specialised cooling and ventilation systems in both trains and stations to maintain comfort in summer temperatures, which often



exceed 45°C. Similarly, construction crews had to continuously manage sand infiltration during tunnelling works, with tunnel boring machines equipped with pressurised shields to stabilise loose soil.

The city's wide highways and car-centric development also posed engineering hurdles. Building the Blue Line along Olaya Road involved deep underground excavation beneath one of Riyadh's busiest commercial corridors, requiring traffic diversions and careful coordination to minimise disruption.

Encouraging Modal Shift

Overall, Riyadh's investment in mass transit demonstrates that even cities long dominated by private car use can transform mobility patterns. The rapid uptake of the Riyadh Metro, the ongoing

expansion of its lines, and the planned Qiddiya High-Speed Rail illustrate the ambition and the practical progress of the city's transport strategy.

Looking ahead, the long-term success of Riyadh's transport transformation will require further integration with buses, pedestrian pathways and park-and-ride facilities, creating an accessible and sustainable network that encourages residents to leave their cars behind.

Through these developments, Riyadh offers a compelling model for other rapidly growing, car-dependent cities seeking to modernise their urban mobility in line with global sustainability goals.

Read more from Principal Journalist, Tiana May but visiting our website [railway-news.com](https://www.railway-news.com).



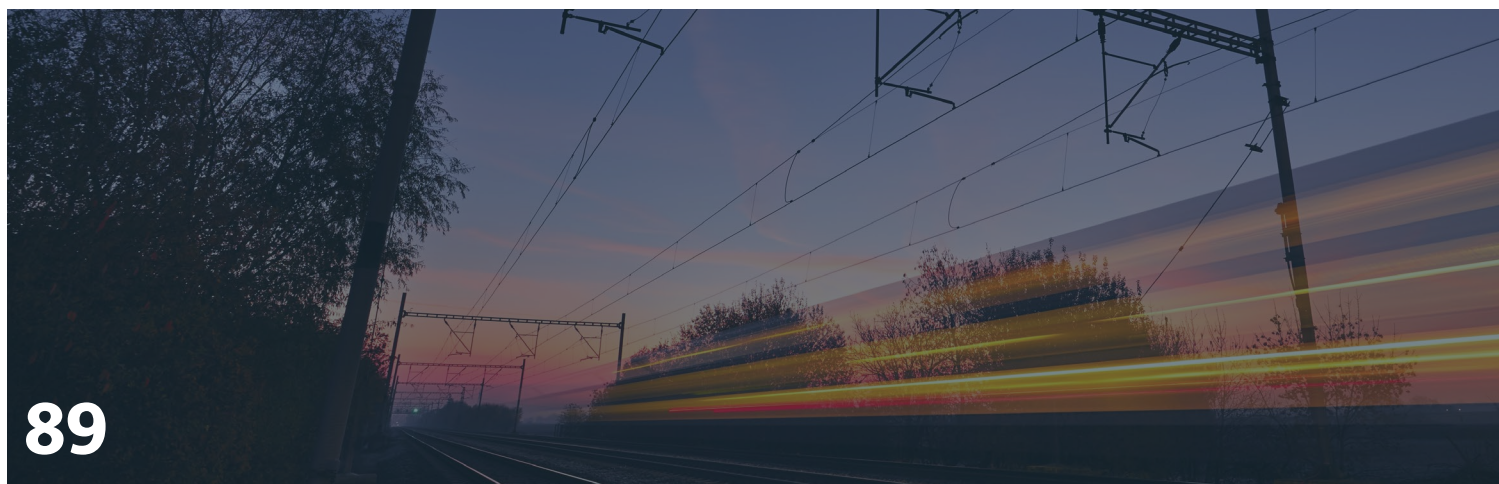
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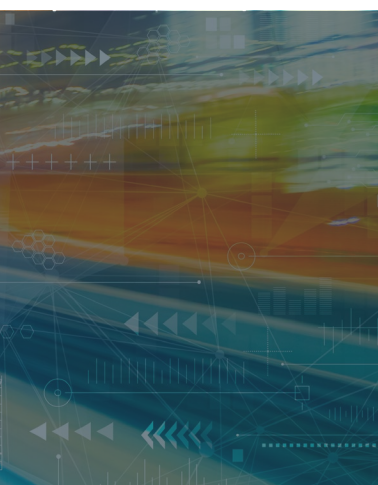
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AusRAIL PLUS 2025

Where: Melbourne Convention & Exhibition Centre

When: Tuesday 25 November – Friday 28 November 2025

Organiser: Australasian Railway Association (ARA)



With over 7,000+ attendees each year; **AusRAIL Plus** is the largest rail event in the Asia-Pacific region, welcoming more than 600+ exhibitors across three days at the Melbourne Convention & Exhibition Centre.

Taking place from Tuesday 25 to Friday 28 November; the event is set to feature talks from rail leaders hailing from Australia, New Zealand and across the world discussing the biggest trends, achievements and issues facing the rail industry today.

The last edition of AusRAIL PLUS in 2023 was awarded ‘NSW Association Event of the Year’ at the Meeting & Events Australia (MEA) Awards, with 2025 looking to build on the success of previous years.

Attendees at the exhibition include representatives from across the industry, including passenger rail operators, freight rail operators, heavy haul operators, rolling stock manufacturers, contractors and rail industry suppliers.

Conference

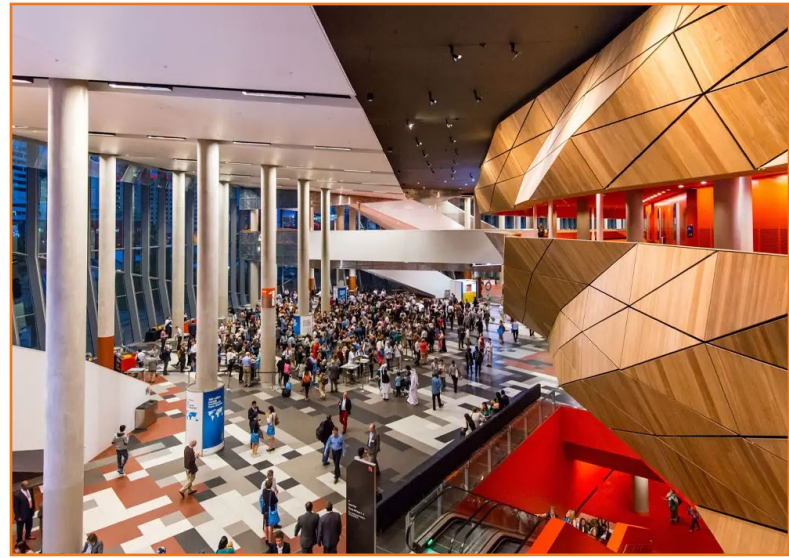
2025's edition of AusRAIL PLUS will be a three-day event and feature 120 speakers across a wide series of panel discussions and dedicated talks.

Speakers are set to include Gabrielle Williams, Minister for Transport MP for the Victorian Government, who will deliver a ministerial address on the opening day, Jim Betts, Secretary of Department of Infrastructure, Transport, Regional Development, Communications and the Arts, who will speak about infrastructure investment priorities for the rail industry and Paul Bloxham, Chief Economist, New Zealand and Global Commodities at HSBC, who will present a look at the future for rail investment in Australia and the world.

Alongside these dedicated sessions, panel discussions will include a meeting of the Chief Executive Officers of V/Line, Metro Trains Melbourne and Yarra Trams to discuss Victorian operation, a discussion on the transformation of Australia's rail policy landscape led by Chief Executive Officer of the Australasian Railway Association, Caroline Wilkie and a look at how best to sustain the future of freight with panelists Peter Thomas (Regional Senior Vice President – ANZ/SEA, Wabtec), Brett Grehan (Chief Executive Officer, Pacific National), Hon Melissa Horne MP (Minister for Ports and Freight, Victorian Government) and Geoff Smith (Managing Director, The SCT Group) and facilitator Georgia Nicholls (General Manager – Rail Freight and Heavy Haul, Australasian Railway Association).

Exhibitors

With over 300+ exhibitors on site, the rail industry will be out to represent itself at this year's AusRAIL PLUS.



Those in attendance are set to include ABB, PowerRail Australia, Frauscher, Stadler, Siemens, Westermo, Alstom, Nokia and many more.

Social Events

AusRAIL PLUS also offers a number of social events for those looking to meet and connect with other rail industry professionals.

The event is kicked off with a Welcome Drinks gathering at the Melbourne Convention and Exhibition Centre's Plenary 2 foyer on Tuesday 25 November, with complimentary tickets provided for registered conference delegates.

The morning of 26 November will see the Women in Rail Breakfast take place in the Exhibition Centre's Melbourne Room, sponsored by McConnell Dowell.

Those looking to keep active during the event are also invited to the AusRAIL PLUS 2025 Fun Run and Walk; a free-to-join guided 5km run or 3km walk throughout Melbourne before the event's official Closing Drinks in the Plenary 2 foyer later that evening.

Standard registration for the event is open until the deadline on 21 October, with tickets for all social functions available to non-registered ARA members on the same date and available to non-registered, non-members on 11 November, subject to availability.

ausrail.com



Supplier Spotlight

Exhibitor

Stand Number

ABB Australia Pty Limited

Stand 500

Dellner Couplers Australia Pty Ltd

Stand 111

Frauscher Sensor Technology Australia Pty Ltd

Stand 327

Frequentis Australasia Pty Ltd

Stand 650 & 671

Goldschmidt Australia Pty Ltd

Stand 474 & 475

Hexagon

Stand 598 & 599

Holland

Stand 90

Mosdorfer Rail

Stand 728 & 729

Nokia

Stand 108 & 135

Pandrol Australia

Stand 88

PowerRail Australia Pty Ltd

Stand 37 & 38

Sogeclair Australia

Stand 654

voestalpine Railway Systems Australia

Stand 185

ZF Services Australia

Stand 734

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Holmatro

Powering Innovation



For over 55 years, we have been leading the way in innovation in high-pressure hydraulic solutions.

We continuously immerse ourselves in our customers' industries and challenges. This knowledge, combined with our many years of experience, allows us to develop high-quality solutions that enhance our customers' efficiency, safety and performance.

We constantly challenge ourselves to deliver innovative, reliable and safe solutions to our customers. This drive led us to explore the world of rerailling & recovery, where we seek to utilise our knowledge and expertise to perform this crucial task with enhanced safety, efficiency and control,

ultimately bringing more cost-effectiveness to operations.

Rerailling – Recovery Systems

When developing a system with these parameters, you want to make sure you understand your customer's needs. So we teamed up with ProRail, the leading Dutch rail infrastructure management company, and responsible for the recovery of all derailed trains within the Netherlands.

With this cooperation, we studied and examined the rerailling systems available in the market and were able to combine years of experience in rerailling, years of experience in high-pressure hydraulics and modern technology in one single system.



- Load lowering valves on each cylinder, ensuring lowering is possible in a controlled manner without the load having any influence on lowering.
- Integrated hose rupture security feature in the lowering valves on each lifting cylinder; ensured safety, because of the load holding function, even in the event of a hose rupture.

CONTROLLED

Working with high-pressure hydraulics requires great responsibility. Holmatro high-pressure hydraulic systems are designed to offer you controlled power.

- We offer a wireless, remote-controlled pump unit; no need to carry out a heavy, noisy pump unit into the field.
- Our traverse cylinder carries an equal capacity for both pushing and pulling, enabling you to both push and pull the vehicle into position, usable in any position and either direction.
- Inside the traverse sleds, you will find an additional internal sled, compensating for the radius the train makes, working with less or even without repositioning of the system during operation.
- An indicator on the traverse sleds will alert the operator to the traverse limits. This prevents the instability of the railway vehicle and the equipment.
- Sled fill plates are used to place the cylinder closer to the lifted object and not lose stroke of the plunger to reach it.
- Adapter plates are used to position the cylinder directly at the center of the traverse sled or filing plate.
- Finally, we added a locking device. Should you work in a sloped position, this device prevents the system from shifting downwards and therefore prevents the creation of an unsafe situation.

FAST

A system with maximum performance, at a minimum weight.

- Holmatro rerailing cylinders are fully made of aluminum; this makes them sufficiently lighter and way easier to carry (by one or two people).
- Fully aluminum beams, which are lightweight and easy to carry. With the connecting set, you can connect different lengths of beams without the use of special or additional tools.

Johan Knuivers, ProRail: *“The result of our close collaboration was astounding. We have three sets of Holmatro rerailing systems in use, and together they are deployed 50–60 times per year. Due to the lower weight, safety features and ergonomics of the components, the system enables us to work faster and safer. This has resulted in the fact that we could do our job in two hours less per deployment. This time reduction and more ergonomic and safer deployment have also led to less absenteeism of our employees.”*

Discover Holmatro’s Rerailing Systems

SAFE

When working in demanding circumstances and time is of the essence, you want to ensure a safe work environment above all.

- To increase stability and safety, we use stacking rings when the cylinders are extracted. They are easy to safely place around the plunger of the lifting cylinder; they mechanically lock the load in position for a longer time; and they therefore enable you to work safely near and under the load.
- Easily replaceable slide bearings both under and in the traverse sled; safer operation with less stress on the railway vehicle and the equipment. No steel wheel rollers needed, decreasing maintenance & weight.
- An indicator on the traverse sleds will alert the operator to the traverse limits, preventing instability of the railway vehicle and the equipment.
- Coloured hoses & matching colours on the outlets of the pump unit and/or control table; reduces the possibility of incorrect assembly and thus faulty operations.

- Our traverse sleds contain sliding bearings made of low-friction Teflon-like material (UHMWPE), and do not have steel wheel rollers, so you will experience:
 - o Less friction
 - o A huge weight reduction
 - o Less chance of damaging the beams
 - o Less maintenance
- Our traverse struts are fully made of aluminum, and thus lightweight distance bars are used to keep the sleds in position. For stability reasons, Holmatro uses two bars.
- Since the traverse sleds have sliding bearings, decreasing friction, you can work with a lower capacity traverse cylinder, resulting in a lighter cylinder. With the Holmatro system, only a 12-ton traverse cylinder is required.
- All system components have optimally placed grips; easy to carry, by just one or two people, and easy to assemble and disassemble without the use of any extra equipment.

Holmatro Compact Rerailing Unit

The lightest solution for rerailing lightweight railway vehicles, with the highest precision.

- Weight ready for use: only 54kg
- Easy transportation to the accident site
- Easy to install due to its compact dimensions
- Equal, split flow pump unit
- Core hose technology; press and return one single hose enabling you to switch between control valves, while the pump is running
- Remote-controlled valves give you an excellent overview of the situation

Quality & Reliability

Holmatro develops, designs, manufactures and delivers high-pressure hydraulic solutions, providing safety, reliability and durability to our customers and users. Our tools and systems are developed, manufactured and maintained in conformity with the highest quality standards of durability, side load, mechanical distortion and overpressure.

Health, safety, security, environment and quality (HSSEQ) are core values throughout the entire Holmatro organisation. Our leaders set the standard, ensuring every employee takes personal responsibility for HSSEQ, protecting coworkers, customers and visitors alike, proven by our ISO 9001, 45001 for Health & Safety, and 14001 for Environmental Management certifications.

Holmatro Premium Service Programme

In addition to quality, we focus on unburdening our customers. Our in-house specialists and global partner network offer direct support, maintenance, spare parts and training as well as on-site training and consultancy. Our long-standing experience and the local market knowledge of our partners ensure safe applications, maximum reliability and a longer lifespan.

For more information [click here to email Harro Joustra](mailto:harro.joustra@holmatro.com), Commercial Manager Rerailing Systems.

www.holmatro.com/en/





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PowerRail proudly offers cost-efficient and time-saving custom Kits for all your needs. Provide us with your project schedule and we'll have the Kits ready to ship when you need them.

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PowerRail

Delivering What Matters: PowerRail Kits Keep Locomotives Moving

For over 22 years PowerRail has been providing the rail industry, both domestically and internationally, with parts and components to keep their locomotives running.

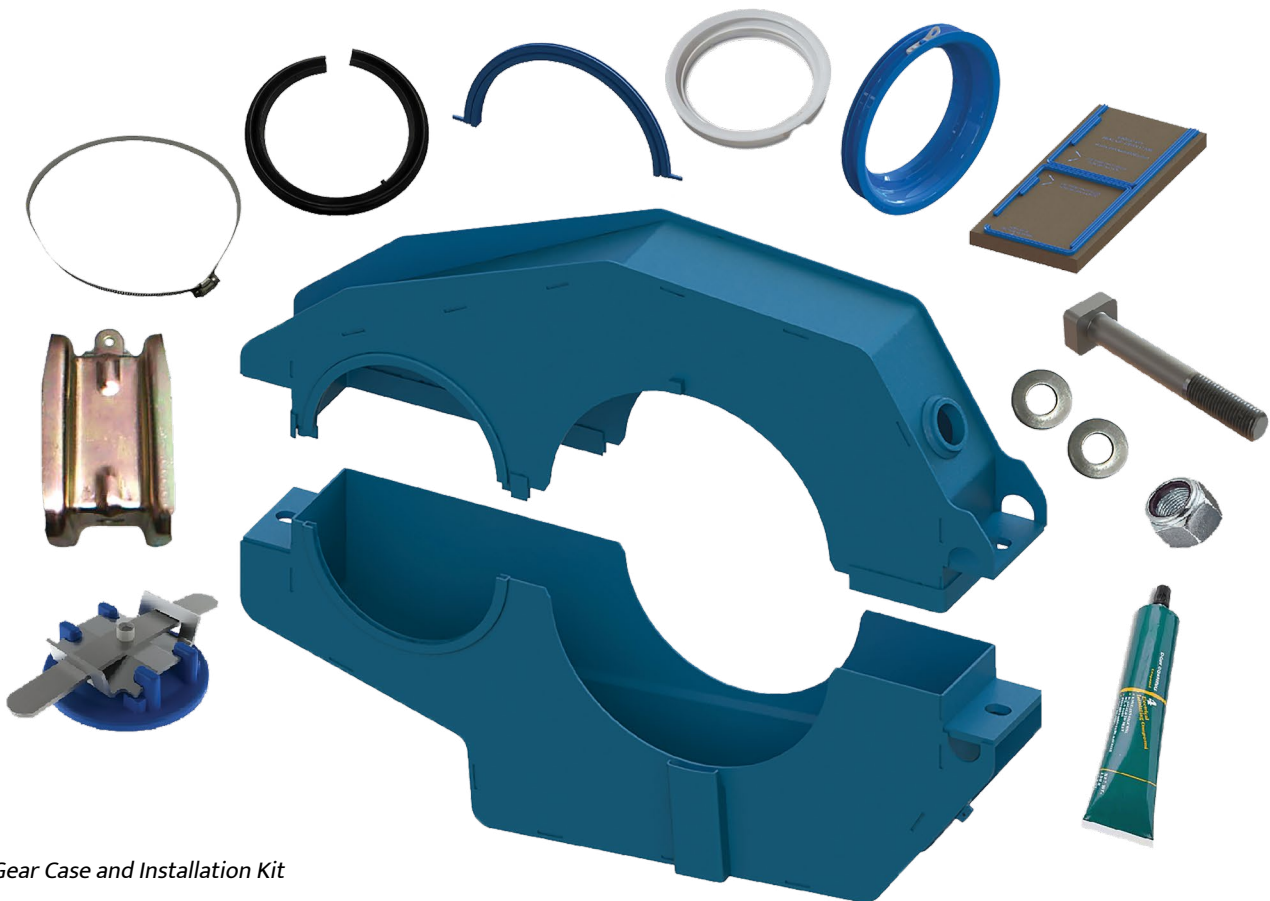
In recent years, PowerRail has added even more value by helping customers improve their production efficiency for major projects such as like-new remanufactured locomotives or modernisation and repowering projects.

Whether it's standard, regularly scheduled maintenance, or a major capital project, timing is key. Having the parts you need on hand when you need

them is one of the most important steps to staying on schedule. PowerRail offers a wide variety of custom kits for all your project needs. They work with their customers to define not only the contents of the kit, but also the timing of when it should arrive. The concept of creating customised kits first began with PowerRail building 92-Day and Annual Inspection Kits for their customers. The kits are assembled at PowerRail with all the necessary parts for the inspection... filters, lightbulbs, gaskets, etc., tagged with the customer's road number and shipped out based on their specific inspection schedule. The ease of ordering, the reduced inventory on customers' shelves, and the decrease in labor hours spent assembling kits onsite are all part of the value-added service that PowerRail provides. As the Inspection Kits became more popular,



Example of PowerRail Truck Kit



Gear Case and Installation Kit

PowerRail began offering various other kits, including wheel change-out kits, power assembly change-out kits, as well as engine overhaul kits and truck rebuild kits.

When recently working to standardise the engineer’s cab in all their locomotives, a Canadian railroad partnered with PowerRail to create kits for their entire fleet of locomotives. Each kit included everything from an event recorder/camera system and voice radio to safety items, such as a first aid kit, blanket and flares, as well as brooms and even a kettle.

PowerRail’s diverse production capabilities, coupled with their extensive parts offering, provide a wide range of options for customers, assisting them to complete standard scheduled maintenance, as well as major projects and capital programs on time, and on budget. Their in-house kitting, manufacturing and assembling capabilities provide customers with a true one-stop shop experience.

PowerRail is a United States-based company, proudly offering a wide range of new and rebuilt rail-related parts and components including bearings and journal

boxes, electrical rotating parts, engine components, compressors, pumps and motors, from their various manufacturing facilities across the US. In addition, PowerRail offers locomotive rebuilds, overhauls and mobile maintenance at their locomotive shop. PowerRail also serves as a global supplier with a distribution location in Australia.

To see how PowerRail kitting, assembly or parts manufacturing services can benefit your project, please contact them at +1 570-883-7005 or visit their website at www.ePowerRail.com



Icomera

From Concept to Carriage: Transforming the Railway 200 Exhibition

By Mike Mortimer, Director of DG8



The UK rail industry is marking the bicentenary of the modern railway through the cross-sector Railway 200 campaign.

Earlier this year, the exhibition train Inspiration began its year-long tour. Over the next twelve months, this free, family-friendly train is scheduled to visit around sixty main line stations, heritage railways and freight sites, giving more than 200,000 people the chance to step aboard and explore rail's past, present and future.

DG8, Icomera's in-house design and engineering team, played a central role in realising the concept.

Working alongside Network Rail and the wider Railway 200 team, DG8 developed the initial idea into detailed drawings and documentation, then supported manufacture and installation as British Rail Mark 3 coaches were converted into engaging and accessible exhibition spaces designed to handle high visitor numbers. As part of Icomera, the world leader in connected transport solutions, DG8 brings deep rail engineering expertise to projects that combine passenger experience, safety and operational efficiency.

For Inspiration, DG8 translated a compelling educational vision into a practical interior architecture. The team coordinated constraints such as vehicle structure, power, lighting, accessibility and passenger



The bicentenary is a great opportunity to look back on all that the railway has achieved for communities across the world, the things that it does well, the areas where we can do better and to look forward and plan for the next 200 years. Inspiration will hopefully do just that and show those that visit the train what fantastic opportunities for learning and development exist within the rail industry and hopefully lead to the next generation coming through into the railway.

Ingenious Technology, Intelligent Solutions, Inspiring Partners

This project demonstrates how DG8 supports the rail industry with passenger-enhancing, life-extending upgrades to older vehicles delivered sustainably and cost-effectively.

DG8 also supports its parent company, on-train Internet specialists, Icomera, by delivering design and engineering projects that integrate new, ingenious technologies, such as LEO satellite connectivity and 5G-enabled on-board routers, into existing fleets, turning digital ambition into rail-certified reality.

Rail operators will increasingly utilise high-speed, low-latency mobile internet connectivity for real-time monitoring, remote diagnostics and onboard systems management: intelligent solutions that do more than connect; they enhance, protect and optimise.

Together, Icomera and DG8 are turning data and design into equitable, sustainable, passenger-centric mobility, acting as inspiring partners for the smart, connected journey.

Watch our video of the exhibition [here](#).

www.icomera.com
www.dg8design.com
www.railway200.co.uk

All images: Jack Hall/PA Media Assignments/Railway200




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TECHNOLOGY
INTELLIGENT
SOLUTIONS
INSPIRING
PARTNERS

Your Partner for the Smart, Connected Journey

For over two decades, Icomera has kept you connected on the move, delivering seamless onboard connectivity.

Our networks have the power to fully integrate tens of thousands of vehicles into the cloud, paving the way for a bold new generation of safer, more efficient and sustainable transport solutions.



FIND OUT MORE AT [ICOMERA.COM](https://www.icomera.com)

HEXAGON

Accurate, Repeatable Rail Wheelset Measurement Boosts Vehicle Availability

ÖBB-Wagenmeister, Graz, Austria



ÖBB-Wagenmeister slashed rail vehicle inspection times by adopting fast, accurate handheld wheelset measurement

ÖBB-Production wanted to speed up its ÖBB-Wagenmeister division's train inspections to increase vehicle availability for its customers.

It chose Hexagon's NEXTSENSE CALIPRI C42 handheld measurement devices for precise and reliable measurement of wagon wheelset dimensions.

Deploying the Hexagon solution streamlined the inspection process and reduced vehicle downtime by 75%.

Part of ÖBB (Austrian Federal Railways), ÖBB Produktion offers its customers a wide range of railway services, from providing 6,500 trains daily to cleaning, refuelling and brake testing. Vehicle inspections are handled by its ÖBB-Wagenmeister division where 650 'Wagenmeister' – wagonmasters – are responsible for monitoring the safety and quality of rolling stock on ÖBB's infrastructure.

Measuring wheel profiles is a key part of the technical inspections performed by wagon inspectors on freight vehicles whenever irregularities occur during regular operations.

Efficient Inspections with CALIPRI C42

“The biggest challenge is completing the inspection process as quickly as possible for our customers to avoid delays and delivery issues,” says Christian Trummer, who coordinates 220 wagonmasters as head of ÖBB Technical Wagon Services in the south of Austria.

A project called ‘Technical Wagon Service – Wagonmaster Next Level’ confirmed that a better way to measure was required. *“This project aimed to meet the needs of our customers and expand the technological capabilities in the technical wagon service,”* says Christian. *“It became clear that optimising the measurement processes for measuring damaged wagons was necessary,”* continues Christian. *“We realised that the previous process was very labour-intensive, involving 10 to 12 steps to transport a wagon after a damage report.”*

Finding a Better Way to Measure

One team member was aware of Hexagon’s NEXTSENSE CALIPRI range of measurement tools and made contact with the company, which is located in the same town as ÖBB-Wagenmeister’s headquarters. *“Since Hexagon / NEXTSENSE is based in Graz like us, it was particularly obvious that we should consider their product,”* says Christian. *“The CALIPRI measurement systems met all the requirements set out in our General Operating Instructions and this convinced us.”*

ÖBB-Wagenmeister decided to evaluate the CALIPRI C42 for non-contact profile measurement of wheel profiles, wheel diameters and wheelset back-to-back distances. This lightweight, handheld and easy-to-use profile measuring device is widely used within the rail industry to support the inspection process during maintenance.

Precise and Repeatable Measurements with the CALIPRI C42

Purpose-made for measuring heavy rail equipment, the wireless CALIPRI C42 uses laser light section technology to provide rapid and correct evaluations with high repeatability. A single device covers the complete rail application range, including high-speed and regional trains as well as cargo stock.



An employee from the team measuring the inner clearance within wheelsets, this measurement is a challenge for wheelsets of freight vehicles

In addition to wheels, optional software modules for the multifunctional CALIPRI C42 enable it to measure the widest possible range of brake discs, rails and switches. ÖBB Wagenmeister added a ‘Back-to-Back’ measurement gauge to measure the inner clearance within wheelsets and Hexagon created a special ‘Wagenmeister-Gauge’ with a customised measurement plan to suit its needs.

“NEXTSENSE supported us excellently, especially in modifying the device for track use,” says Christian.

The latest version of the back-to-back gauge, as used by ÖBB Wagenmeister, features more robust contact angles while its length can also be adjusted. This simplifies the handling of the gauge, increases its flexibility and means it can be adjusted at the trackside. The downtime of a damaged vehicle could be significantly reduced thanks to the optimised workflow.

Streamlining Wagon Measurement Delivers Higher Availability

In 2023, ÖBB-Wagenmeister acquired a set of CALIPRI C42 devices and started to evaluate them in a pilot project. After exhaustively analysing the results, it pressed ahead with a full roll-out and trained a group of 20 staff. The C42 was in regular operation by the autumn of 2024.

“The CALIPRI system reduces the wagon downtime from 10-12 days to only 2-3 days.”

Christian Trummer
Head of Technical Wagon Services, ÖBB

“The CALIPRI C42 system reduces the wagon downtime from 10–12 days to 2–3 days,” says Christian. *“We can now perform the measurement immediately on-site, which saves time and significantly improves the processes, ultimately increasing the availability of the wagons. The devices are used between 800 and 1,000 times per year, depending on the need and the number of measurements, and the measurement data is a central part of our process optimisation,”* explains Christian. Measured dimensions from the CALIPRI C42 can be displayed on a tablet PC or directly on the device’s display. This has enabled ÖBB Wagenmeister to build a streamlined workflow where the measurement data flows from the device to the tablet and then directly into its own systems.

“Previously, measurement protocols were filled out manually and transmitted manually,” explains Christian. *“Today, we automatically generate a PDF with the measurement data that is immediately sent to the damage wagon dispatcher at the RCA . This step of digitalisation has significantly helped us work faster and more efficiently.”*

Fast, Dependable Measurement that’s Proven for Rail Applications

ÖBB-Wagenmeister is very happy with its new wagon measurement system. The Hexagon devices fit its needs exactly and the level of local support is excellent. The C42’s simple calibration procedure is an added bonus. *“From the very beginning, it was clear to us that we would work with Hexagon | NEXTSENSE because CALIPRI meets all our operating requirements, and provides precise and reliable measurements,”* says



The gauge has more robust contact surfaces and an adjustable length, making it easier to handle

Christian. *“The calibration of the devices on-site and the service support in Austria are also important to us, as they provide significant advantages.”*

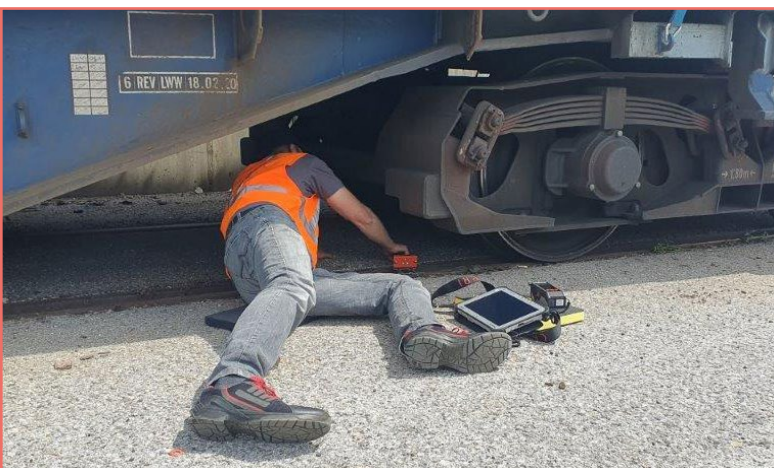
“We plan to acquire more devices in the future,” concludes Christian.

Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon’s Manufacturing Intelligence division provides solutions that use data from design and engineering, production and metrology to make manufacturing smarter.

Learn more about CALIPRI at calipri.com and follow us [@hexagon](https://twitter.com/hexagon) | [nextsense](https://twitter.com/nextsense).



CALIPRI C42 enables precise and repeatable measurements even with wheelsets that are difficult to access



 Directory

Rolling Stock

Christ
WASH SYSTEMS

Train Washing Solutions for Your Vehicle Wash Business

Otto Christ AG has been one of the leading manufacturers of vehicle-washing systems in Europe since 1963.

Every day, we ask ourselves how we can perfect the vehicle washer. The result is a demand for maximum quality, tailored technical solutions, customer-friendly usability, sustainability and low energy consumption.

Innovation Is Our Passion

We create washing experiences that are developed by people for people to make your vehicle wash business successful and, at the same time, to use valuable resources gently. We create systems with details that turn the washing process into an experience. The needs of our customers and end users are our highest inspiration. We consider the conservation of natural resources at every step of our product development. Our services ensure customer satisfaction and the longevity of our products.

Thanks to the comprehensive and modern portfolio of roll over wash units, wash tunnels, self-service wash and vacuum systems, accessories and vehicle-washing chemicals, as well as truck/bus wash systems and special systems for rail technology (tram and train wash systems), customers worldwide benefit from obtaining suitable solutions from a single source.

With high-end washing technology, Christ wants to make the washing business simple and profitable and turn vehicle washing into an experience.

Train Wash Systems

The C1000 SOA train wash system is designed as a stationary passage wash system for trains with



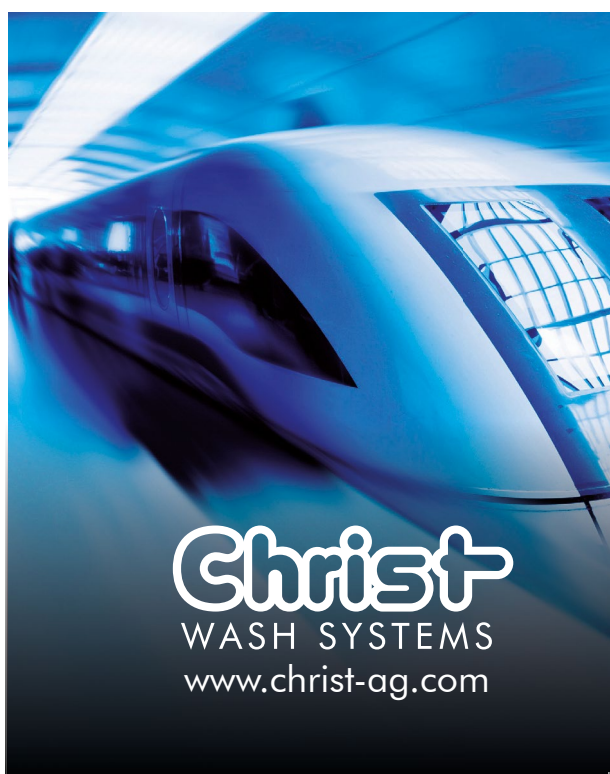
no length limitation, and it can be configured with or without a current collector. During the washing process, the side surfaces are cleaned, and optionally, at an additional cost, the roof slopes can also be washed using additional brushes. Depending on the train's passage speed, the system is equipped with the appropriate number of brush pairs to apply washing chemicals and remove dissolved dirt. The washing process concludes with free-standing spray and rinsing stands.

Flexible Wash Concept

The C5400 SOA train wash system enables semi-stationary or overrun washing for trains without a current collector. In this system, the train positions itself before or after the front/rear wash, then moves past the self-propelled wash system for lateral washing. An optional feature also allows for horizontal washing.

Watch our video [here](#).

www.christ-ag.com



Christ
WASH SYSTEMS
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Airvac | Roediger

Supporting a Growing Passenger Rail Industry in the USA

The USA passenger railway business continues to experience steady growth.

Cities and regions across the country are investing in new rail infrastructure to relieve traffic congestion, reduce carbon emissions, and offer travelers safe, efficient alternatives to highways and air travel. As passenger rail networks expand, the need for additional vehicle maintenance facilities (VMFs) to keep fleets operating safely and reliably grows just as quickly.

Airvac | Roediger has emerged as a trusted partner in meeting this demand. With more than 35 years of experience in the passenger railway sector, the company has contributed to the development of several key USA projects and is currently completing multiple high-profile facilities. These projects showcase Airvac | Roediger's ability to deliver reliable, sustainable solutions for a rapidly evolving industry.

Airvac | Roediger provides complete solutions for potable water supply and wastewater disposal. Leveraging advanced vacuum technology, Airvac | Roediger designs highly efficient systems that safely remove wastewater from rail cars – even in challenging site conditions – and deliver drip-free, environmentally friendly solutions for safe wastewater disposal.

Airvac | Roediger has decades of proven global references that demonstrate their ability to meet client requirements while maintaining full compliance with Build America, Buy America (BABA) standards. Its 100,000-square-foot manufacturing facility, situated on a 40-acre campus in Indiana USA, offers the capacity and flexibility to support large-scale, complex projects and accelerated construction schedules. Every component is built to the highest quality standards, ensuring dependable performance for years to come.



In addition to manufacturing capabilities, Airvac | Roediger provides comprehensive end-to-end support. A worldwide network of design and product engineers collaborates with experienced service technicians to guide each project from initial concept to final commissioning. Detailed training programs, responsive technical assistance, and ongoing maintenance services help passenger rail systems maintain peak performance long after installation.

By combining innovation, sustainability and a customer-focused approach, Airvac | Roediger continues to play a key role in the expansion of the USA passenger railway business. Its advanced vacuum systems and dedicated support services enable rail operators to build the next generation of maintenance facilities with confidence, ensuring safe, efficient and environmentally responsible operations for decades to come.

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Rex-Royal AG

Engineering Meets Espresso: Coffee Expertise on the GoldenPass Express



© MOB - GoldenPass

Since December 2022, the GoldenPass Express has been a highlight of Swiss railway history.

It's the first train service to offer a seamless journey from Montreux to Interlaken without a change, thanks to an automatic track gauge change system. The train, a collaboration between the MOB and the BLS, operates four daily round trips, linking three major tourist hubs: the elegant lakeside town of Montreux, the chic resort of Gstaad, and the picturesque mountain village of Interlaken.

A New Golden Age for Rail Travel: The GoldenPass Express

According to Frédéric Delachaux of MOB's management, the GoldenPass Express fulfils a long-held dream. The new route makes travel more comfortable, especially for groups, by eliminating the need to switch trains. The technical marvel that makes this possible was developed by MOB in partnership with Alstom. At Zweisimmen, the train's bogies automatically switch between the MOB's metre-gauge track (1000mm) and the BLS's standard-gauge track (1435mm). While



© Aniela Lea Schafroth Photography

the locomotives and crew change at this point, the dedicated catering team remains with the passengers for the entire journey.

The train itself is designed to make the journey an experience. The interior features panoramic windows that frame the stunning landscape, and the Prestige class offers rotating seats for maximum comfort and views. The onboard catering is another key feature, with a menu that highlights the flavours of the region. Passengers can enjoy local specialties like Alpenkaviar from sturgeon raised in mountain spring water, wines from the UNESCO-listed Lavaux terraces, and charcuterie boards with cheeses and meats produced along the route.

High-Quality Coffee on the Move

An important new addition to the onboard experience is the freshly brewed coffee. Replacing the previous instant coffee, the train now serves barista-quality cappuccinos, espressos and lattes. The coffee is prepared using a Rex-Royal S2 Railway CST coffee machine, a specialised full-automatic machine designed specifically for use on trains.

Christoph Staubli, Project Manager Railway at Rex-Royal, explains the unique challenges of creating a coffee machine for trains. Following a tragic train fire in 2000, safety standards for train equipment were significantly tightened. This meant Rex-Royal had to

completely redesign their machines to meet stringent new requirements. The S2 Railway, conceived and produced in Dällikon, Switzerland, uses non-flammable, non-toxic plastic components and features shock- and vibration-resistant mounting frames to ensure maximum stability. This design process is ongoing, with continuous adjustments made to meet evolving standards.

The S2 Railway also boasts clever solutions for the practicalities of train operation. It has an integrated self-sufficient water supply to maintain constant



© Aniela Lea Schafroth Photography



© Aniela Lea Schafroth Photography

Enrico D'Herin, Head of Catering at MOB, and Frédéric Delachaux both praised Rex-Royal's professional approach. After testing various providers, Rex-Royal was able to deliver a machine that met all the specific requirements, including the challenge of working with two different power systems. The fact that Rex-Royal is a Swiss brand also made it a perfect fit for the 'Swiss-made' train.

The GoldenPass Express is part of a long tradition of scenic Swiss rail travel. The original railway line was electrified by 1905, and the introduction of the first dining car in 1906 and elegant Pullman coaches in 1931 established a reputation for style and luxury. In 1976, the MOB pioneered the first panoramic car on narrow-gauge tracks, an innovation that drew global attention, even hosting Queen Elizabeth II. The new GoldenPass Express, with its technological advancements and refined onboard experience, continues this legacy, offering passengers a memorable three-hour journey that connects three cantons, two languages and two distinct cultures.



pressure, which is crucial given the limited water on board. Maintenance is also simplified by a slide-in platform system that allows the machine to be easily disconnected and serviced outside the train's tight galley space. Another innovative feature is the frost protection system, which automatically drains the water to protect the machine from temperatures as low as -40°C.



A collaboration based on mutual respect (from left): Christoph Staubli, Project Manager Railway, Enrico D'Herin, Catering Manager at MOB, and Marco Schwarzenbach, Marketing Manager at Rex-Royal AG © Aniela Lea Schafroth Photography

TAKE CONTROL of Passenger Comfort



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Passenger experience is paramount to the successful operation of any rail system. And a significant factor of passenger comfort is climate control. Automated HVAC Test Solutions from Astronics ensure your HVAC systems and sub-systems operate at peak performance. The ATS-500 HVAC is based on an open architecture and industry standards, allowing flexibility to configure the system for your needs and expand as you grow in size, power, or functionality.

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View the
Solution Sheet

Kiel Americas

80 Years of Rail Seating with Kiel



1945 Franz Kiel GmbH production building in Nördlingen, Germany

From its roots in post-war Germany to a global presence in the rail seating market, Kiel celebrates 80 years of engineering excellence, comfort and innovation.

When Franz Kiel founded his workshop in Nördlingen, Germany in 1945, he couldn't have imagined that eight decades later, the company bearing his name would be supplying rail seating solutions to operators around the world.

In the aftermath of World War II, Deutsche Bundesbahn – the German Federal Railway, faced a severe shortage of passenger coaches, with much of the fleet outdated or damaged. Restoring reliable public transport was

urgent, and seating design and production played a crucial role in shaping the passenger experience in post-war Germany – as well as setting the standard for the modern high-speed era.

Over the decades, Kiel has continuously adapted to new demands from post-war reconstruction through to today's high-speed, digitally connected railways, and today is trusted by leading OEMs and transport providers thanks to its blend of ergonomic design, durability and innovation.

1945

Franz Kiel GmbH is founded in Nördlingen, Germany, as a small metalworks company initially focusing on iron component construction.

1948

The company begins to specialise in passenger transportation, starting with bus seating and later adding rail solutions. Clients include Mercedes-Benz, MAN and Magirus Deutz. A new production facility is built to manufacture metal parts, furniture and vehicle equipment.

1965

Kiel upgrades its finishing capabilities, improving the quality and resilience of its seat components. The company opens a new powder-coating and wet-painting facility, also investing in durability-focused seating for long-distance travel and harsh use environments.

1975

Kiel receives its first major order from Deutsche Bundesbahn. This marks a pivotal expansion for Kiel's business in the rail sector.

1983

As seating components become more complex, Kiel begins developing and producing complete seats and seating systems. The company invests in a high-bay warehouse, painting and powder-coating facilities.

Late 1980s

By the end of the decade, Kiel begins to position itself as a serious competitor in the field of passenger seating for railways, starting initially with a focus on regional railways and trams. The company invests in robotic welding and CNC-controlled machines, boosting production capacity and quality. In 1989 it expands production further, with the opening of a new administration building, warehouse and stamping plant in Nördlingen.

1990s

By the start of the 1990s, the company has reached a magnitude which enables it to extend into the global market. The increasing concentration of buyers and sellers also contributes towards the development of an international group of companies. This includes the founding of the Kiel Oto Kiltuk subsidiary in Bursa, Turkey in 1996 and the launch of the Kiel Polska subsidiary in Nowy Tomysl, Poland in 1997.

1993

Kiel establishes a dedicated upholstery department and surface technology unit.



Kiel train seats from 1975

1997

The company heavily invests in product development to maintain its position as a leader in seating solutions. By the end of the decade, it's transformed from a component supplier to a full systems provider, offering development production, delivery and installation of complete seating systems. The development, production, delivery and assembly of complete seating systems for trams and trains becomes even more comprehensive.

2000s

Expansion continues with the acquisition of Deco Seating in the Netherlands, renamed Kiel B.V., and launches – including but not limited to Kiel France s.a.r.l and Kiel Seating in the UK.

A new production site is built in Turkey and sales activities expand to include Scandinavia, Greece, Israel, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Kosovo and North Macedonia.

In addition to this global growth, Kiel introduces a rigorous quality management system to further optimise products and production.

2008

First delivery of the Match train seat for regional transportation – to date more than 500,000 have been produced. This model is valued for its adaptability, with options for headrest height, cushion size, backrest adjustment and add-ons such as tables or footrests. Its ergonomic design and tapering silhouette ensure long-journey comfort.

2009

Kiel N.A. LLC is founded, which opens the door to the North American market. Elkhart, Indiana was chosen as the production location due to its proximity to suppliers of key materials as well as potential customers. The same year, Kiel N.A. participates in, and ultimately wins, the tender for the largest project on the North American railway market at that time: the Bay Area Rapid Transit (BART) project. The company produced 775 carsets for this project.

2012

A new production hall for train seats in Nördlingen is constructed.

2014

Development and delivery of the first Comfortline seat for high-speed trains is completed. Designed for long-distance travel, this model features spring-core cushioning that absorbs movement, ergonomically shaped adjustable backrests, fold-out armrests and foot supports. A wide headrest with large sides enhances privacy, while options such as LED reading lamps, USB charging, centre consoles, foldable tables and storage details create a modern, high-comfort experience in every class.

2017

Kiel is the first to deliver workstation tables designed to meet the industry's latest crashworthiness standards. The same year saw the founding of Kiel Macedonia DOOEL, further increasing EU production capabilities.

2019

Kiel enters joint venture in China, launching the Jiangsu ARSALE Kiel Seat Co Ltd.

2025

Kiel marks its 80th anniversary with global operations, 1,500 employees and a footprint in Europe, North America, Australia, Asia and the Middle East. The



Kiel train seats today

company renews its contract with BART, providing a further extra carsets.

Looking to the Future

Kiel's journey from ironworks to international seat systems supplier has been defined by adaptability, craftsmanship and customer focus. Looking ahead it aims to strengthen its position as a leading seating manufacturer while continuing to grow internationally.

Several clear trends are shaping the future of rail seating. One of the most significant is the ongoing drive for safety. Since the first publication of APTA crashworthiness standards in 1999–2000, regulations have continued to evolve, and seating design has advanced in step with them.

There is also a stronger emphasis on accessibility, with clearer markings, signage and colour coding now used to prioritise seats for passengers with additional needs. At the same time, passenger expectations continue to shift. Where once seats were designed to be bulky, today lightweight designs are increasingly in demand, and modern passengers expect USB ports, cup holders and workstation tables.

Kiel covers the entire travel spectrum: from simple metro and tram seats to high-comfort models for regional, tourist and high-speed trains. With production sites spread across multiple continents, the company remains committed to combining ergonomics, safety and modern design to meet the evolving needs of rail passengers worldwide.



SEATING SOLUTIONS

TrainOptimizer

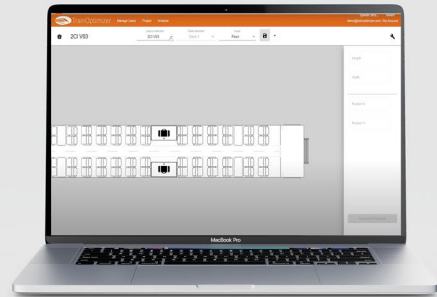
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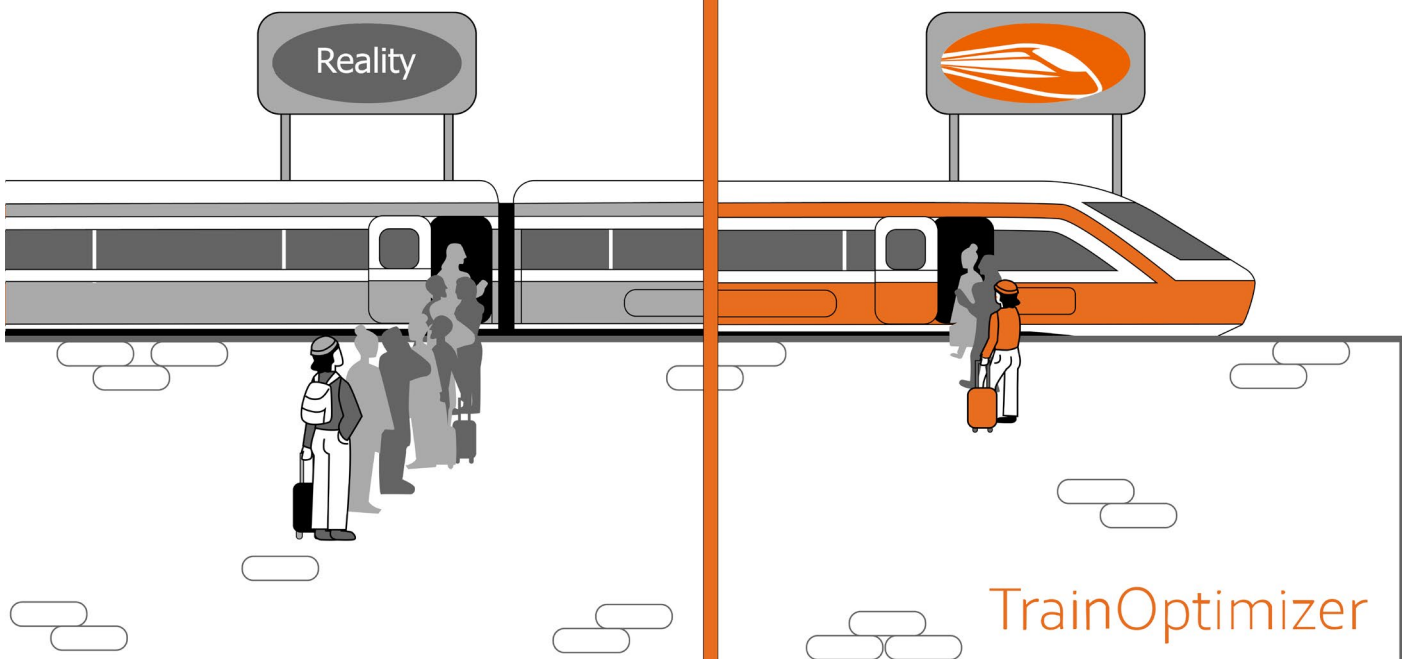
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netwiss

Where Is the Weak Point in Your Train – Where Are You Losing Money?

Dwell Time: 5 min

Dwell Time: 2 min



Did you know that the layout and design of your vehicles have a significant impact on operational efficiency and even the environment?

Your goal is to transport as many people as possible, so you want to have as many seats in the vehicle as possible, right? Well, that sounds good at first glance, but it doesn't work. If you have too many seats on the train, there won't be enough luggage racks and the interior will be very cramped. What does this lead to?

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What makes a train journey comfortable?



We are happy to advise you, but you can also simply use our TrainOptimizer®-Software. It is very easy and intuitive to use, and you can analyse your first layout in just 20 minutes.

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We will also be exhibiting at the Rail Interiors Show in Prague on 24 and 25 November at stand 408 and at RailLive! in Madrid from 26 to 28 November at stand E150. Visit us there and gain valuable insights into the world of efficient vehicles!

weaknesses right from the start and focus on efficiency and customer friendliness from the outset.

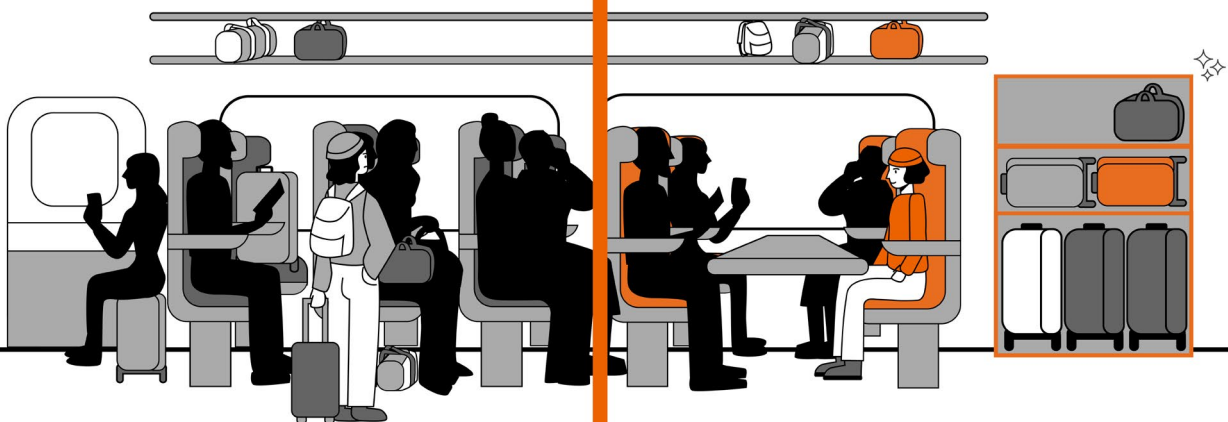
As a result of an optimised vehicle layout, you will receive, for example:

- Reduced dwell time by up to 70%
- Increased seating capacity by up to 20%
- Reduced rail energy consumption by up to 20%



Reality

TrainOptimizer



griwecolor GmbH

Quiet Travel, Safe Travel: griwephon® AN2-800 & AN2-900 Sets New Standards in Railway Comfort

In a world where mobility is accelerating, comfort and tranquillity are becoming essential.

griwecolor GmbH introduces two advanced sound deadening solutions – griwephon® AN2-800 and griwephon® AN2-900 – designed to transform railway travel into a peaceful and safe experience.

Silence That Moves You

Whether commuting to work or embarking on a long-distance journey, passengers increasingly seek quiet environments to read, rest or focus. The rhythmic hum of train wheels and the vibration of metal panels can disrupt this serenity. griwephon® coatings absorb these structure-borne noises, creating a calm acoustic atmosphere that enhances the feeling of space and well-being inside the cabin.

Silence is not a luxury – it's a necessity for modern travel. A quieter cabin allows passengers to enjoy conversations without raising their voices, listen to music or podcasts with clarity, and experience a sense of privacy even in shared spaces.

Emotional and Practical Benefits of Quiet Travel

Quiet environments contribute to reduced stress levels, better sleep quality and improved mental health. For business travellers, reduced noise means increased

productivity – enabling focused work, video calls and uninterrupted reading. Families benefit from a more relaxed atmosphere, where children can nap and parents can unwind.

In addition, quiet travel enhances the overall perception of quality and luxury. Passengers associate silence with technological advancement and thoughtful design, making griwephon® a key contributor to brand reputation and customer satisfaction.

Why griwephon® Makes a Difference

Reduced Vibrational Noise:

Applied directly to metal surfaces, griwephon® transforms high-frequency vibrations into low-frequency energy, significantly reducing audible noise.

Improved Passenger Well-being:

Less noise means less stress, better sleep and improved concentration – especially in designated quiet zones.

Design Freedom:

Enables lightweight construction without compromising acoustic comfort.

Enhanced Safety:

Certified fire protection and low smoke toxicity ensure compliance with the highest railway standards.

	Railway Vehicles		Structural Engineering	
<i>griwephon</i> [®]	AN2-800	AN2-900	AN2-701	AN2-750/EU
Main application	Railway Vehicles	Railway Vehicles	Structural Engineering	Structural Engineering
Density (dry)	~1,2 g/cm ³	~0,8 g/cm ³	~1,3 g/cm ³	~1,3 g/cm ³
Standard	EN 45545-2:2020, EN 45545-2:2023	EN 45545-2:2020, EN 45545-2:2023	DIN 4102-1	DIN EN 13501-1
Classification	DIN 5510 Part 2 Flammability class S4	DIN 5510 Part 2 Flammability class S4	B1 flame retardant	A2-s1; d0 non-flammable
recoatable				
Condensation absorption	hydrophobic	hydrophobic		
Toxicity test according to DIN EN ISO 5659-2	R1, R2, R3, R6, R7, R17 / HL3	R1, R2, R3, R6, R7, R17 / HL3	—	R1, R2, R3, R6, R7, R17 / HL3
Building authority approval	—	—		

Technical Highlights

- AN2-800 Dry Density: approx. 1.2 g/cm³
- AN2-900 Dry Density: approx. 0.8 g/cm³
- Loss Factor: 0.20 (AN2-800), 0.22 (AN2-900) per DIN EN ISO 6721-3
- Fire Protection: DIN 5510 Part 2, Class S4
- Standards: EN 45545-2:2020 & 2023 (HL1–HL3, R1–R17)
- VOC Content: < 0.6 g/l
- Application: Manual or mechanical, up to 5mm wet layer in one pass
- Weight Saving: Up to 40% with AN2-900

Application Areas

- High-speed trains, metros, light rail
- Wagon and container construction
- Shipbuilding and vehicle construction
- Plant and equipment engineering

About griwecolor GmbH

Founded in 1996 in Germany's Black Forest region,

griwecolor GmbH stands for innovation, sustainability and precision. With a team of 15 specialists, the company develops water-based paints and coatings that meet the highest standards in industry and transportation. *griwephon*[®] is part of a broader portfolio that includes solutions for home & living, marking systems, plant fortification and creative applications.

For more information contact us

Email: info@griwecolor.de

Website: www.griwecolor.de

Phone: +49 (0)7707 9904-0



A young boy with short brown hair and blue eyes, wearing a red and blue plaid shirt, is looking out of a window. The background shows a blurred outdoor scene with trees and a building.

griwephon product series



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Mattei Group

The Importance of Compressed Air in Rail: Mattei's Century of Innovation and Reliability

By **Graham S. Leach**, Business Development Director, Mattei Rail & Transportation Division

Together with electricity and diesel, compressed air is one of the most critical energy sources in rolling stock.

It powers braking systems, pantographs, doors and even suspension in some passenger vehicles, directly influencing safety, punctuality and passenger comfort. In demanding climatic conditions – whether high-altitude cold or desert heat – compressed air ensures that trains continue to run reliably and smoothly.

Its importance is often overlooked by passengers, who may take for granted the reliability of systems operating in the background. Yet for operators, the stakes are high. If compressed air systems fail, brakes may lose performance, doors can jam, or auxiliary functions risk becoming unreliable. This makes air quality and compressor technology vital to modern railway operations.

Why Clean Air Matters

Raw compressed air is never clean. During the compression process, water vapour, dirt, wear particles and hydrocarbons mix to form a corrosive sludge often referred to as 'mayonnaise'. Left untreated, this contamination can damage sensitive pneumatic equipment, accelerate corrosion and shorten system lifespans.

International standards such as ISO 4975:2022 (railway applications – braking system air quality) and ISO 8573.1 (testing methods for contaminants) highlight just how

crucial it is to guarantee air quality. Meeting these standards is non-negotiable, not only for compliance but for operational safety and long-term asset protection.

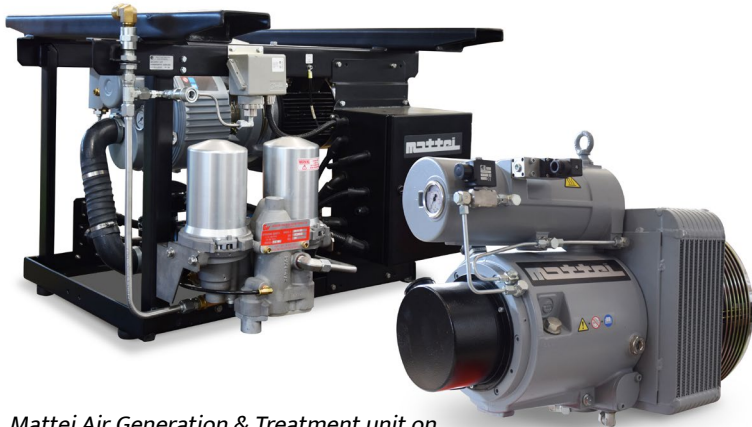
Historically, debates have centred around oil-free versus lubricated compressors. Oil-free systems are marketed as cleaner, but they can be less efficient and more expensive to service. By contrast, lubricated compressors traditionally raised concerns about oil contamination and leakage despite being more efficient, smaller and easier to service on-vehicle.

Mattei's Sustainable Solution

Mattei Rail & Transportation, a division of the Mattei Group, has developed a specially formulated eco-friendly biodegradable lubricant for its rotary vane compressors. This lubricant is derived from renewable raw materials and supports reduced CO2 emissions, aligning with the railway sector's growing focus on sustainability and environmental stewardship.



New RVT integrated compressor, designed for both rail and road applications



Mattei Air Generation & Treatment unit on the left and Mattei RVR 03 on the right, air compressors for on board applications

Mattei's vision has always been to anticipate change. Continuous investment in research and development has allowed the company to design compressors that are lighter, quieter and more energy efficient. Its rail-focused product lines – such as the RVR, RVM and RVT Series – embody this philosophy of delivering tomorrow's products today.

Building a Greener Future for Rail

The rail industry is under increasing pressure to cut emissions and adopt greener practices. Compressed air systems, while often overlooked, play a central role in this transformation. By adopting biodegradable lubricants and energy-efficient compressors, operators reduce environmental impact across the entire lifecycle of their fleets.

This not only reduces operating costs but also improves reliability – helping rail networks meet rising expectations for punctual, sustainable and safe transport.

Looking Ahead

Mattei's introduction of a biodegradable lubricant is more than just a technical development—it signals a paradigm shift. It proves that sustainability and high performance can coexist in rail applications. For operators, it provides a pathway to reduce carbon footprint without sacrificing efficiency or reliability.



BIODEGRADABLE LUBE

With over a century of expertise, Mattei continues to shape the future of compressed air in transportation. Its blend of tradition, innovation and sustainability ensures that rail operators have the tools they need to meet tomorrow's challenges – today.

www.matteirail.com



Unlike traditional lubricants, Mattei's formulation maintains effectiveness across a wide temperature range, making it suitable for both hot and cold climates. It can be used in new compressors or retrofitted into existing fleets, giving operators flexibility in how they adopt greener technology.

The innovation challenges the perception that oil-free compressors are the only environmentally responsible choice. With the right downstream air treatment and Mattei's biodegradable lubricant, rail operators can achieve both efficiency and sustainability without compromise.

Over 100 Years of Research and Reliability

Founded in 1919, Ing. Enea Mattei SpA has spent more than a century pioneering compressed air technology. Today, it stands as a global leader in the design and manufacture of rotary vane compressors – a technology it has refined and perfected across generations.

Rotary vane compressors differ from screw or piston types by using a rotor mounted eccentrically within a stator. Vanes slide in and out of the rotor slots, riding on a thin film of lubricant that forms a perfect seal against the stator wall. This simple but highly effective design minimises wear, reduces frictional losses and results in exceptional energy efficiency. Operators benefit from longer service intervals, lower lifecycle costs and dependable performance – key requirements in the demanding rail industry.

celduc[®] relais

Switching to the Future: SDI Solid-State Relays for Rail



Designed for high-demand rail applications, celduc[®] relais' SDI range of solid-state relays offers enhanced performance, reduced maintenance and real-time monitoring to keep rail systems running smoothly.

Safely and reliably switching high-voltage DC power has long been a challenge for the rail sector, given the demands of its electrical systems. DC networks often lack natural current zero-crossings, making arc extinction difficult during switching events. Additionally, many rail applications involve long distribution lines, such as catenary systems, which introduce significant line inductance. This greatly increases the energy that must be safely dissipated during switching.

Traditionally the sector has used electro-mechanical

relays (EMRs), but they've proven slow in responding to faults, require external protection circuits and suffer thermal management issues, leading to risks from overvoltage and short-circuits. They're also considered prone to wear: needing regular inspection or replacement due to mechanical fatigue.

In response to these issues, experts at celduc[®] relais have developed the SDI range of solid-state relays (SSRs), engineered to better handle the demanding conditions of railway networks.

SSRs offer many advantages over their EMR counterparts. Their lack of moving mechanical parts means they're not subject to wear and tear or deformation, and they're capable of reliably switching a wide variety of loads found in rail systems, including resistive elements, motors, power converters and lighting systems.



and overcurrents, compatibility with low switching frequencies and lower conduction losses at high currents.

Built in with advanced protections including active clamp circuits and real-time monitoring and fault detection, the SDI range provides a safe, efficient and maintenance-free alternative to traditional relay offerings. Its 750VDC rating is a key advantage, as this is a common voltage level in urban transit networks such as metro systems and trams, however it delivers a higher voltage capability of up to 940VDC.

Smarter Switching for Modern Rail

As onboard electrical systems become more sophisticated and expectations for reliability, efficiency and proactive maintenance go up, the SDI range offers a clear upgrade path from electromechanical switching devices. Each unit is equipped with diagnostic and status outputs that provide real-time information about the relay and installation, enabling operators to detect and address issues quickly. For example, if a power supply fault occurs – such as a blown fuse, open load or excessive leakage current – the relay will signal it immediately, reducing downtime, simplifying maintenance and preventing more serious and costly failures.

The 50A model also features continuous current monitoring, allowing early detection of abnormal load behaviour by preventing overloads and driving the system to remain within safe operating limits. Together, these capabilities support predictive maintenance, improve safety and help keep rolling stock running reliably with minimal disruption.

IGBT Technology

celduc® relais' SDI range leverages insulated gate bipolar transistor (IGBT) technology, combining the high input impedance and fast switching of metal-oxide-semiconductor field-effect transistors (MOSFETs) with the high current and voltage-handling capabilities of bipolar junction transistors (BJT)s.

Unlike pure MOSFETs or thyristors, IGBT's are better suited to high-voltage DC applications due to their higher voltage ratings, resistance to overvoltages

Key Features and Benefits

Designed for high-demand DC applications, the SDI range of solid-state relays (SSRs) combines performance, reliability and easy integration:



- **High DC capacity** – switches up to 100A at 750VDC nominal (up to 940VDC)



- **IGBT technology** – fast switching with high current/voltage handling for demanding DC loads



- **Long operational life** – mean time to failure (MTTF) up to 118 years; no moving parts to wear out



- **Intelligent monitoring** – real-time diagnostics and optional continuous current monitoring



- **Flexible integration** – multiple control voltages (24–110VDC) and load connection options



- **Railway-grade design** – rugged construction certified to EN 50155 and EN 45545-2

Critical Compliance

Additionally, the range's compact, rugged design has been designed to meet railway standards EN 50155 and EN 45545-3. These certifications can only be obtained after a series of rigorous tests designed to simulate extreme conditions in a railway environment, including voltage variations, power interruptions, supply changeover, vibration and temperature extremes and fire conditions, making them safe and dependable for use across a wide variety of railway systems.

Built to Last

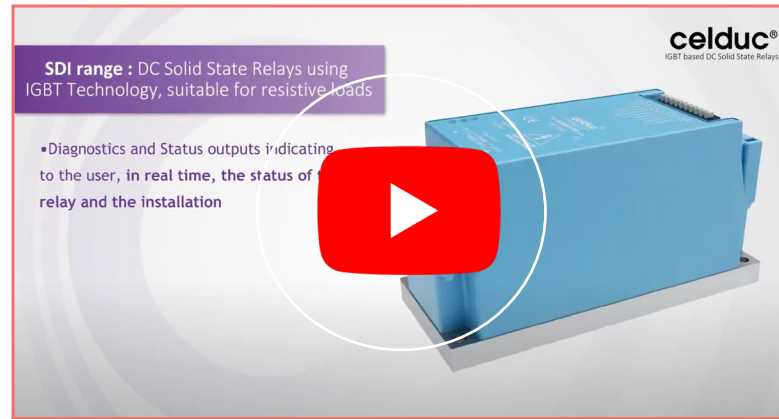
Another benefit of the SDI range is high life expectancy. According to calculations based on ISO13849-1, the mean time to failure (MTTF) is 118 years, with a diagnostic-based MTFF of 236 years. Even in extreme conditions, the relays are expected to last over 20 years, far beyond what traditional solutions typically offer.

This commitment to performance and reliability has made celduc® relays the supplier of choice for major rail operators across Europe, including the integration of SDI SSRs into a new tramway project with Poland's largest rolling stock manufacturer.

Safety First

The SDI range delivers safety through advanced protection features and robust construction:

- **Inductive spike protection** – active clamp technology prevents equipment damage
- **Built-in safeguards** – overvoltage, overcurrent and overtemperature protection as standard
- **Fault lock-out** – automatic shutdown after four short-circuit events for inspection
- **Operator safety** – fully sealed solid-state design eliminates arcing and exposed contacts
- **Certified safety** – meets EN 50155 and EN 45545-2 standards for fire safety, shock, vibration and EMC compliance



Developing the Next Generation of Rail Relays

As electric trains and rail electrification continue to expand globally, celduc® relays sees solid-state playing an increasingly central role in modern rolling stock and infrastructure. The technology's key advantages, such as long service life, maintenance-free operation and built-in diagnostics, make it particularly well-suited for the demanding and safety critical environment of rail transport.

With this in mind, its R&D team is continuing development in this area, working on a more compact version of the SDI solution. Size is a critical factor in onboard systems, as space is often limited, with every piece of equipment needing to be as compact as possible without compromising performance or reliability. Furthermore, reducing footprint offers additional benefits including improved energy efficiency and higher power density, driving an easier integration into existing and new designs.

celduc® relays is also currently in the midst of developing a modular DC relay designed to cover a large voltage range. This approach will allow greater flexibility and scalability, enabling the SSR to be easily adapted to different applications and voltage levels.

Learn more about celduc® relays' SDI range of SSRs in the video overview above.

To find out more visit our [website](#) or [contact one of the team](#)





RAILWAY MODULAR CONNECTORS

EvoTrak – the real modularity

EvoTrak family

Simplifying and unifying your traction chain connections

Experience seamless connectivity across your entire traction chain with the EvoTrak family. Stäubli's compact and flexible modular solutions ensure a consistent connection philosophy.

Whether your application requires 1 to 4 poles, straight or angled design components or receptacles, EvoTrak is configurable to meet your specific needs. In addition, EvoTrak not only meets all relevant standards but also undergoes rigorous testing beyond railway requirements, ensuring sustainable reliability.



ABB

Powering the Future of Urban Mobility: How ABB Solutions Drive Efficiency, Comfort and Cleaner Cities

By Yevgeniy Bandukin, Global Segment Manager Rail OEM, ABB



ABB Traction Converter used for Stadler's underground metro cars operating in Berlin's BVG U-Bahn system © Stadler

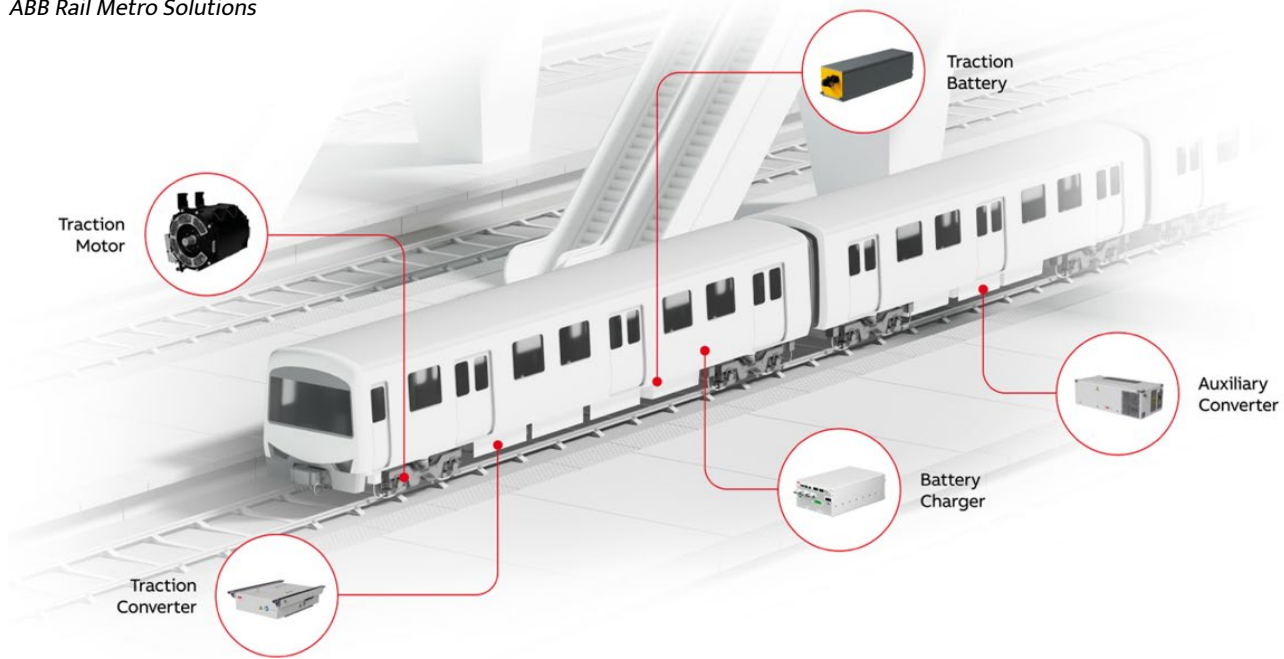
Public transportation moves billions of passengers, and as cities expand and sustainability takes the spotlight, advanced electrification and automation are key to powering smarter, greener transit systems.

The International Energy Agency highlights that rail is the least emissions-intensive mode of passenger transport, and driven by increasing road congestion and urbanisation, rail is **uniquely positioned to support global low-carbon objectives.**

Metro systems are emerging as an intelligent urban transportation solution. Of the world's operating metro systems, over one-third were put into operation between 2017 and 2021; this illustrates the increasing global emphasis on climate goals in cities. To meet this growing demand, ABB offers innovative traction solutions designed to optimise energy use while increasing reliability and passenger comfort.

Using regenerative braking technology, centralised power distribution, and the latest power electronics technology, metro systems can minimise energy

ABB Rail Metro Solutions



consumption per passenger. These rail networks serve as more than just transit infrastructure, they function as the circulatory system of modern cities, delivering exceptional energy efficiency, enhanced passenger experiences and reduced street-level pollution and noise.

ABB is leading the transformation from road vehicles to rail, helping cities around the world – from Adelaide to Los Angeles – electrify their public transit systems, driving this shift with its efficient traction solutions.

In developing countries with fast-growing populations and low rates of car ownership, public transportation serves as a daily lifeline for tens of millions. The same holds true in many industrialised and developed nations, where extensive national and regional rail systems support large numbers of commuters.

Nonetheless, there is a stronger need than ever to facilitate the transition from road vehicles to public transport. Individual cars are the biggest contributors to global road transportation emissions and are highly energy-inefficient per passenger-km. **Between 2010 and 2023, emissions from passenger vehicles increased by around 20 percent to 3.2 GtCO₂e.** Yet, research conducted by Nature, has used a unique panel dataset of 27 metro operations worldwide, to underline the potential in energy reduction for urban rail transit systems, finding that a **10% increase in passenger-kilometres travelled on a fixed network reduces**

energy use per passenger-kilometre by 3.45%. This underlines the need for this transition.

Improved Energy Efficiency

ABB's BORDLINE® CC750 DC traction converter is designed to enhance metro systems in rapidly growing cities by combining high energy efficiency, reliability, and ease of maintenance. It converts catenary DC voltage into AC to propel the traction motors, while also offering integrated car, bogie or single axle control, low-noise operation and modular components that simplify servicing.

Besides traction converters, ABB provides auxiliary converters, traction motors, traction batteries, and train control and monitoring systems (TCMS). Together, these components create a complete and fully optimized traction system — managing power seamlessly from the catenary down to the wheels. This integrated approach ensures higher efficiency, reliability, and simplified maintenance since all subsystems are designed to work in harmony as part of one unified solution.

Surat and Ahmedabad, India, serve as prime examples of ABB delivering its full traction portfolio – including traction converters, auxiliary converters, traction motors and driverless TCMS - to provide a complete and optimized propulsion chain for metro systems. ABB, with its local production, and Titagarh Rail Systems

partner to supply and manufacture the entire traction chain for Surat and Ahmedabad metro projects, from power conversion to train control.

Regenerative Braking

Regenerative braking is another key enabler of energy efficiency and sustainability in modern metro systems, offering both environmental and operational benefits in densely populated urban areas. The process captures the kinetic energy from a slowing train and converts it into electricity. This energy can be stored in batteries, fed back into the grid, or used to power other trains on the same line while they are accelerating. **By reducing the need for additional power generation, it can cut rail energy consumption by up to 30%.** As well as energy savings, regenerative braking offers the benefit of reduced wear of mechanical breaks, which leads to reduced maintenance costs.

This efficiency leads to lower carbon emissions, less reliance on fossil fuels, and long-term cost savings. It also eases the load on electrical systems by minimizing power losses and heat generation, reducing the need for cooling in tunnels and substations.

In Europe, regenerative braking is widely used in electric, and hybrid trains and plays a key role in meeting EU sustainability targets.

The BORDLINE® CC750 DC traction converter has significantly accelerated the adoption of advanced power electronics solutions for Stadler's underground metro cars operating in Berlin's BVG U-Bahn system. ABB's solution provided a built-in inductor and braking resistor integrated into a single cabinet of the compact converter, forming a standardised lightweight traction converter metro application platform.



Enhancing Customer Experience

The safety and punctuality of metro systems, particularly when we consider that they are air-conditioned, well-lit, and accessible, means they are a popular choice for passengers. **According to a report on noise pollution recently released by the European Environment Agency (EEA), more than 110 million people – over 20% of the European population – are exposed to harmful levels of transport noise** that exceed EU reporting thresholds, posing risks to human health, the environment, and the economy.

Since road traffic has been identified by the EEA as the leading source of noise pollution, electric trains offer a quieter alternative to combustion engine vehicles in our cities. Not only that, but metros avoid road congestion and reduce emissions in central areas. The air quality benefits of electric rail, alongside its urban design synergy with car-free zones mean that integrating metro use with liveable urban planning is the appropriate choice.

In 2022 South Australia's Department for Infrastructure and Transport (DIT) tasked ABB with upgrading Adelaide Metro's trains to reduce noise and emissions and improve the overall commuter experience for the 16 million people who rely on the service annually. This encompassed converting 50 trainsets into a hybrid fleet capable of switching seamlessly between diesel and battery-electric power.

Conclusion

Whilst advancing the metro will require high investment, long-term gains in efficiency, environment, and economic value outweigh short-term costs. Metro systems are the backbone of energy-smart cities, and these emerging technologies are catalysts for sustainable, smart, and humane cities. Investment should be a core infrastructure priority.

new.abb.com/railway



MERSEN

Local Presence, Global Expertise – Mersen in North America

From flagship projects in New York to long-term support in Chicago and Toronto, Mersen provides rail operators with proven components, digital innovation and the assurance of local manufacturing capacity.

Mersen has long been recognised for its expertise in electrical protection and power management solutions for the railway sector, and in particular the third-rail current collector market. Known for its wide range of components, which fall under four product families – on-board disconnecter switches, fuse boxes, third rail current collectors and earth return current units – the company has been developing and delivering custom solutions for over 100 years.

Among Mersen’s four product families, the current collector device (CCD) is one of its flagship products. With multiple CCDs needed per train, demand is high for both new projects and spares.

“Our offering operates reliably in challenging operational conditions for decades. Very few companies can deliver this combination of durability and engineering knowledge,” says Florent Canolle, Business Operations Manager for Mersen’s Power Transfer for Rail Vehicle (PTRV) division.

Combining Global Engineering with Local Responsiveness

With its group headquarters in Paris, France, and the PTRV division headquartered in St Bonnet de Mure near Lyon, Mersen today operates more than 50 industrial

sites and 21 R&D centres across 33 countries worldwide. In North America it’s had a regional base in Vaudreuil-Dorion, near Montreal, Canada since the 1970s, which is also home to a full-service factory certified IRIS ISO 22163. Regional hubs such as this enable the company to offer global expertise hand-in-hand with local service.

“All design is centralised in France, where our engineers draw on lessons from projects worldwide,” explains Canolle. *“At the same time, our local sales, project management, quality and customer service teams ensure that we’re close to our customers: in the same time zone, speaking their language, so we can offer premium support.”*

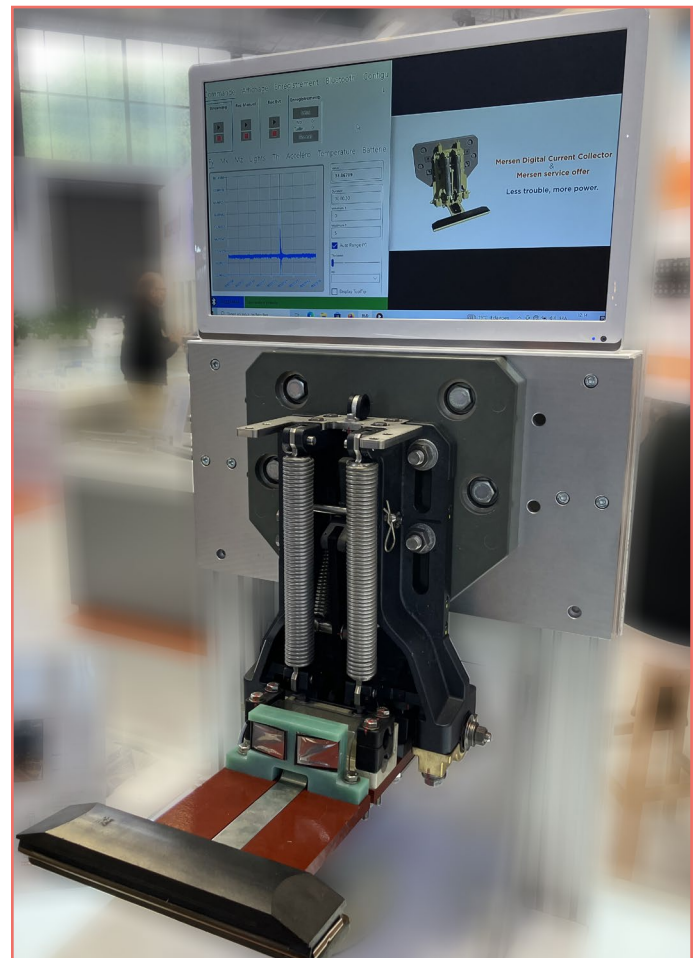


For example, the company redesigned and requalified fuse boxes for a major transit authority in the US after the original manufacturer ceased operating, while in another case it was called in to redesign disconnecter switches to extend the life of two ageing metro fleets.

“Our approach to the aftermarket is another key differentiator,” notes Canolle. “We work closely with major OEMs around the globe, which operate with very strict requirements. That experience means we bring the same level of rigour to supporting operators in the field. For example, when a customer needs to extend the life of an aging train fleet while incorporating new functionalities, we can redesign an obsolete device (disconnecter switch, CCD etc...) to integrate seamlessly into the existing systems. It’s a perfect example of how we apply OEM-level expertise to deliver concrete, tailored solutions for our customers.”

Real-time Monitoring

While balancing customers’ appetites for new solutions with their understandable reticence to change proven components, Mersen engineers continue to innovate.



Mersen in North America

Mersen’s presence is deeply embedded in Canada’s three largest transit systems: Montreal Metro, Toronto and Vancouver, where its CCDs have been in use for many years. In the US, the company’s flagship project is the New York R211 programme, supplying disconnecter switches and having a recognised place on the Metropolitan Transportation Authority’s (MTA) qualified manufacturers list.

“We have a large install base in America: our solutions are part of rail networks in Chicago, Las Vegas, Atlanta, New Jersey and Honolulu, but New York is especially important, as being qualified there is a benchmark credential that can open doors worldwide.”

Replacing Obsolete Components

Mersen understands that many of its North American customers are having to manage ageing fleets, and therefore offers robust aftermarket and obsolescence solutions to support retrofits and mid-life overhauls. This includes ensuring transit authorities have the spare parts they need to keep their reliability performance at an optimal level, as well as providing replacements for obsolescent components as they arise, to help extend fleet lifetimes.



“Our offering operates reliably in challenging operational conditions for decades. Very few companies can deliver this combination of durability and engineering knowledge,”

Florent Canolle, Business Operations Manager for Mersen’s Power Transfer for Rail Vehicle (PTRV) Division

Digitalisation is one area of focus – enabling data to be gathered that can support predictive, or condition-based maintenance for example.

One of the company’s latest solutions is the Digital CCD (D-CCD), a device for real-time monitoring of the contact force between the shoe and the power rail, enabling operators to quickly detect any changes to force, as well as arcing or sag.

Buy America

Mersen plans to expand its US footprint with a new production line in New Jersey. This enabled the company to meet the requirements of the Buy America Act (BAA), which requires all manufactured products used in federally-funded infrastructure projects to be produced within the US.

The company has already positioned itself to answer its first BAA-compliant contract to manufacture for a new project in the northeast of America at the New Jersey production site.

The US market presents major growth potential, notes Canolle, particularly in New York, where the MTA recently approved procurement of new M-9A commuter cars, and the new R262 subway car is on the horizon. Mersen is positioning itself as a trusted partner for future projects, bringing Buy America capability and IRIS – ISO 22163 certification to support transit authorities and OEMs in meeting their evolving needs.

From its Canadian base and new US facility to come, Mersen is committed to supporting North America’s metro and transit operators. With a balance of engineering expertise, local service and a proven install base, the company is well placed to play a growing role in the region’s rail future.

“We have the expertise and capacity to support North American OEM and transit authorities’ emerging growth opportunities. Our team is ready to help, and we welcome conversations with any organisation looking to address challenges or explore new possibilities,” Canolle concludes.

www.mersen.com



Digitalisation is transforming the rail passenger journey



Nomad Digital has been pioneering the use of high-performance train-to-ground connectivity, enabling train operators to transform journeys into truly engaging experiences since 2002.

Discover how Nomad Digital is shaping the future of passenger experience in rail, experts@nomad-digital.com

Nomad Digital, with over 20 years of experience, delivers secure connectivity and advanced digital solutions that transform the passenger journey.

Data & Monitoring

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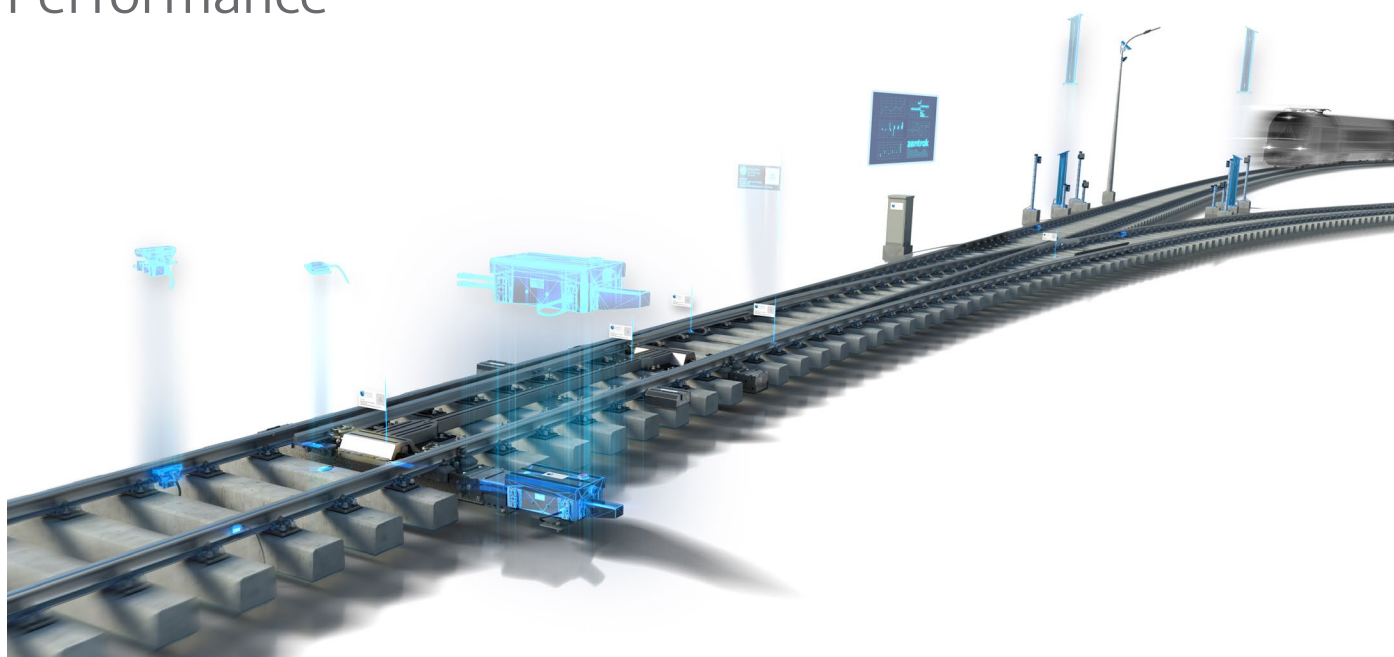
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voestalpine Railway Systems

Turning Railway Infrastructure Data into Reliable Performance



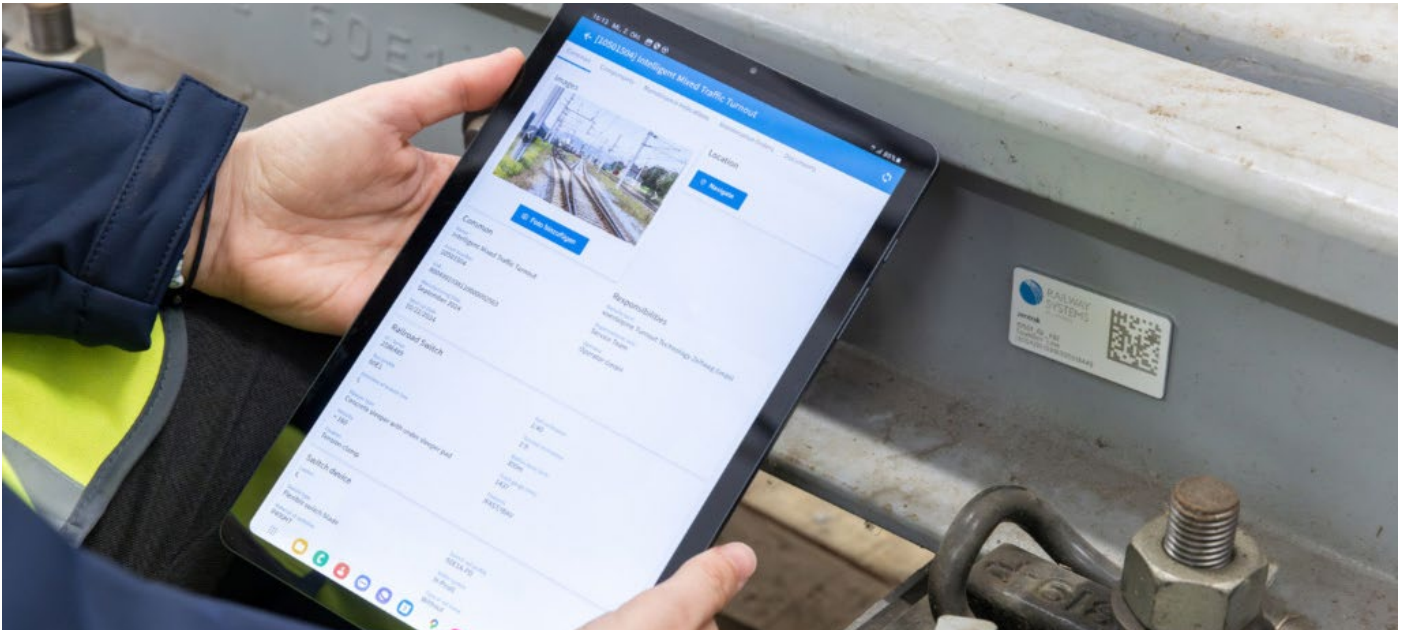
Digitalisation is changing the way railways operate. By combining engineering expertise with smart data, voestalpine Railway Systems helps operators improve reliability, increase availability, provide necessary safety and cut costs and plan with precision, says CTO Profit Center Signaling, Heinz Schatz.

Digitalisation is transforming the rail industry, unlocking new opportunities to improve reliability, availability, maintainability, safety and efficiency across networks. From advanced condition monitoring to predictive and prescriptive knowledge driven maintenance, the integration of digital systems is helping operators move away from being reactive towards smarter, data- and knowledge-driven decision-making.

It's About System Thinking, Not Isolated Tools

Delivering these benefits requires more than technology alone – it relies on a holistic, hybrid approach that brings together the strengths of physical systems and digital tools. Success depends on integrating these elements into existing processes and having a clear strategy for how information will be used to add value throughout an asset's life.

In an industry where reliability is non-negotiable, adopting new digital tools can be daunting. The key lies in aligning technology with customer needs, embedding digitalisation into the physical product from the outset, and ensuring that the insights generated are not just collected, but transformed into actionable improvements that enhance performance and reduce lifecycle costs.



Challenges Rail Operators Face

At voestalpine Railway Systems we often talk about the ‘pains’, or major challenges our customers face, which are reliability, availability, maintainability, safety and security.

Rail operators face the constant challenge of doing more with less, working within tight budgets while under pressure to maintain punctual timetables and keep assets in service. A major hurdle is the lack of transparency over asset condition – without clear, up-to-date insights, maintenance can become reactive rather than proactive, increasing the risk of costly delays.

Digitalisation can help with these pains. With predictive algorithms and artificial intelligence for example, operators can gain real-time visibility into asset health, identify emerging issues before they become an issue, and better prioritise (service and inspection) activities. Spare parts inventory is also a cost driver, so predictive information to optimise spare parts management and thus improve working capital is another optimisation approach. This not only supports availability, but also enables smarter allocation of resources, helping operators deliver a more reliable and efficient service.

The Digital Push Reshaping Railway Infrastructure

Digitalisation is becoming increasingly important

for our customers, particularly as Europe advances initiatives like EULYNX — a standard for digital interlocking systems that defines how they communicate both with field elements and with systems handling safety-relevant maintenance information. This is driving greater demand for both digitalisation (creating new digital processes) and digitisation (converting physical processes and information into digital form).

The genie’s out of the bottle. For operators, predictive and prescriptive maintenance, AI-backed insights, knowledge-based recommendations and greater automation are fast becoming the new standard, and those that don’t embrace the change risk being left behind.

Data, Decisions and Action

The biggest benefits come from working with a trusted systems partner rather than just a product provider. Traditionally, once a product was manufactured and delivered, its lifecycle was largely managed by the operator. With our digital system solutions, we aim to support the entire lifecycle, from commissioning through to end of service, which in terms of rail components can be as long as 30 years. We deliver this through what we call the digital layer, which is made up of three key stages:

- Data harvesting (sensor) technology – collecting the right operational data from robust add on and/or embedded sensors and monitoring systems

- Prediction (information generation) – using algorithms and software tools to turn raw data into actionable insights, whether that’s the current condition of the system, or a probability-based prediction of future performance
- Prescription (knowledge provision) – providing clear recommendations on what actions to take, either to resolve an existing issue or to prevent a potential future problem

By combining condition monitoring with predictive and prescriptive analytics, we can help operators make informed decisions in the present that positively impact asset performance and lifecycle costs in the future. It’s a continuous feedback loop that ensures our solutions keep delivering value over decades of service.

Predictive Insights in Action

voestalpine Railway Systems brings together mechanical engineering expertise, digital innovation and industry experience to deliver solutions that are built in, not bolted on. Whether upgrading existing infrastructure or delivering new-build projects, we design our products to work seamlessly in the most demanding railway environments. Our goal is simple: to help operators improve reliability, increase availability, optimise maintainability in a safe environment to reduce costs and get the most out of every asset.

Take a frog, or crossing point. By applying our monitoring systems, we are able to detect wear, track its progression over time and predict the future behavior. This data provides a prediction of how the crossing will develop, enabling the customer to plan ahead for service interventions and inspections.

Our algorithms can forecast the expected end of the crossing’s useful life under certain conditions, allowing

operators to prepare well in advance. This supports dynamic spare parts management, reducing the need to hold large stocks while ensuring components are ready exactly when required.

Data-driven maintenance is supported by our state-of-the-art and future-oriented zentrak Asset and Maintenance Software Platform.

Choosing the Right Partner for Digital Success

While not every segment is fully digitalised yet, the trend is clear – there’s no turning back. In the industry, buzzwords like artificial intelligence (AI) dominate headlines, but the real challenge is finding a partner who can deliver tangible value over the entire lifecycle of an asset.

Once the right partner is selected, trust in that choice and move forward with digitalisation and digitisation initiatives. Done well, these can significantly optimise reliability, availability, maintainability, safety and security – all while helping manage costs more effectively in today’s competitive environment.



Heinz Schatz
CTO Profit Center Signaling,
voestalpine Railway Systems GmbH

www.voestalpine.com/railway-systems



Find hazards fast with fiber.



LANDSLIDE



TREEFALL



ROCKFALL





Nature's Noises – Sounding Out Rail Safety

Hearing Climate Complaints and Calamity

Nature's forces of water and gravity combine to pose huge challenges to railway operations and resilience. Natural hazard threats such as rockfalls, landslides, washouts, avalanches, sink holes and even toppled trees lead to, at best, disrupted rail operations and financial loss. At worst, if unseen, these hazards can lead to tragic loss of life and environmental disaster. Climate-change compounds the rail-resilience challenge as extreme weather events escalate.

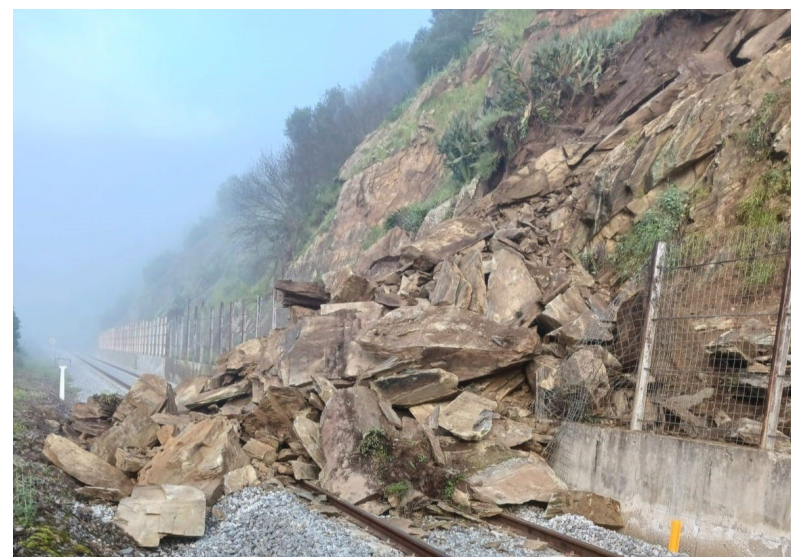
Ensuring the safety of railway users is essential, so our Sensonic team have pioneered a revolutionary approach to detecting natural and geohazards along railways that overcomes the limited reach and coverage of traditional sensors. Using Distributed Acoustic Sensing (DAS), we transform railway fibre optic infrastructure into an intelligent surveillance network listening out for track trouble.

The Sense in Sound: Hearing the Unseen

Distributed Acoustic Sensing, (DAS), is a technique to detect sound and ground vibrations via fibre optics. The technology uses light pulses and analyses the reflected light turning an optical fibre into a continuous acoustic sensor listening to entire rail routes. [Find more on how DAS technology works here.](#)

Each sensing device monitors up to 80 kilometres (50 miles) of track. That is around 1000 times the range of a standard CCTV camera and over 15,000 times the range of a tilt or pole sensor. The long-range reach is why the technology already excels in both pipeline monitoring and international border surveillance duties.

Advanced algorithms, powered by AI and machine learning, analyse vibration data in real-time to listen for natural hazards and alert teams when their characteristic vibrations are detected.



Real rockfalls detected and potential accidents averted

Threat Types



Rockfall: Falling rocks generate ground vibrations. Algorithms recognise the characteristic vibrations providing real-time geolocated alerts to enable operations teams to respond effectively.



Landslide: Ground vibrations from rapidly moving earth and tumbling materials are identified automatically by advanced algorithms. 24/7 alerts allow operations teams to prevent railway accidents and rolling stock damage.



Washout: Ground vibrations from tumbling ballast and fast flowing water show the potential during track trials to trigger real-time alarms for operations teams alerting them of compromised rail routes, avoiding a natural hazard becoming a rail disaster.



Object Drop: Accidents or structure failures above the railway can lead to falling debris obstructing track. Detecting the acoustic signatures of these object impacts, we allow operations staff to take appropriate action before trains arrive.

Many more natural hazard applications are possible pending development data. [Find more here](#) or [contact us](#) for development partnerships.

Listening and Looking

Knowing where, when and what natural hazard or geohazard threat is present is vital for rail operations teams. Combining DAS insight with other monitoring technologies can provide enhanced benefits. Integration with new or existing CCTV and the ability to trigger alerts in existing monitoring systems, cameras can be accessed and controlled near to sonically geolocated hazards. This allows rapid remote visual confirmation and enhanced situational awareness giving teams both eyes and ears on site remotely.

Outside the range of CCTV cameras, Sensonic DAS goes the extra mile too. Sensonic extends visual coverage by integrating DAS and drone capability together through selected partners. Drones are particularly useful for rapid response in remote, hazardous or difficult to access areas. As hazards are accurately geolocated with the DAS system, manned or fully autonomous drones can be dispatched to the incident location to gather more information via high-definition video. The use of lidar and thermal imaging allows hazards to be further monitored and assessed remotely before anyone puts a boot onto ballast.

Intelligent Investment in Responsive Railways

DAS technology provides a unique and intelligent solution for railways to rise to rising weather and climate challenges. Its ability to remotely detect natural hazards in real-time over vast lengths of rail infrastructure gives operations and maintenance teams an immensely powerful tool at their disposal.

Using often pre-existing fibre infrastructure, Sensonic can deliver a cost-effective and rapidly scalable natural hazard monitoring solution. There is no need to install, maintain and reset a forest of new lineside sensors, as a single monitoring unit can offer 80km of route protection. This elegantly simple yet powerful solution enhances railway safety, protecting passengers, personnel, freight and rolling stock from rockfalls, landslides and more.

Contact our Sensonic team to learn more about how listening to rail infrastructure simply makes sense, and how DAS can revolutionise your railway resilience responses.

[Email us here](#)

www.sensonic.com

cn-mobility

Dynamic Schedule: One Timetable, One Source of Truth

Developed with input from drivers and operators, Dynamic Schedule aims to replace outdated processes with a single, accessible timetable – improving safety, efficiency and the user experience, writes Wolfgang Schüttler, cn-mobility.

In this era of smart phones and AI, it seems archaic that train drivers are still having to pull information from a number of different sources to create a comprehensive, reliable operational timetable.

No single seamless timetable currently exists for them because the constructed network timetable is processed into various formats for specific uses. Instead, every piece of information must be painstakingly compiled from a number of up-to-date sources such as timetable books, speed restriction lists, diversion orders, operational notices and special instructions.

These may only be available in specific formats on certain devices – and in some cases only on paper – adding an unnecessary level of complexity and mental load to drivers' work. Operating a locomotive is highly demanding: there are countless rules, complex signalling systems and technical knowledge to master. That alone is a steep learning curve, and adding the burden of navigating and reconciling multiple sources of information only makes the role more daunting. In German, there's even a word for this overload: Zettelwirtschaft, meaning a jungle of documents. Yet with infrastructure managers facing little internal pressure to innovate, this vital workforce has been left to grapple with outdated information practices that don't reflect today's digital age.

Introducing the Dynamic Schedule

In response to this, cn-mobility developed its Dynamic Schedule solution, which brings together all the relevant information from these disparate sources in one complete schedule that is updated daily.

Our application helps remove this extra weight. Instead of spending time gathering and managing information, drivers can focus on what really matters: operating trains safely and effectively. With Dynamic Schedule, all operational scheduling data, such as speed restrictions, schedule directives, future digital commands and driving recommendations can be displayed in a single, unified interface via onboard devices or tablets. This eliminates the need for drivers to switch between multiple documents on the go, plus GNSS-based auto scrolling enables them to keep focused on the route.

No other independent solution currently exists that can combine all the necessary information into a single output format, and at present, every country or network tends to rely on its own approach.

From Local Lines to International Networks

In Germany, for example, Deutsche Bahn (DB) provides a digital timetable, but it only covers the basic schedule. Drivers still need to supplement this with additional documents often in separate formats. Some parts of DB have tried to develop their own tools to improve this, but these remain limited compared to what we offer.

Austrian Federal Railways (ÖBB) is also working on a digital solution, but it will only cover their network. Our

goal is very different: to create one unified application that works across networks and borders. With this in mind, Dynamic Schedule is aligned with European requirements from the Technical Specifications for Interoperability (TSI OPE). Imagine starting a journey in Munich and travelling to Vienna. Instead of piecing together multiple sources, the driver simply enters the train number in Munich and instantly receives a complete timetable covering both the German and Austrian legs of the trip. That's our vision: a single, borderless solution for interoperable train management.

But it's important to note that this isn't just about national networks. Alongside DB in Germany or ÖBB in Austria are many smaller regional and local infrastructure managers. They also publish timetables for their sections of track, and operators frequently cross from local networks onto national ones and back again. Our goal is to provide a single, seamless timetable that covers the entire journey – from a local branch line right through to a major national network, and across borders. That's the true vision of interoperability.

Construction Impacts Made Clear

Railway operators can also benefit from integrating Dynamic Schedule with their construction management timetable, which gives planners the ability to see which trains are affected, what routes are impacted, and how travel times will change. With this, they can adjust operations in advance – from scheduling to wagon allocations – based on accurate construction data.

When a driver enters a train number, the system automatically checks whether that service is affected by construction works. If it is, the construction timetable is retrieved and combined with the basic timetable and daily infrastructure notices, producing a single, complete output file.

From Pilot to Proven Solution

Dynamic Schedule was first introduced to the industry as a prototype at InnoTrans 2022 and the system has been live since June 2025 with Arverio Deutschland. This followed an extensive two-year pilot phase with





TX Logistik, Rail Cargo Carrier - Germany GmbH, RBH Logistics and Trans Regio Deutsche Regionalbahn. During that time, roughly 50 drivers tested the software, provided feedback and helped us refine it through multiple new releases. This process made the solution safer, more stable and better aligned with operational needs.

Because the application handles critical safety data – such as maximum speed limits – every new function had to be carefully assessed and rigorously tested. It isn't as simple as adding features; each update must be validated to ensure compliance and safety integrity. This is safety-relevant software, and it must stand up to deep technical scrutiny.

To date, the feedback from both rail companies and drivers has been extremely positive. Even in the pilot phase, when the software was still incomplete, drivers were eager to use it. They told us it was already better than their existing solutions, because they had a single point of truth. That, in their words, was a game changer: it simplified daily work, reduced the mental load, and made the job easier and more intuitive.

Driving the Future of Timetabling

Having rolled out Dynamic Schedule for DB InfraGO's network, we're now implementing it with ÖBB's ZFM Interface to extend coverage to the Austrian network. A proof of concept is complete, and the next step is full integration into our application.

We're also exploring other countries, including the Czech Republic and Switzerland, but our plans don't end there. Looking further ahead, the next evolution will be to bring timetables directly from mobile devices back into the on-board driver display.

For more information visit cn-mobility.eu/en

cn  **mobility**

MAXIMISE YOUR CP7

BUDGET WHILST IMPROVING RELIABILITY

Proven Tier 1
monitoring technology
supporting rail
operators since 2018

Looking for smarter ways to stretch your CP7 budget and boost network reliability? Discover how **CableGuardian** can help you do both.

Our comprehensive business case outlines the full operational, financial, and safety impacts of implementing **CableGuardian** across systems. Supporting Asset Managers, Maintenance and Project Teams in making the case for smarter, safer, and more sustainable rail power management.

CableGuardian's Network Rail-approved monitoring system empowers you to make smarter investment decisions by enabling targeted replacement based on real-time asset condition. Through continuous, proactive diagnostics, it not only detects sudden faults in live signalling systems, but also provides early warning of gradual degradation, helping to minimise unplanned disruptions.

Inside the business case, you'll learn how CableGuardian can:

- Cut unnecessary CAPEX ✓
- Reduce maintenance by up to 80% ✓
- Boost safety & lower intervention risk ✓
- Support CP7 KPIs ✓
- Plan smarter with real-time data ✓



Making the case for...

**CABLE
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Visit our website to read the **business case**
www.viperinnovations.com/cableguardian



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Data & Monitoring



VIPER INNOVATIONS

From Disruption to Direction: What CP7 Tells Us About the Future of Rail Innovation

Earlier this year, industry leaders, technologists, strategists and stakeholders gathered together to explore how CP7 can maximise opportunities for innovation and performance.

The conversations reflected the pressing issues facing UK rail today – from operational pain points to the promise of digital transformation – and provided a valuable snapshot of where the industry is heading next.

Viper Innovations was part of those discussions, with Divisional Manager (Rail UK) Peter Alexander contributing to a panel on how innovation can drive performance and revenue growth.

Operational Challenges and Technical Solutions

Supported by the Rail Forum, the Chartered Institute of Rail Operators (CIRO), the Rail Delivery Group and the Institution of Engineering and Technology (IET), these discussions brought together voices from across the rail ecosystem, underscoring their significance. Some of the most notable contributions included:

- Albert Porter (Network Rail) highlighted how poor train performance disrupts infrastructure operations, increasing wear and tear and limiting access for maintenance.
- Gareth Evans (Network Rail) laid out CP7's RD&I roadmap – over £250m in funding, targeting

emissions cuts, delay reductions and freight growth.

- James Connolly (eviFile) made the case for digital transformation, citing siloed data, poor visibility and manual processes as barriers to efficiency.
- Jason Wade (Northern) shared sobering stats on delay impacts – emotional, financial and reputational – with over half of surveyed passengers reporting effects beyond just lost time.
- Luisa Moio (RSSB) introduced the Rail Technical Strategy (RTS), a framework for system-wide innovation, from low-emission operations to freight-friendly infrastructure.

Together, these perspectives painted a consistent picture: the UK rail industry faces structural challenges, but it also has clear opportunities to address them through coordinated, technically driven approaches.

As Peter Alexander noted: “Operational problems are driving the need for smarter, more resilient technical solutions.”

Innovation as a Revenue Strategy

A key shift in mindset is emerging: operations are increasingly being seen not just as a cost centre, but as a significant and reliable revenue enabler. However, unlocking that potential depends on addressing new and sometimes unexpected failure modes.

Peter explains: “We’re seeing issues we hadn’t considered before. Like freight damage from vegetation on diversion routes, or the cost of lift failures requiring

disabled passengers to be rerouted and bussed back – all of which add up.”

This strengthens the case for technologies such as CableGuardian, which helps prevent outages in 650V signalling power supplies. Viper’s ongoing investment in AI and machine learning aims to extract even more actionable insights from data captured across rail infrastructure.

But innovation requires consistency. As Peter observed: *“Rail spending has been inconsistent, and SMEs are feeling the strain. For innovation to thrive, we need continuity – not fits and starts.”*

Looking Ahead: What Comes Next

With the emergence of Great British Railways (GBR) and GBRX, operators are gaining more influence over technical solutions. This could be a turning point if the industry establishes the right framework. The next phase should focus on:

- Creating innovation pathways that reduce cost and risk

- Building business cases that link operational improvements to revenue
- Ensuring funding consistency, especially for SMEs
- Leveraging data for predictive maintenance and smarter decision-making

Peter summarises: “Improving operations and reducing failures means more passengers and freight, which means more revenue, more investment and fewer failures – a virtuous circle.”

CP7 offers the chance to fundamentally rethink how the rail industry innovates, funds and measures success. Viper Innovations is committed to being part of that journey – not only through the delivery of advanced technologies, but also by providing thought leadership that challenges the status quo and helps the industry build a more resilient, efficient and future-focused network.

Because when the trains run reliably, everyone wins – passengers, freight, operators and the planet.

For more information visit our website www.viperinnovations.com.



Helping passengers arrive on time.

Viper's CableGuardian portal and monitoring unit delivering real-time cable condition insights

 **VIPER INNOVATIONS®**

Transmission Dynamics

Trains with Brains[®]: Real-Time Intelligence for Safer, Smarter Rail Operations

The rail industry faces increasing pressure with passenger and freight demand rising, tighter timetables and reduced possession opportunities.

Much of today's network relies on life-extended assets working alongside modern builds, resulting in highly variable performance across routes and fleets. At the same time, climate variability is amplifying seasonal stresses: heat, icing, wind and vegetation drive seasonal fault patterns that periodic inspections often miss.

Traditional inspection regimes are no longer enough. Static or interval-based inspections are labour and cost-intensive and often miss emerging faults that only occur under dynamic interactions. Many failures give little or no warning until they have escalated into service-disrupting incidents. Workforce constraints and safety reinforce the need to only do the work that matters, exactly where it matters, with less time on track.

What is needed now is a shift in approach: away from periodic checks and delayed reporting, towards continuous, in-service monitoring that delivers real-time visibility of the whole system. Railways need real-time fault detection that is precise, fast and actionable — ensuring interventions are made exactly where and when they are required.

Trains with Brains[®]

Transmission Dynamics is trusted by global rail operators seeking turnkey solutions to these challenges. Our expanding Trains with Brains[®] portfolio is the industry's answer — client-driven, proven

approaches to real-time monitoring and predictive maintenance. By equipping routinely operating passenger and freight fleets with advanced, train-borne sensors and edge-processed AI analytics, we transform them into intelligent, continuous, mobile inspection platforms.

With Trains with Brains[®], every passenger or freight journey doubles as an inspection run. Our edge processing based systems detect and report faults within minutes, enabling targeted maintenance at precise GPS locations, and reducing unnecessary manual inspections. AI insights feed directly into operational control systems, helping teams avoid escalation of identified faults, adjust schedules or reroute services to maintain reliability.

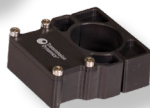
The result is a fundamental shift from reactive, calendar-based maintenance to predictive, data-driven decision-making. For operators, this means fewer unplanned disruptions, safer working practices, reduced time on track, and significant savings across asset life cycles.

OLE Reliability: Continuous Monitoring at Scale

Overhead line equipment (OLE) is central to reliability on electrified routes, yet traditional approaches rely on periodic inspections or dedicated measurement runs. PANDAS-V[®] changes this by inspecting the pantograph-OLE interface continuously during normal service and covering hundreds of kilometres each day without taking capacity out of the timetable. A roof-mounted camera system is synchronised with a pantograph-mounted wireless accelerometer, capturing



PANDAS-V camera & wireless accelerometer



and reporting impacts at precise locations. AI analytics recognise and contextualise events such as carbon-strip chip initiation and progression, repetitive impact locations, arcing, pantograph height and wire stagger deviations, dropper-related anomalies and foliage proximity. Detection events are reported quickly, typically within minutes, so resources are directed exactly where they are needed, and repairs are targeted and fast.

Track Integrity: Detecting Issues before They Escalate

Points, crossings and rail joints are among the highest-stress elements of the railway network. Failures here can have immediate and serious consequences.

RailBug, a compact wireless sensor, automatically detects joint integrity issues in fishplates and clamps. It attaches magnetically in minutes and requires no bolt instrumentation or preload interference. Activated dynamically by passing trains, it captures inertial signatures that reveal loosening or structural changes over time.

Combined with PANDAS-X, our high-definition, video-based track diagnostics that provide continuous track



RailBug



imaging to detect alignment changes, defects and debris, operators gain early warning and precise fault location. This allows targeted interventions, improves safety and keeps networks running reliably despite the tough operating conditions.

Rolling Stock and Freight: Fleet-Wide Intelligence

Condition monitoring cannot stop at infrastructure – rolling stock and freight are equally critical to performance and safety.

Our AI-powered solutions, including SmartBug®, Smart Oil Plug®, and the HIVE Cargo Gateway, continuously collect data on vibration, temperature and other performance indicators while vehicles are in service. AI analytics detect early warning signs from wheel and track interface issues such as wheel flats, rolling contact fatigue and polygonisation, to component health including bearing degradation, gearbox wear and out-of-balance conditions.

By analysing this data across entire fleets, operators can quickly identify outlier vehicles and recurring problems, reducing risk of escalating failures. Predictive maintenance strategies become achievable: parts are replaced when required, not simply on schedule. This extends component life, minimises depot downtime, improves fleet availability and lowers lifecycle costs.

A Complete, AI-Driven Monitoring Portfolio

From overhead lines to track, rolling stock and freight, Transmission Dynamics delivers a full suite of monitoring solutions that embed intelligence directly into the railway system. With Trains with Brains®, every journey becomes a source of actionable insights. The impact is tangible: fewer service disruptions, improved safety for the workforce, more efficient use of maintenance resources and networks that remain resilient under increasing demand.

Transmission Dynamics is redefining the future of global rail by providing the intelligence needed to operate safely, efficiently and with confidence.

www.transmissiondynamics.com

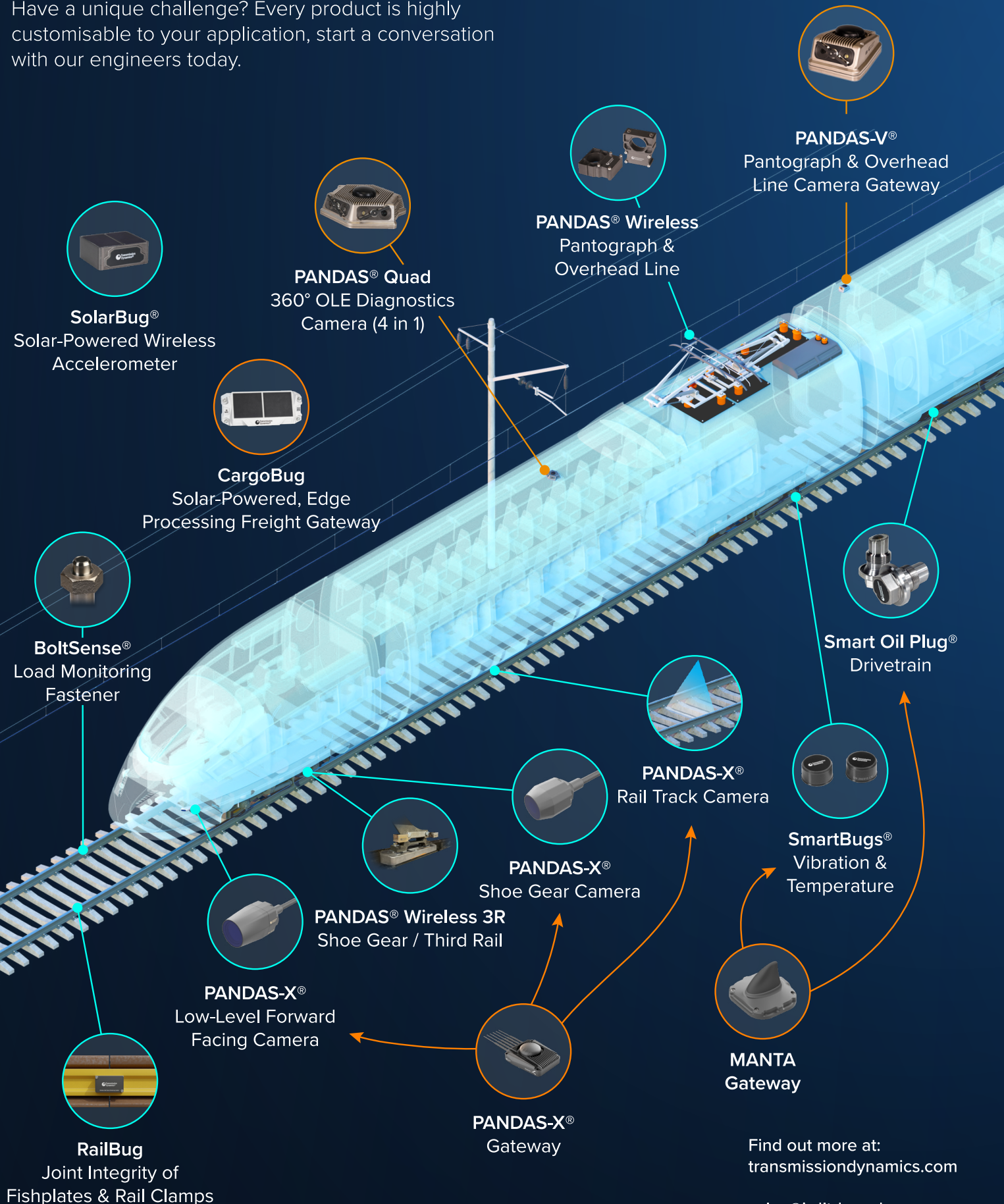


Trains with Brains®



The complete, AI-driven monitoring portfolio redefining the future of rail networks globally

Have a unique challenge? Every product is highly customisable to your application, start a conversation with our engineers today.



Find out more at:
transmissiondynamics.com

sales@jrdltd.co.uk
+44(0) 191 58 000 58



Delivering Cutting-Edge Remote Condition Monitoring Solutions Across the Rail Industry

Born out of two decades of research at the Birmingham Centre for Railway Research and Education (BCRRE), MoniRail is a pioneering rail technology company bridging the gap between academic innovation and industry needs.

Their mission: to enhance maintenance strategies and improve network reliability through advanced condition monitoring systems.

Using sensors installed on in-service trains, MoniRail provides a non-intrusive method of monitoring track condition and degradation. These sensors collect ride quality data and detect both train- and track-related faults in real time.

Introducing MoniRail

MoniRail is founded on over 20 years of research into low-cost, vehicle-mounted sensor systems designed to measure track geometry and ride quality. Following the development of an initial prototype – successfully tested on an operational passenger train – MoniRail is now focused on commercialising the technology and its data analytics platform.

The core objective is to deliver a commercially robust solution that continuously monitors both track and train conditions. By detecting and identifying performance issues early, the system empowers train operators and infrastructure managers to make informed decisions about maintenance and investment, reducing downtime and improving safety.

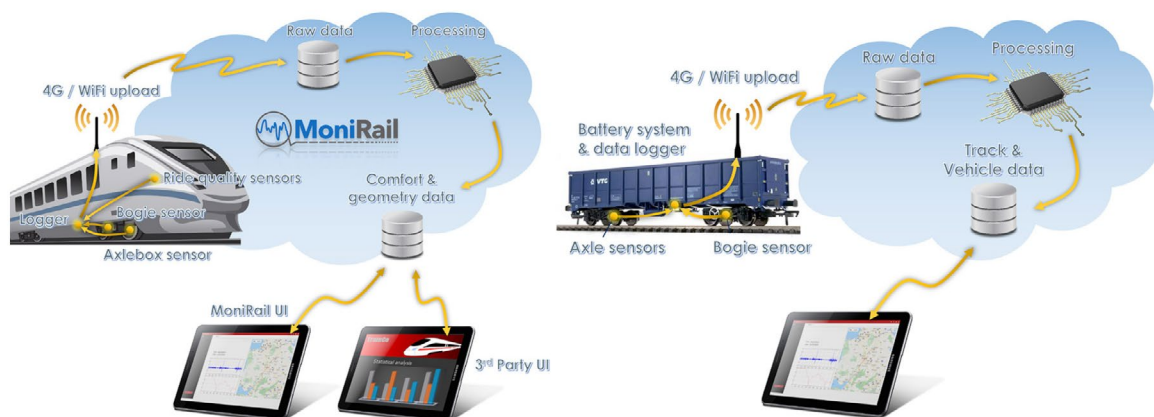
How the System Works

The MoniRail system collects data via onboard sensors, which is then processed and visualised through its proprietary analytics platform. This transforms raw sensor data into actionable insights, helping customers predict potential failures and better understand the evolving condition of their assets.

With this continuous monitoring and early fault detection capability, MoniRail enables proactive maintenance planning – saving time, reducing costs and minimising disruption.

Since its inception, the MoniRail team has worked to make a meaningful impact on the rail industry through the power of applied research and technology.

Click [here](#) to learn more about MoniRail's work.





In-service track and ride quality monitoring

Non-intrusive track and train monitoring based on 20 years of academic research from the University of Birmingham, the MoniRail solution harnesses advanced vehicle-mounted sensor technology to deliver insights into track geometry and ride quality, enabling continuous monitoring and predictive maintenance.



Improves Efficiency

The integrated hardware and software solution supports continual data analysis, helping to improve performance and reduce maintenance costs.



Fits Fast, Built to Last

Designed for easy installation and low-maintenance, the solution monitors track conditions in real time without disrupting daily operations.



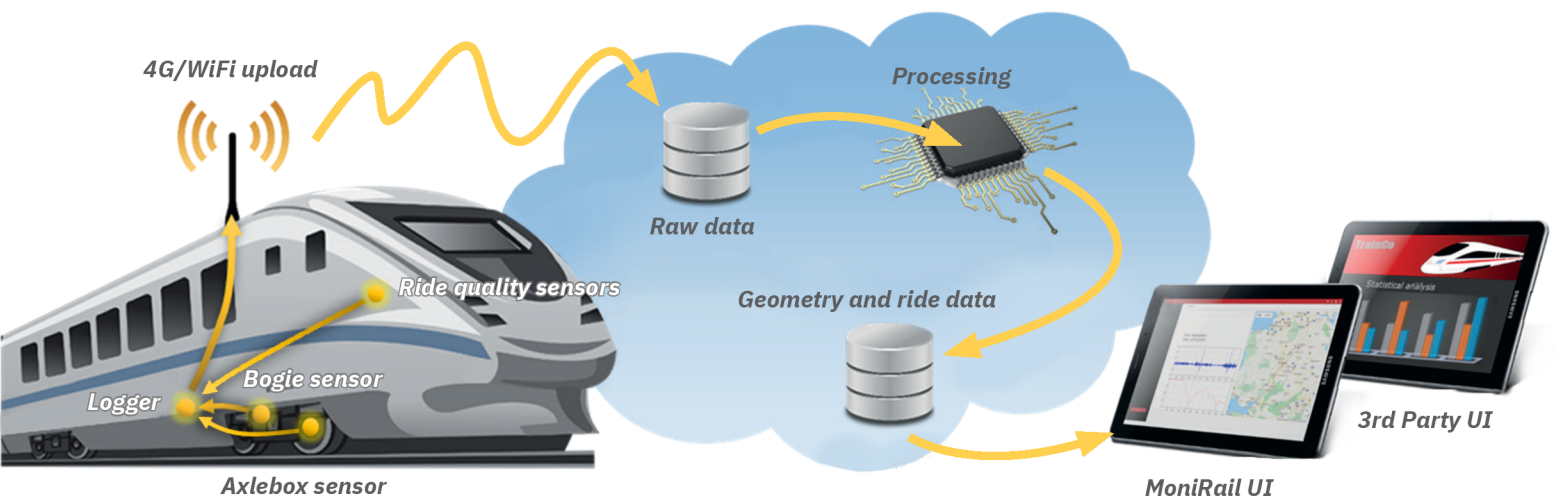
Real-Time Data

Processed sensor data delivers accurate track condition and vehicle performance data combined with accurate position information.



Predictive Maintenance

MoniRail empowers railway operators to undertake predictive maintenance, by providing early detection of potential issues. Ensuring the longevity of rail assets and enhancing ride quality.





The MoniRail system

The MoniRail system consists of two parts: software and hardware. The MoniRail hardware provides a modular solution that includes inertial measurement units on the body, with additional bogie and axlebox vibration sensors to extend the monitoring capabilities depending upon the measurement requirements.

The data from the sensors, combined with an accurate positioning system, is transferred to Azure storage via a 4G connection. Within the cloud, the track and vehicle response data are processed. All data passes through the vehicle body logger system before being transferred to secure cloud storage. The processed data and analyses can then be accessed through a web-based portal that displays track and ride information using a range of parameters.

MoniRail also has access to APIs that allow third-party visualisation platforms to retrieve the data. These datasets can be aligned with data from other track geometry monitoring systems and track recording vehicles. In addition, the system can pinpoint driver-reported rough rides with accuracy to the nearest metre.



Ride quality - rough ride

Pseudo track geometry

Hunting detection

Suspension performance



Sub-metre track/rail issues

Wear and impact

Axlebearing monitoring



Track geometry measurements

Bogie instability checks

Track degradation

Ride quality - rough ride

Pseudo track geometry

Hunting detection

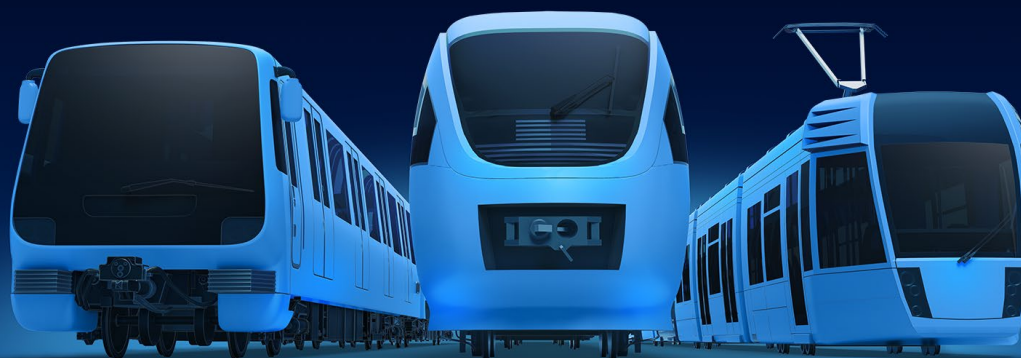
Suspension performance



ZF Friedrichshafen AG

Over a Century on Track: Railway Technology by ZF

100 years on track: ever since it entered the railway technology business in 1924, ZF has supported the industry in their trajectory towards the future – with better, safer and more reliable products



Since the adaptation of the TS18.5 Soden transmission for railcars in 1924, ZF has been driving innovation in railway technology.

What began as a pioneering step in Friedrichshafen, Germany, has evolved into a global success story. Over the decades, ZF has grown into one of the world's leading technology groups, becoming also a preferred partner for rail vehicle manufacturers and transport associations worldwide. Today, ZF's rail solutions are synonymous with proven reliability, efficiency and forward-thinking engineering.

At the heart of ZF's success lies its core strength: technology transfer. From its earliest days, ZF has leveraged innovations across its vast and diverse portfolio – automotive, agriculture, construction and even wind energy – to enrich its rail offerings. This

cross-sector synergy allows ZF to deliver solutions tailored to the unique demands of rail transport. Rail companies benefit from this approach through access to proven technologies produced at scale, even for niche applications.

Impressive Innovations, Extensive Portfolio

Over the course of the decades, ZF has bolstered its portfolio by strategic acquisitions. As a result, the rail technology segment of the ZF Group has grown into an overall supplier of driveline, chassis and safety technology for a wide range of rail vehicles. Whether you are looking at metros, trams, electric multiple units, high-speed trains, diesel multiple units, locomotives or special vehicles – chances are, if it's running on tracks, it does so with the help of ZF components.

ZF Rail: Keeping the world on track



From trams and metros in major cities across the world to high-speed trains that connect Britain to mainland Europe – it does so with the help of ZF technology

fault signatures such as flat spots or cracks. For track monitoring, ZF employs AI-based pattern recognition that continuously learns from historical data and feedback, improving its accuracy over time.

With connect@rail, ZF combines its expertise in sensor technology, cloud computing and digitalisation to create a user-friendly platform that enables condition-based maintenance planning for vehicles and rail networks

From Data to Decisions: Tangible Benefits for Operators

The result? A system that not only detects faults early but also helps operators plan maintenance more efficiently, reduce downtime, and extend asset lifecycles. The connect@rail dashboard serves as a central hub, visualising all relevant data in a user-friendly interface. Operators can manage alerts, track maintenance history and even integrate third-party monitoring solutions – all within one platform.

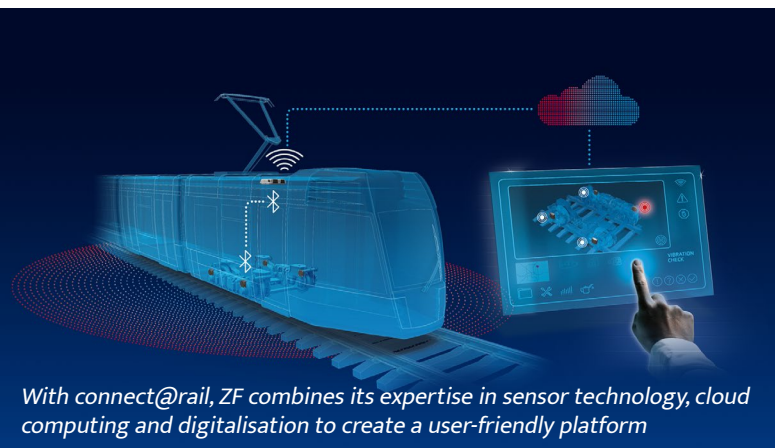
Thanks to its modularity and OTA (over-the-air) update capability, connect@rail is future-ready. It can be retrofitted to existing fleets with minimal effort and is compatible with all common vehicle types – from trams to highspeed trains. Even underground systems like subways are being considered, with pilot projects underway to overcome GPS-related challenges.

With connect@rail, ZF empowers rail operators to move from reactive to proactive maintenance strategies. It's a key enabler for the digital transformation of rail transport – and a testament to ZF's commitment to innovation, reliability and sustainability.

Digital Intelligence on Track: connect@rail

In an era where rail transport must be smarter, safer and more sustainable, ZF's connect@rail platform sets new standards in digital condition monitoring. Originally launched in 2018, connect@rail has evolved into a modular, scalable system that enables predictive maintenance for both rail vehicles and infrastructure. At its core, connect@rail combines ZF's expertise in sensor technology, telematics, cloud computing and data analytics. The system uses robust wireless sensors – known as Heavy Duty TAGs – to monitor vibrations and accelerations at the wheel-rail interface. These sensors detect anomalies that may indicate damage to wheels or tracks, and transmit the data via VCU Pro Onboard Units, ZF's powerful telematics gateways adapted from commercial vehicle applications.

Once in the cloud, the data is analysed using tailored algorithms. For wheel monitoring, connect@rail uses damage-specific crawlers to identify typical



With connect@rail, ZF combines its expertise in sensor technology, cloud computing and digitalisation to create a user-friendly platform



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Your next connection: connect@rail

The intelligent condition monitoring system connect@rail demonstrates how integrated sensors and advanced data analysis tools can further improve efficiency, reliability and safety in rail transport.



For more information please visit
www.zf.com/connect-at-rail



Bender

Trusted on the Rails, Built to Last

By Gareth Brunton, Bender UK

When signal power fails, everything grinds to a halt.

In rail infrastructure, specification decisions determine whether systems prevent problems or create them which directly impacts safety, service reliability and the professional standing of decision-makers.

For those managing long term infrastructure lifecycles, monitoring system investments must deliver proven value while preventing costly reactive maintenance that impacts strained budgets and service quality.

The stakes are high. A single undetected earth fault can lead to service disruption, passenger delays and penalties reaching thousands of pounds per incident. Traditional reactive approaches such as waiting for faults to occur before responding no longer meets the sector's operational or financial demands.

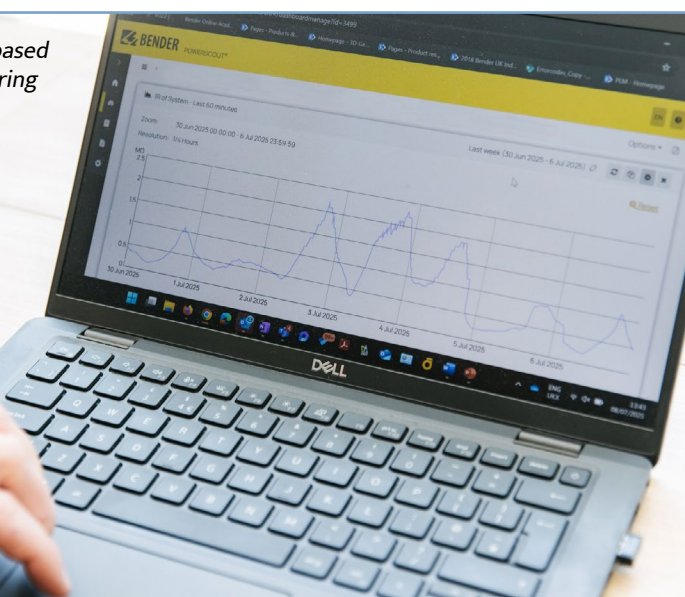
This is why over 200 Bender **RS4 systems** monitor critical signal power systems across the UK rail network, building on the 1,300 previous generation systems already deployed – Bender estimates to protect up to 90% of the UK's signal power monitoring market. From the Wessex route to East West Rail, from Transport for Wales to Network Rail's core infrastructure, it is an authority that has not been built on clever marketing promises – but earned through two decades of engineering heritage, precision and operational reliability that continues to address the underlying challenges that define success.

Pressure Points Across the Network

The railway sector faces relentless operational demands. **As the UK rail network marks its 200th anniversary in 2025**, ageing assets are highlighted as an acute challenge for the industry with much of the UK's infrastructure dating back to the mid-18th century. This ageing infrastructure demands increasingly sophisticated monitoring to prevent cascading failures, which result in millions of pounds in delay compensation and operational disruption.

Network Rail's prohibition of red zone working means every trackside intervention requires costly possession windows, often pushing maintenance into expensive night shifts. Delay minute penalties can be costly, while safety protocols demand that 'boots on ballast' become the exception, not the rule.

Infrastructure owners need systems that provide advanced warning of potential faults arising, reducing disruption and allowing informed decisions to keep routes operational, rather than simply detecting them. These tools must provide remote visibility without



Cloud-based monitoring

requiring engineers to stand trackside with handheld test equipment. The traditional reactive maintenance approach and scheduled cable testing are no longer an option.

Strategic Monitoring Approach

Bender's RS4 solution addresses these pressures through three distinct monitoring levels, each engineered for specific contexts. The entry-level solution has served as the industry benchmark for fifteen years, delivering fundamental monitoring capabilities that have transformed rail diagnostics from reactive to predictive.

The enhanced monitoring tier has now emerged as the de-facto national standard, offering superior system visibility and diagnostic precision for a reasonable cost increase. Network Rail's commitment to upgrading hundreds of systems to this enhanced technology across most routes reflects the optimal balance of capability and value.

The most advanced installations target high-traffic corridors where delay minute penalties justify premium investment. These systems provide the most granular monitoring available including:

- Separate monitoring of switchgear and cables
- Unmatched diagnostic precision
- Real-time fault assessment capabilities

More than 1,500 RS solutions operate across the UK, spanning entry-level through to the most advanced monitoring installations. This deployment reflects the sector's strategic approach to monitoring investment.

Precision in Practice

RS4 moves away from standard monitoring into precise fault location – a capability that sets it apart in the market. Core-to-earth faults represent most signal power failures, and the system remains the only solution on the market capable of accurately pinpointing these faults with a combination of fixed and handheld solutions.

Success stories have emerged from York, Nottingham and St Pancras, where systems have proactively detected developing faults and prevented service disruptions. RS4 monitors continuously without

disrupting railway operations. Teams install systems without requiring power disconnection, meaning diagnostic capability improves without risk.

Remote reconfiguration capabilities further reduce trackside interventions. Power system adjustments that previously required possession windows and on-site engineering can now be managed from control centres, streamlining operations while maintaining safety protocols.

Lifecycle Mathematics

The financial case for advanced monitoring extends well beyond initial procurement costs. A client's RS4 business case demonstrates this clearly – an investment of just over £1million would achieve a £4.8 million return, achieving calculated payback within five years while providing a twenty-year service lifespan. Multiple sources drive these returns – reduced possession costs, delay penalties avoided, predictive maintenance scheduling and emergency responses eliminated.

Our transparent pricing model removes the uncertainty and overhead that plagues many technology investments. Hardware costs, cloud services and ongoing support are declared upfront, with no hidden licensing fees or unexpected charges emerging over the system's lifecycle. This clarity enables accurate lifecycle costing and confident capital planning.

Engineering Transparency

For engineers specifying critical rail infrastructure, system transparency and technical openness matter as much as performance specifications. Our team at Bender provides complete documentation, open system architecture and direct access to the principles underlying RS4 operation.

This is not a black-box-approach where proprietary algorithms remain hidden behind marketing claims. Engineers can understand exactly how the system functions, how it reaches its diagnostic conclusions and how it integrates with existing infrastructure. The methodology is proven through two decades of field operation, not theoretical modelling.

Technical support comes directly from the engineering team responsible for system development, ensuring



Rail signal power monitoring

Sustainable Infrastructure and Expanded Monitoring

Rail infrastructure investments must deliver decades of reliable service while adapting to evolving operational demands. RS4's modular architecture and remote update capabilities ensure systems remain current without requiring replacement hardware.

This approach aligns with broader sustainability objectives, extending asset life through intelligent monitoring rather than frequent replacement cycles. Predictive maintenance scheduling reduces unnecessary interventions while targeted repairs prevent those smaller issues escalating into major failures.

RS4's modular architecture extends beyond signal power monitoring to cover a comprehensive range of infrastructure components. The system's unique structure enables monitoring of multifunction meters, temperature and humidity sensors, UPS systems, and other critical infrastructure elements. This expanded monitoring capability provides infrastructure owners with a unified view of their critical systems, reducing the need for multiple monitoring platforms while enhancing both overall network visibility and maintenance planning.

The platform's energy efficiency and compact footprint minimise operational environmental impact while its remote capabilities reduce the carbon footprint associated with maintenance travel and trackside working.

In a sector where certainty matters, Bender has been the trusted partner for decades – and remains the reliable choice for a smarter, safer, more sustainable rail future.

that queries receive authoritative responses rather than scripted support desk interactions. This direct technical communication builds the professional confidence essential when specifying safety-critical systems.

Partnership Continuity

Over 1,500 Bender systems now operate across rail networks, with many installations approaching or exceeding their second decade of service. This operational longevity reflects both robust engineering and ongoing manufacturer support – systems don't become orphaned when newer technologies emerge. The RS4 evolution continues through regular updates and capability enhancements, meaning today's investment remains relevant throughout its operational life. Many of our rail customers maintain active service contracts precisely because Bender delivers sustained support rather than install-and-abandon relationships.

This continuity matters especially for infrastructure assets with twenty-year-plus operational lives. Partners need confidence that today's monitoring investment will receive support, updates and technical assistance throughout its service period, not just during the initial warranty phase.

Gareth Brunton, Managing Director, Bender UK

www.bender-uk.com





Nomad Digital

connected transport, intelligent solutions

How Can the Digitalisation of Rail Services Shape the Passenger Journey Experience?

The Role of Digitalisation in Rail – A Q&A with Monika Singh, Product Manager at Nomad Digital

Digitalisation is evolving so quickly across every industry, and transport is no exception. If we look back at cars 10 years ago, they were mostly mechanical with very little digital support.

Now, cars come with built-in GPS, entertainment systems and a lot of digital conveniences that passengers simply expect. Rail has traditionally moved more slowly, but I believe now is the right moment for operators to embrace digitalisation and truly enhance the passenger experience.

Connectivity: The Foundation of Digital Rail Services

Connectivity is the foundation. Without **stable connectivity** real-time information won't work. Companies like Nomad Digital provide that infrastructure so operators can build on top of it, offering reliable journey updates, real-time information and **passenger digital services catalogues**.

For me personally, this is very important. When I first came to Germany and didn't know the language, I was always anxious about whether I'd get off at the right station. I'd constantly be peeking out the window to check. Even today, the first thing I look for when I enter a train is the **passenger information screen**. When it shows me the next stop, the final destination and confirms the train number, I feel so much more relaxed.

That confidence, that you're in the right place and will arrive where you intend to go, comes from digitalisation. And that has completely transformed the passenger experience in recent years.

Q: How can train operators attract more passengers to rail travel and offer a stress free, comfortable journey?

MS: Operators today face more competition than ever before – not just from other rail companies, but also from cars, buses and even planes. Travel options are becoming more affordable and accessible, so rail needs to actively compete by offering a superior experience.

That means catering to different types of passengers: daily commuters, business travellers, families and tourists. Each has different expectations.

Commuters and business travellers value reliability, punctuality and connectivity. If they can check their emails on board and arrive at the office already having done their first round of work, that's a huge time saver and incentive.

Families with children have very different needs. As a parent myself, I know how hard it can be to plan travel with children. But on trains, you already have toilets, café cars and space to move around. If on top of that, you provide **entertainment services** with cartoons, games or digital catalogues, then children stay engaged and parents can relax with a newspaper or a movie. That makes rail travel the easier choice compared to a long car ride.

The Importance of Embracing Advanced Rail Technologies

Tourists often want clear, reliable information, especially if they don't speak the local language of where they are traveling. Digital journey updates can provide passengers with the confidence they need to travel stress-free.

By tailoring services to these passengers and using digitalisation smartly, operators can make rail the most attractive option for all passengers.

Future Trends in Rail Passenger Experience

Q: Why is it important for train operators to adapt with the latest technology and new advanced digital solutions?

MS: The simple answer is: if they don't, they'll fall behind. Cars, planes and buses are all adopting new technology quickly and rail needs to keep pace.

But it's not only about competition, it's also about growth. Operators' business models will depend on getting more passengers on board, and that means creating better, more seamless journeys. Yes, this involves comfortable seating, good on-board facilities and cafés. But it also means accessibility.

For passengers with accessibility requirements, reliable digital information is crucial. Access to information such as whether a station has a lift, whether a platform is accessible and where exactly in the train their reserved seat is, can help passengers plan their journey and make it comfortable and enjoyable. This applies not

just during the journey, but before it as well. Imagine being able to check at home: "My train is delayed 45 minutes, so I don't need to rush to the station." That level of transparency and reliability can make rail travel comfortable and attractive for everyone.

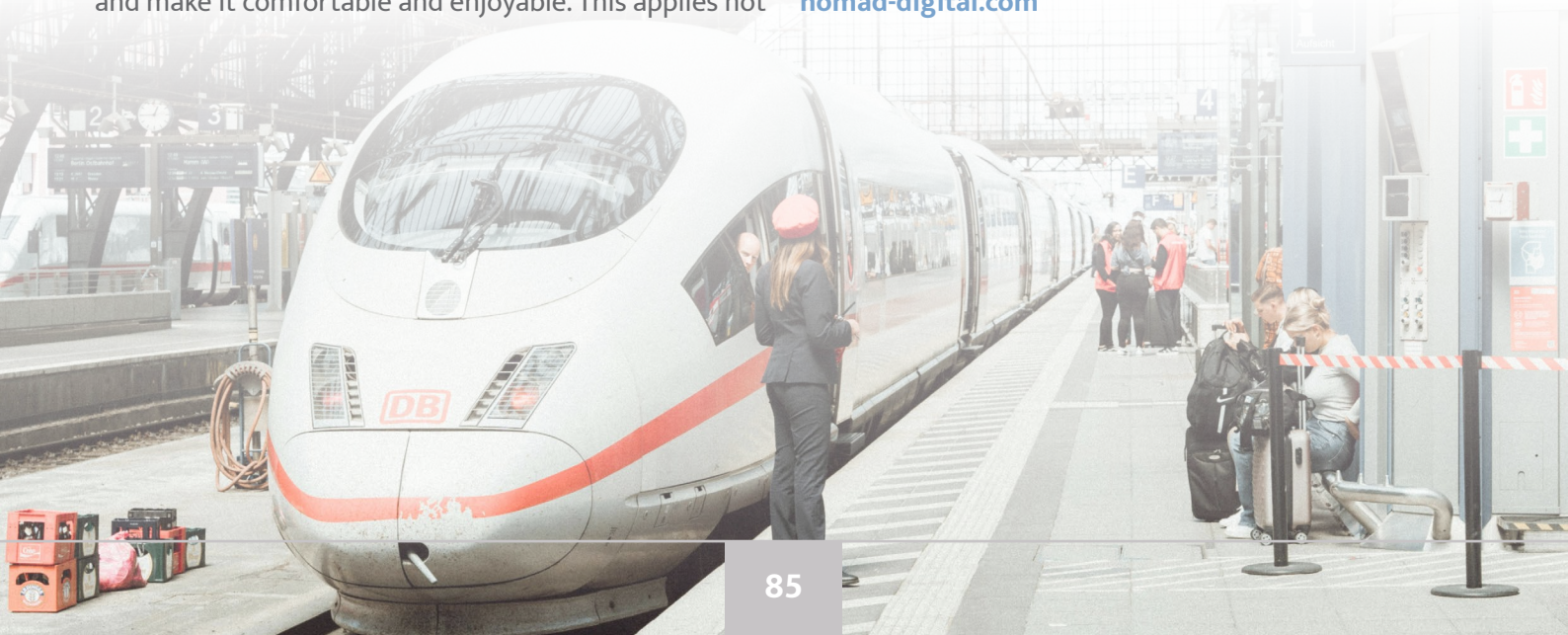
Q: What does the future of passenger experiences look like when travelling by rail?

MS: Right now, most digital services focus on the time passengers spend on the train. But in the near future, I see things evolving into true door-to-door digital travel experiences. Passengers will be able to plan their entire journey seamlessly, from home to their destination, with reliable real-time updates along the way.

Today, we still don't fully trust digital delay notifications, we'd rather go to the platform on time just in case. But as data becomes more accurate and reliable, people will feel comfortable adjusting their schedules confidently.

AI will play a key role in transforming the passenger experience. Picture intelligent digital assistants that provide real-time support, helping travellers locate available seats, managing the flow of people through the train, or guiding passengers with accessibility requirements directly to the right carriage, in line with the EU Web Accessibility Directive based on WCAG (Web Content Accessibility Guidelines) standards. These systems will make journeys smoother, more personalised, and far more comfortable. In short, the future of rail travel is about combining physical infrastructure with advanced digital solutions, giving every passenger confidence, comfort and convenience from start to finish.

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AI-POWERED RAILCAR INSPECTION

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AI Efficiency - Always One Step Ahead in Railcar Intelligence!

Over 6,000 train accidents occurred in the past 6 years in the United States.

Duos Technologies is redefining the future of railcar inspection and safety through the power of AI efficiency. By combining AI-driven analysis with expert human oversight, we ensure inspections are faster, safer and more reliable than ever before. From reducing derailment and accident risks and cutting yard dwell times to enhancing border security and spotting unauthorised riders, our AI solutions keep rail operations moving smarter, safer and one step ahead.

Duos Railcar Inspection Portal (RIP®) offers comprehensive remote visual inspection of railcars aided by the power of advanced artificial intelligence and machine learning (AI/ML) algorithms.

Railcar Inspection Portal (RIP®)

Railcar Inspections Made Easy

The Railcar Inspection Portal (RIP®) from Duos Technologies is an advanced, AI-enabled imaging system captures high-resolution images of railcars traveling at track speed (to 125mph+), producing a comprehensive 360-degree view of each railcar – including the top, sides, and undercarriage.

With its streamlined, intuitive interface, the RIP® empowers inspectors to review railcars in detail, perform thorough assessments and complete inspections faster than ever before.

Optional artificial intelligence (AI) detection capabilities take inspections to the next level by automatically identifying a wide range of potential

defects. Professionally developed AI models highlight areas of concern, issuing alerts and notifications directly to inspectors. By focusing attention on specific issues in real time, the RIP® significantly reduces inspection time while increasing accuracy.

With a track record of success, Duos Technologies' Railcar Inspection Portal is setting a new standard for how railroads conduct inspections in the digital age.

Features/Benefits

- Modular, customisable turnkey system
- Enhances safety for employees, shippers, the traveling public and enforcement personnel
- Reduces risk through derailment prevention and operational reliability
- Boosts network fluidity by cutting line-of-road delays and yard dwell time
- Maximises fleet utilisation and efficiency
- Strengthens security at borders and checkpoints by detecting illegal, unauthorised riders, concealed cargo and other hidden threats
- Proven performance: US Class I rail company benchmark study showed it is 8x more effective than manual inspection alone

Expert AI- The Duos Difference

CENTRACO® + AI I Data Analysis

Who couldn't use a little help now and then?

The RIP® features a set of over forty (and growing) expertly crafted artificial intelligence/machine learning (AI/ML) models that offer just that. As the RIP® captures high-resolution images, our AI models anomalies or defects on the railcars. Detected defects are immediately reported in the CENTRACO®.



CENTRACO® is Duos Technologies’ customer-facing platform that transforms railcar inspection into a streamlined, AI-powered experience. It not only allows Duos employees to detect and confirm defects in real time, but also gives customers transparent access to results, empowering them with actionable insights that improve safety, efficiency and compliance.

Duos’ proprietary AI development and deployment framework gives clients full control over implementation, delivering dependable and efficient operations.

Our edge-based AI delivers inspection results within 60 seconds of a railcar scan – critical for avoiding delays and derailments.

Our in-house team of seasoned railcar mechanics act as subject matter experts (SMEs), ensuring highly accurate detections. Duos integrates Human-in-the-Loop technology, combining the speed of machine analysis with expert human judgment to minimise false positives.

Our ready-to-deploy AI detection library is designed to automatically pinpoint and classify critical railcar defects.

This fusion of AI and Human-in-the-Loop intelligence powers CENTRACO®, a platform capable of identifying unauthorised riders on trains, with clear image displays provided for review and analysis.

Detection of Illegal Riders

It is important to detect unauthorised riders and

various related objects (bags, backpacks, tarps and blankets) on freight cars. The RIP® system uses overhead cameras as well as side panoramas and AI-enabled analytics to detect when an unauthorised rider or associated objects are on the top, side or ends of the freight cars. If required, the appropriate security agencies can be notified for immediate review. Illegal riders is a direct security detection which is expected to be immediately actionable. Minimal – if any – review by a qualified mechanical car inspector is required. This enhances safety, supports border security and railroad personnel and reduces risk by identifying hidden individuals in real time.

- Enhance workers and public safety by identifying hidden individuals before they cause harm
- Support immigration and border control efforts with reliable, automated detection
- Reduce liability and risk exposure by preventing unauthorised access to trains
- Improve operational efficiency by accelerating inspections and minimising delays
- With RIP®, railroads benefit from a proven system that not only automates detecting detections but also protects people, assets and critical infrastructure

Request a Duos AI Detection catalogue [here](#).



Click or scan the QR code of more information

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Track & Infrastructure

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Depot Equipment

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Upcoming Publication Dates:

Issue One 2026 - 17 March

Issue Two 2026 - 25 August (InnoTrans Special)

Issue Three 2026 - 01 December

Complete Composite Systems (CCS)

Innovative Rail Cabling Solutions Provided by the Composite-Constructed and Ever-Evolving ARCOSYSTEM®



Multiple troughs of ARCOSYSTEM® stacked vertically to meet the demanding cable-load requirements for a project in Berlin

Installing trackside cable troughing along challenging routes is becoming quicker and easier thanks to the flexible design of the elevated ARCOSYSTEM® cable containment system.

Manufactured from pultruded glass fibre reinforced polymers (FRP/GRP) for a robust yet lightweight finish, ARCOSYSTEM® combines the durability of composite troughing with bespoke, laser-cut steel brackets to overcome the most challenging requirements, whether

that be reaching hard-to-access areas along the cable route or finding alternative attachable options.

The lightweight design means ARCOSYSTEM® can be post-mounted up to 6 metres between supports with height and directional changes easily accommodated, making installation faster and more cost-effective than traditional ground-based systems. ARCO can also be fastened to walls, **clamped to bridges**, or attached to a variety of trackside features such as **noise barriers, railings, rock walls** or **hillside slopes**.

Key features and benefits of ARCOSYSTEM®:

- Safely encloses and protects high-voltage power, signalling and digital communication cables for long runs alongside railway tracks
- Carries cable loads of up to 90kg/m
- Engineered GRP construction ensures strong resistance to heat, water, corrosion and UV rays compared to more common materials, providing a long lifespan and sustainability
- Can withstand working temperatures between -40°C and +80°C
- Twin-walled design of the troughing ensures system can resist lateral forces from embankment subsidence, high snow loads and wind effects from high-speed trains
- Resistant to continuous freeze-thaw cycles, as well as a wide range of chemicals
- Troughing available in different cell sizes to accommodate a range of cable load requirements or space restrictions
- Independently verified life cycle assessment (LCA) carried out as part of an official **Environmental Product Declaration (EPD) published in 2025**

The range of complementary bracketry is constantly being updated, with a new ‘ClickFit’ style option allowing site operatives to simply click the troughing cells into place with a satisfying snap, instead of sliding the troughs into the shoes of the brackets, making installation much easier on sloping ground or in slippery conditions.

Working in conjunction with key partners like Anchor Systems Ltd, technology such as the **Rapid Route technique** – fitting ARCOSYSTEM® via Sigma Posts atop specially designed Anchor Screws – enables speedy installations without the need to excavate and use cast in-situ posts, further reducing carbon emissions.



ARCOSYSTEM® installed using the Rapid Route technique with ground-screwed Anchor Screws to ensure solid fitting along a steep trackside route near Glasgow

Contact the experienced **technical experts at Complete Composite Systems**, the exclusive UK distributor of ARCOSYSTEM®, for enquiries about your rail cable project

Complete Composite Systems Ltd



85 Great Portland Street, London, W1W 7LT
Tel: +44 7702 206755 or +44 7860 147863
Email: info@completecomposites.co.uk

The exclusive UK rail stockist of ARCOSYSTEM® is the **Scott Parnell Rail Division**



ARCOSYSTEM® is developed by CCS's Swiss partners, **Castioni Kabelführungssysteme GmbH**



The ‘Rapid Route’ cable containment installation method is developed in partnership with **Anchor Systems Ltd**



COMPOSITE BRIDGES

Innovative composite solutions for challenging rail infrastructure applications



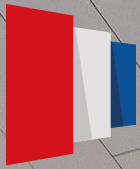
- BEAM or TRUSS designs
- Pedestrian, cycle or vehicular bridges
- Manufactured from glass fibre reinforced polyester (GRP) for strong load-bearing performance and long-term durability
- High corrosion, UV and weather resistance & flame retardant
- Lightweight, easy to handle for quick and cost-effective assembly and erection on site
- Pioneers in the field of GRP bridge construction, with more than 250 installations across Europe



Made by Complete Composite Systems (CCS) in association with BGL Ingenieurbau GmbH in Germany

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reliable and industry proven
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 Directory

Track & Infrastructure

Zonegreen

Improving Safety One Depot at a Time

How many workplace fatalities are too many?

In 2023/24, two people died at work on Australia’s railways and yes, that’s two too many. In addition, 23 incurred serious injuries. Both figures are an increase on previous years.

These statistics are from Australia’s Office of the National Rail Safety Regulator (ONSR) report, which pledges to ‘influence safety practices and build safety knowledge’ as a strategic priority by 2027. To do this, accredited operators have been assigned to the rail sector to identify where safety procedures need to be improved or implemented, including in yards, sidings and terminals.

As these statistics prove, rail maintenance depots are undeniably dangerous places to work. Moving vehicles, high-voltage electricity and powerful machinery create daily risks for staff.

The good news is positive steps are being taken at ground level. In the last ten years, four depots in Australia have invested in Zonegreen rail safety solutions, which are supplied by local partner, Andrew Engineering. All are now using the Zonegreen Depot Personnel Protection System (DPPS) to automate safety and remove the margin for human error.

Unrivalled Expertise

DPPS allows rail vehicles to be moved safely and efficiently around maintenance facilities, whilst providing physical protection to staff. Workers log on using personalised RFID cards that record where



they are located in the depot and prevent Network Rail-approved derailleurs from being lowered, stopping vehicles entering a road where staff are logged on to work.

Train movements can only be authorised by a supervisor, using a road end panel positioned in a convenient location within the maintenance building – they are normally located near the doors to give a

clear line of sight to incoming and outgoing trains. This can only happen when all personnel have logged off the road and it is safe for the movement to take place. The shunt signal will then move to 'proceed' after the derailer has been lowered and audible and visual warnings are activated to let everyone know a train is in motion.

Included within the DPPS package is the advanced Zonegreen Depot Manager SCADA software, which offers an overview of the entire protection system and complete traceability. It displays the location of personnel and the status of plant and equipment, whilst providing key information to make operations easier and quicker to implement.

DPPS is one of the safest systems on the market, boasting independent certification to prove its compliance with both the hardware and software requirements of SIL 2 – a reliability assessment of the relative risk reduction. It is also the most thoroughly tested and proven in use, offering a low-risk option to depots looking to improve their working environment.

The benefits of DPPS are extensive. It utilises modern electronics to future proof the system, boasts an innovative software design to allow for future depot upgrades, is easy to modify and expand according to a depot's requirements and includes an 'inputs and outputs' diagnostic feature that makes maintenance easier, whilst also expanding the lifetime of the product.

Government Approval

Last year, DPPS received official government product approval from Transport for New South Wales (TfNSW), which leads the development of safe, integrated and efficient transport systems.

The design and functionality of DPPS was found to comply with industry standards and safety regulations by the director of signals and control systems on behalf of the New South Wales government.

Two depots in the region now operate the system, with the most recent installation taking place at the new billion-dollar Mindyarra Maintenance Centre in Dubbo. Three tracks at the entrance to the purpose-built facility have been fitted with road end panels (REPs), operating the Crowder derailers. Andrew Engineering



worked closely with main contractor, CPB Constructors, to install the Zonegreen system equipment as part of the final stage of the depot's development.

Christian Fletcher, Head of Engineering, said: "It is a huge honour to receive product approval for DPPS, after providing Australian rail personnel with safer working conditions for more than a decade. It is a testament to the quality of the Zonegreen DPPS product and the continuing relationship with Australian partners, Andrew Engineering. Following installation, contact with the depots is maintained so they can be supported for upgrades or any queries they may have about the system."

Zonegreen rail safety solutions are the result of more than a century's engineering experience and are currently protecting maintenance workers and infrastructure worldwide. The innovative products not only include DPPS, but also the Zonegreen Points Converter and the latest addition to the range – the Zonegreen Electronic Interlocking Solution (EIS), a modern interlocking system. Each product is renowned for its quality, safety and reliability, and can be tailored to the individual needs of a depot.

Zonegreen at Ausrail

Zonegreen rail solutions will be available to view at this year's Ausrail exhibition, held at the Melbourne Convention and Exhibition Centre from November 25-28.

Information about the full range of products will be available from Andrew Engineering on stands 89,106 and 107.

This is the fifth time Zonegreen solutions have been exhibited at the event, which attracts more than 100 exhibitors and 6,000 attendees.

To find out more, telephone (0114) 230 0822, visit zonegreen.com or follow on LinkedIn: [Zonegreen Ltd.](#)





SAFE. EFFICIENT. RELIABLE.

Zonegreen Electronic Interlocking Solution (EIS) for rail depots.

Zonegreen EIS is a state-of-the-art safety system designed to control depot equipment and access to hazardous areas. Zonegreen EIS uses fail-safe principles to prevent personnel injury or costly damage.

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Trelleborg

Supporting Growth and Connectivity Across Australia's Rail Network

With a growing portfolio of successful light rail projects across Australia, Trelleborg has established itself as a trusted partner in delivering resilient, long-lasting rail infrastructure that meets the needs of a fast-expanding network.

Australia is a key market for **Trelleborg**, with its Vector™ encapsulation solution supporting major rail developments across the country. Its long-standing relationship with Australia not only covers rail but also extends into other sectors such as defence, marine, mining and quarrying.

Australia is known for major investments in its rail and tram infrastructure, driven by forecast population growth of more than 15% over the next decade, and to support key projects such as the Brisbane Olympics in 2032.

With a government that recognises the link between transport capacity and economic growth, investment in expanding and modernising the network remains a clear priority. Trelleborg has become a key partner on this journey, providing customised designs of its **Vector™ embedded rail system**.

This is based on a high-performance, one-piece moulded microcellular foam polymer rail boot that simplifies jointing and installation, while also ensuring there are no voids or cavities, providing improved durability and resilience.

Unlike competing solutions, the **Vector™ system** can be installed using multiple methods – from top-down and sacrificial beams to bi-block sleepers. Its design

enhances noise and vibration absorption, extending rail service life and reducing maintenance, while delivering high electrical resistivity to eliminate stray current.

Acoustic performance and track stiffness can be customised without redesign, and its exceptional fatigue life and abrasion resistance gives a 30+ year design life.

Nationwide Track Record

From the Gold Coast to Adelaide, Trelleborg's embedded rail solutions have been used to dampen noise and provide high electrical resistance for over a decade. While normal requirements for the latter are around 10 Ω/km, Vector has been proven to provide up to 57 Ω/km electrical resistance – achieved on Parramatta Light Rail Stage 1, Sydney.

Australian projects that Trelleborg has supported include **light rail/tram projects in Parramatta Sydney, Gold Coast and Newcastle**, with the first highlighting Trelleborg's ability to adapt designs to meet the challenges of sensitive urban environments.

"A section of the Parramatta track ran past a hospital, and so this required stricter vibration and noise standards," explains Peter Hardy, Business Development Manager at Trelleborg. "In response, we designed a custom augmentation to our Vector encapsulation system to meet these needs, which has now become a standard part of our solution.

"Another challenge we overcame on this project was a section on an incline. That gradient was quite testing in terms of meeting the required specification, but our engineers rose to the challenge."



Fennell St Church St - Track Pour Section



Mac Street

Showcasing Project Success

Another key project for Trelleborg was the Adelaide Tram Extension, where the Vector solution was chosen for its performance and simplicity of installation. Trelleborg was chosen for this project because of the company's expertise in polymer solutions for the rail industry, and the client was very pleased with the Vector™ solution. It provided excellent damping and electrical resistance performance and the installation was very straightforward.

All these factors contributed to keeping the project on schedule.

Trelleborg has also been closely involved with the **Gold Coast light rail project since 2012**. Most recently it contributed to Stage Three, which extended the network from Broadbeach South to Burleigh Heads.

Why Trelleborg?

Peter Hardy believes Trelleborg continues to be chosen for Australian rail projects due to the Vector's advanced design and ease of installation.

"These enable clients to execute project delivery with confidence," he says. "Our Vector system is simple, reliable and backed by the experience of a long

established global polymer organisation. Customers know we're in it for the long haul – providing trusted support on insulation, vibration and alignment, and standing by them if challenges arise."

Trelleborg continues to support the growth of light rail and tram projects throughout Australia, both for new projects and maintenance support. Most recently it has bid for Parramatta Stage 2 enabling works, and Hardy doesn't rule out the potential for future in-country component manufacturing, should the demand be there.

Meet with Trelleborg at AusRAIL

Trelleborg representatives will be attending AusRAIL Plus in Melbourne on 25–27 November and are inviting new and existing clients to meet with them.

If you would like to speak with the team, please contact Peter Hardy on +44 (0)7956 963359 or email peter.hardy@trelleborg.com to book a time slot.



Upcoming Rail Events & Exhibitions

November 2025–March 2026

Click here to see all of our event and exhibition listings!

RailTech Europe
4–5 March 2026 | Utrecht

Transport Ticketing Global
17–18 March 2026 | London

IT-TRANS
3–5 March 2026 | Rheinstetten, Germany

Metro Bilbao Conference
1–3 December 2025 | Bilbao

Rail Interiors Show
24–25 November 2025 | Prague



NRC-REMSA Exhibition
7–10 January 2026 | Florida

Rail Live!
26–28 November 2025 | Madrid

Fire Protection of Rolling Stock
24–25 February 2026 | Madrid

AusRAIL PLUS
25–28 November 2025 | Melbourne

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