

Railway-News

M A G A Z I N E

Inside:

How Satellite Enables Nextgen Freight Rail

&

Green Loans in the Rail Sector

When Will Rail Authorities Start Addressing Active Fire Suppression for Rolling Stock?

ISSUE ONE 2023



MOBILITY WITH VISION

Together with you, Goldschmidt masters the challenges of modern, railbound mobility – for safe, sustainable and long-lasting railways of premium quality.

Goldschmidt offers a comprehensive range of products and services worldwide for the joining of rails, modern construction of railway track, and inspection and maintenance of your track infrastructure. Using our products and services combined with our intelligent digital solutions, we are pushing for the digital future of track.

The unique global network of experts gives you access to the international range of products and services of Goldschmidt – right where you are, via your local contact person, backed by the power of the entire group.

Letter from the Editor



Dear Readers,

It's 2023 and we're back with our first Railway-News magazine of the year!

It's going to be our busiest year to date in terms of magazines, with us publishing our first ever magazine for our sister site, **Future Transport-News** in June. If you've not yet come across our other publications, do please also check out **Bus-News** and **Airport Industry-News**.

In this issue, we kick off with a thought-provoking contribution from Fireaway Inc. (p.6) calling on regulators to require active fire suppression measures alongside existing requirements such as passive measures and fire detection.

Also in this issue I spoke with Sabine Lehmann, Green Loan Advisor at KfW-IPEX Bank, about green loans in the rail sector and what trends she thinks will grow in importance in the lending sector (p.134).

On p.138 Ilse Vermeij, Product Manager Testing at Ricardo explains virtual

testing, why it is needed and what its benefits are.

Todd Cotts, Senior Principal Product Marketing Manager, Mobility at Intelsat discusses how satellites enable the next generation of rail freight, delivering increased economic efficiencies, improved safety, reduced downtime (p.16).

We have just come through another season of managing leaves on the line, which can cause serious problems if left untreated. One recent example where they caused a collision was at Salisbury Tunnel Junction in October 2021. Network Rail then started testing how laser beams could be used to clear leaves off the line, using Laser Precision Solutions's LaserTrain. You can read more about their approach to minimising slip-slide on p.79.

If you would like our rail news straight to your inbox, make sure you're subscribed to us [here](#). As always, if you want to be featured on our site or in our e-magazine, please [email](#) Andrew Lush or call +44 7432 725001.

Our second Railway-News magazine of 2023 will be published on 25 April. In it, we will take a closer look at what's in store at Railtex, one of the key rail industry events in the UK, this year.



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COVER & BACK COVER: © Intelsat



Moving Communications Forward

High-throughput Global Connectivity for Freight Rail 4.0

Enabling next generation digitization in freight rail operations requires dependable and secure connectivity everywhere, all the time.

Intelsat FlexMove is the flexible, high-throughput connectivity solution for keeping freight trains connected in areas where terrestrial connectivity is not available or reliable.

Learn more at intelsat.com/solution/flexmove-for-rail



Issue One

2023

Features

p.6 When Will Rail Authorities Start Addressing Active Fire Suppression for Rolling Stock?

Looking at the Kaprun disaster that occurred in Austria in 2000, in which 155 people lost their lives, Fireaway Inc. argues a strong case for why authorities should start requiring active fire suppression measures on rolling stock.

p.10 Upcoming Events

A look at what railway events are taking place in March, April and May 2023.

p.12 Directory

A directory of railway suppliers for data & monitoring, rolling stock, track & infrastructure and services. Read about all the latest innovations and product developments in the rail sector.

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When Will Rail Authorities Start Addressing Active Fire Suppression for Rolling Stock?

Trains represent the oldest form of mass land transportation that is still in use today. Rolling stock in some form has been with us for over 200 years. Rail is one of the most energy-efficient transport modes and rolling stock conveyances are so popular because they are efficient, have less overall environmental impact than other forms of transportation, are a relatively inexpensive way to move freight, and most of all, rolling stock is safe.

In terms of safety, **rolling stock is second only to commercial airlines**. In the U.S. most incidents involving rolling stock are **the result of a collision or derailment**. In the UK, 78% of all rail fatalities are due to **'suicide by rail'**. Fires on rolling stock are thankfully rare events with many of them being secondary to a collision or derailment.

But fires on rolling stock do occur, and often with catastrophic consequences. Since opening in 1994, the English Channel tunnel has experienced several high-profile fires that, while not resulting in fatalities, have resulted in significant downtime to the rail service. In other instances, those involved in rolling stock fire incidents have not been nearly so lucky.

One of the most significant, in terms of lives lost, is the Kaprun disaster that involved a funicular railway in



Kaprun Funicular Railway | Photo courtesy of: Wikipedia

Austria on 11 November 2000. In this incident, as the train was ascending through a tunnel, fire broke out in an unoccupied cabin that quickly spread throughout the conveyance. Before the event was over, the fire killed 155 people: 150 in the cars where the fire originated, two on the descending companion train, and three at the rail station on the summit. Only **twelve people managed to survive** the ordeal.



Photos courtesy of: Fire Safety | FRA (dot.gov)

Controversy surrounded this incident with allegations of a coverup and several people receiving criminal indictments. Of immediate interest to investigators was the fact that the train was not equipped with engines or fuel and had no driver. **There was only low-voltage equipment**, hydraulic fluid to operate the brakes, and a single attendant charged with operating the doors.

The Kaprun fire was a perfect storm where circumstances conspired to make the disaster exponentially more horrific. Firstly, the fire broke out in an unoccupied cabin which gave it a several-minute head start before it was discovered. Secondly, the spreading fire burned through the hydraulic lines which, in addition to feeding the fire, caused the train to halt in the tunnel because of low hydraulic pressure. The descending companion train was already stopped in the tunnel **waiting for the ascending train to pass**.

In this instance, the tunnel contained the smoke and toxic fire gases and acted as a chimney to direct the fire gas effluent up the tunnel, past the companion train, and into the occupied rail station at the summit. Because hydraulic pressure was lost, the train's doors could not be opened, and shatter-resistant glass further hindered escape. Adding to the tragedy was that several passengers and the attendant who managed to escape the car egressed up the tunnel instead of downwards and were **overcome in the smoke plume**.

The ensuing investigation revealed that a faulty heater was the cause of the fire. The tragedy was that this incident was yet another example of a fire that started out small, was undetected, and with no fire suppression system present, grew unchallenged. As a result, many people perished.

There is no shortage of fire safety standards in the rail industry. But, when you examine the rail fire safety initiatives underway in both the U.S. and Europe, the focus appears to be squarely on passive fire protection measures.

According to the Federal Railroad Administration (FRA), their most pressing need is the “development of refined testing techniques and metrics of performance that can be applied by car manufacturers and operating authorities for new equipment purchases.” The FRA seems mostly concerned with the burning characteristics of the materials used in the manufacture and furnishing of passenger railcars.

In the European Union (EU), the story is almost the same. **Proposed improvements to TRANSFEU** (Transport Fire Safety Engineering in the European Union) standards call for better and more dynamic modelling and measurement capabilities in predicting fire behaviour and controlling the production of toxic effluents from burning materials. Materials fire testing is a huge business in the EU.

Absent from all these initiatives is the demand for better fire suppression should a fire break out. While reducing the flammability of materials and selecting materials that do not off-gas toxic vapours is a critical task, experience has taught us that you cannot wholly rely on passive fire protection measures.

The rail industry needs to recognise that even if cabin materials and cabin layout are designed to resist fire to the greatest degree possible, all of the personal belongings and luggage with which passengers board are not subject to the same flammability standards. Therefore, the entire fire behaviour modelling – based on combustion of the as-built contents of the car – is incomplete.

In the case of the Kaprun disaster, had there been any form of fire suppression in the car where the fire originated, the event would have made a good story for the train's occupants after they enjoyed a day of skiing. But because the sole focus is passive fire suppression, everything is left to chance once a fire gains a foothold.

Rail authorities need the realisation that passive fireproofing measures are only one part of the fire protection triangle for rolling stock. Of equal importance is the timely detection of fires.

Find out more!



Fire Suppression System
Rolling Stock Fire Protection Triangle

But conspicuously missing is the inclusion of an active fire suppression system. Fire suppression on rolling stock can be challenging because it is mobile and is comprised of individual railcars that may change as the train runs its route. These two factors rule out legacy fire suppression systems such as sprinkler systems. Clean agent systems are a possibility for the locomotive and other select locations but are difficult to extend from one car to another.

Two areas need fire suppression: where the known fire hazards exist, such as the traction motor compartments in the locomotive, as well as around the fuel system and electrical cabinets and in the passenger railcars to quickly suppress a fire, allowing time for the occupants to escape.

Because of the perceived difficulties in developing a suitable system, it has largely been eschewed in favour of passive measures. But innovative changes in fire suppression systems have resulted in new agents and delivery methods that appear tailored to rolling stock fire suppression.

The authorities with jurisdiction need to make the critical decision to address the fire suppression leg of the rolling stock fire protection triangle. They should do this by mandating effective fire suppression measures on rolling stock, but especially in occupied areas such as passenger and sleeper cars.

The solution is readily available and relatively inexpensive. If this decision is not undertaken, it is only a matter of time before there is yet another tragic rolling stock disaster.

Fireaway Inc.

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 Minnetonka, MN
 USA

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Stat-X[®]
Aerosol Fire Suppression



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All the latest industry news and updates broken down in our directory categories which are: Digital Solutions, Bus Interiors & Design, Maintenance & Servicing, and Electrification & Power so you can easily find the items you're most interested in. Plus much more!

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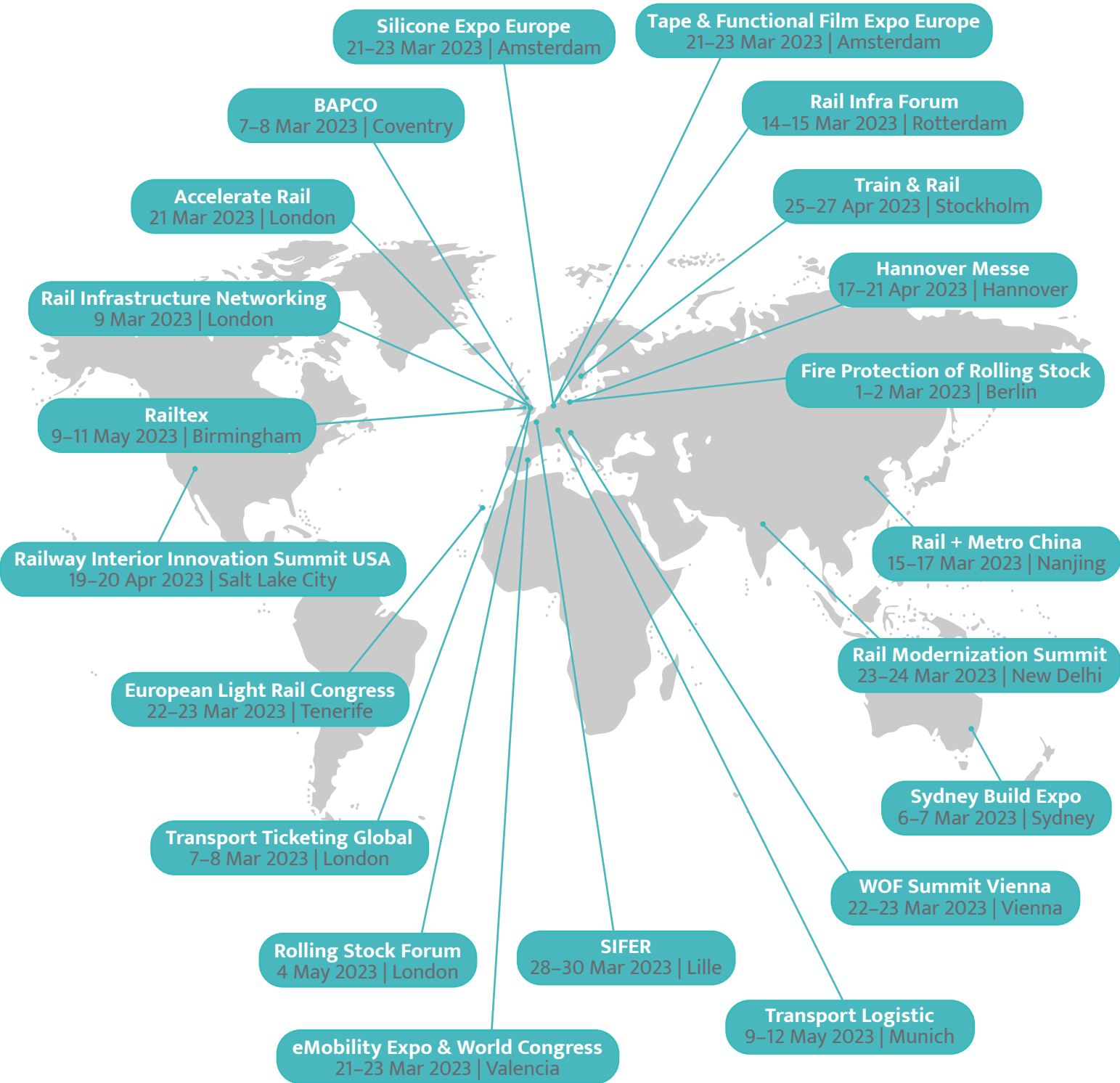


Read our annual Airport Industry-News magazine to stay abreast with all the latest developments in the airport sector, from terminal and runway construction, passenger and baggage handling technology and decarbonisation to digitalisation, design and security.

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Upcoming Rail Events & Exhibitions

March 2023 – May 2023





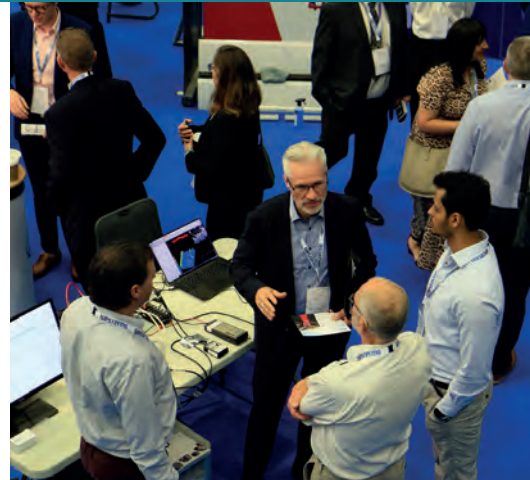
Full Scale International Rail Show for Passenger and Freight Rolling Stock, Technical Enhancements, Depot Equipment, Ancillary Services and the Supply Chain - Free to Attend - Low Cost to Exhibit



Derby Arena



6 July 2023



9.30am to 3.30pm



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Data & Information

Intelsat

How Satellite Enables Nextgen Freight Rail

By Todd Cotts, Senior Principal Product Marketing Manager, Mobility at Intelsat

Everything today is connected, from IoT sensors on goods and machines used for management and monitoring, to smart devices and data-rich applications used for communications with crew, operations and other stakeholders.

That is why today's freight rail industry is under significant pressure to transform its communications strategy to support the rapid rise of Industry 4.0

and the evolution to 5G and unified networks. By equipping trains with next-generation communications capabilities, freight rail companies will be better equipped to benefit from increased economic efficiencies across their operations, improved safety for crew and communities, reduced downtime of equipment, and a greater contribution to sustainability goals. In addition to crew and operations, domestic and international stakeholders within the transport and logistics ecosystem will also benefit from next-generation freight rail communications, including customs, shippers and end customers.





But for freight rail companies to realise the full advantages of Industry 4.0 and unified 5G networks, freight trains must be able to securely connect to the cloud – and stay connected. This requires reliable, high-performing connectivity everywhere the tracks run, including areas where terrestrial connectivity is not available or dependable. That is why advances in satellite technology must play a vital role in next-generation freight rail communications.

At Intelsat, we work alongside other network technologies, including LTE, 5G and IoT, for seamless integration. Our fleet of 50+ satellites, combined with teleport gateways, comprise the world’s most extensive and secure communications network on the planet.

By equipping trains with next-generation communications capabilities, freight rail companies will be better equipped to benefit from increased economic efficiencies across their operations.

Built on our integrated satellite and terrestrial network, Intelsat FlexMove is a solution that enables freight rail companies to ensure their trains (and crew) have uninterrupted and secure high-speed connectivity wherever they roll. With data rates up to 20x faster than legacy Mobile Satellite Services at a fraction of the cost, combined with flexible service and hardware bundle options, freight rail operators can ensure every train stays connected everywhere. And with its next-generation network vision of software-defined satellites and multi-orbit strategy, Intelsat will continue to be on track to meet the evolving connectivity demands and requirements of freight rail companies.

Are you ready to explore the benefits of always-ready connectivity for the next generation in freight rail operations? Contact [Intelsat experts](#) today to discuss how FlexMove delivers reliable and secure high-speed connectivity everywhere, so your freight trains stay connected anywhere.

Click [here](#) to contact us.



VIAVI Solutions

Introducing VIAVI Railway & MCx – For Proactive Critical Communication Operators

Max Becutti and Pascal Bertrand, are responsible for Railway and MCx Service Assurance Product Line Management at VIAVI Solutions.

In this article, they explain how we are enabling customers to test, measure and monitor telecom networks and mission critical systems performance with confidence.

The acquisition by VIAVI Solutions in May 2022, brought together the market-leading solutions from both Comtest Wireless and the previously acquired Expandium (in August 2020).

Combining both companies into a single portfolio has created the industry's largest supplier of railway telecoms and signalling test, measurement and monitoring solutions.

This provides valuable benefits to customers, enabling them to gain even greater value from the individual solutions and the synergies derived from the merger. For example, the new VIAVI Railway and MCx division has allowed the combined team to capitalise on their shared expertise and expand into aligned vertical markets, which also depend on mission-critical systems and operational cyber security.

Right: Max Becutti, Product Line Manager for Railway



Left: Pascal Bertrand, Product Line Director for Mission Critical Communications

Supporting Railways

Max Becutti, Product Line Manager for Railway explains more:

“Combining the Expandium QATS and Comtest NetProbe products and expertise into a single organisation has given us a powerful proposition and a good base for future product evolution, using a ‘best of breed’ approach.

This is a very exciting time for the railway. The desire to



improve train performance will be achieved by tackling three fundamental problems: providing greater capacity, improving service reliability and reducing signalling system renewal costs, something that is a challenge worldwide.

As a result, the evolution from GSM-R to Future Railway Mobile Communication System (FRMCS) is underway; the timetable has been defined by the UIC and national deployments could start as early as 2026.

Many customers are already actively planning to use 4G and 5G solutions for railway infrastructure communications. In fact, work on implementation has already begun in several markets and we are proud to be supporting these projects.

The new team structure also enables us to better support our customers during the transition to these new FRMCS technologies, both wayside and on board.

At the same time, we remain committed to supporting customers with their existing railway telecommunication and signalling test, measurement and monitoring solutions.

In terms of our railway solutions portfolio, the creation of the VIAVI Railway and MCx Division provides us with the opportunity to extend our range considerably. For example, this quarter, we will be launching standalone and integrated operational cyber security solutions, compliant with meeting the new NIS2 directive, announced last November.

Also, as part of the VIAVI group, we are now leveraging the access it gives us to a much wider range of product solutions. This means we can offer our customers a broader portfolio and a faster speed to market, as well as supporting them with wider requirements than the core railway solutions, where required. One of our most recent additions, for example, is a solution that supports asset discoveries.”

Supporting Mission-Critical Communications

Pascal Bertrand, Product Line Director for Mission Critical Communications shares his vision and objectives.

“The extension from our railway-based solutions into



mission-critical assurance was a natural evolution. Bringing together our unique combination of resources offers powerful, exciting new capabilities and expertise to mission-critical markets.

Firstly, let me explain what we mean by mission-critical systems. These are systems essential to the survival of a business or organisation and if they fail, operations are significantly impacted and there can be a threat to human safety.

The new generation of mission-critical services (MCS) networks offers flexibility and local broadband access, which allows these sectors to improve their efficiency, reactivity and service quality, thanks to new applications and usages.

Public transportation systems, ports, blue light and emergency services, factories, mines and offshore platforms are all examples of other verticals that use local private broadband networks. Given the potential threat to personal safety, it is imperative that these mission communication systems remain safe, secure and fully reliable at all times.

As highly technical sectors, they rely on highly technical systems, and require skilled, technical expertise.

Which is why our outstanding experience in the railway telecoms and signalling markets gives us an incredible wealth of domain knowledge and experience in supporting customers and the user experience. Who else can offer the equivalent of Comtest’s Drive Test expertise, Expandium’s monitoring knowledge and solution platform, plus VIAVI’s leadership with LTE and 5G technologies, for example?

However, new systems bring new challenges, as well as new benefits. That’s why we are dedicated to supporting customers who want to migrate from their current Tetra, Wi-Fi or GSM-R-based solution to a 4G or 5G-based communications system.

Thanks to our deep understanding of the railway sector and our work with customers in over 30 countries around the world, we have great first-hand experience in helping to manage technology migrations and updates of this type and scale.

Our expertise and know-how can smooth the transition and fill the gap between service usage and technological complexity. As a result, customers can confidently operate their new systems more efficiently and effectively, to reduce maintenance costs and make their working lives easier.

The dedicated team have a customer-centric approach and we can provide a competitive range of solutions suitable for standalone, shared or hosted private networks.

The solutions and services we offer are similar to those for the railway market. For example, we offer manual and automated mission-critical services drive tests, performance monitoring and troubleshooting. Our extensive solution database and AI capabilities also allow comms data to be stored for several years, making it easy to review quality trends or provide evidence when required.”

Summary


Railway and mission-critical systems are undergoing huge transformations to improve efficiencies and effectiveness.


VIAVI Railway and MCx offers customers the opportunity to welcome these new capabilities, by giving them the capabilities and skills to monitor systems performance and easily troubleshoot issues when required.

Our market-leading assurance services focus on improving the quality of experience and help railway and mission critical services to:

- Increase reliability
- Reduce outage
- Reduce OPEX / CAPEX
- Increase end-user satisfaction

If you'd like to know more, please visit viavisolutions.com/railway or contact us at sales.railway@viavisolutions.com.






VIAVI Solutions

UNITED IN POSSIBILITY

Together we provide efficient railway telecom and signalling service assurance





Czech producer of Sensors, Switches and Converters for Railway Vehicles



temperature



humidity



CO₂



atm. pressure



VOC

CO₂ Sensor for Air Conditioning Ducts

Novelty in our product range – CO₂ sensors **KSC 520** with 4 to 20 mA output and **KSC 122** with RS 485 output are intended for installation in airconditioning ducts. The plastic connection head is provided by the cable ending. Easy mounting of the temperature sensor is ensured by the unique „S head“ design invented by SENSIT s.r.o.

KSC 520 – output 4 to 20 mA

KSC 122 – output RS 485

CO₂ SENSOR WITH MEASURING STEM

- Output signal: 4 to 20 mA or RS 485 MODBUS, possibility to expand with 0 to 10 V output and CAN protocol
- CO₂ measuring range: 400 to 5 000 ppm
- The sensor meet railway standards **EN 50155, EN 61373, EN 50121-3-2 and EN 45545**



For more information about SENSIT s.r.o. sensors, switches and converters, please visit www.railwayvehicles.com or contact us directly at randysek@sensit.cz

Yeltech

Yeltech's Remote Rail Temperature Monitoring System

Yeltech introduced an automatic temperature warning system which allows you to monitor the track temperature remotely, without going trackside, keeping boots off ballast!

Founded in 2004, Yeltech has succeeded in understanding industry needs, where there is a need to negate the risk of injury or loss of life. By creating innovative solutions that measure conditions remotely, Yeltech is fast becoming an industry leader in remote condition monitoring solutions.

Yeltech produces a range of innovative products offering practical and cost-effective solutions to all our customers around the world.

We work within a range of industries, including rail, water, buildings, structures and environment.

How Does It Work?

The Rail Temperature Monitoring Unit (RTMU) is installed at the web of the rail and is immediately secured with the high-strength magnet. When the device makes contact with the surface, the activation sensor is triggered turning the device ON. When the device is removed from the surface the same sensor is triggered to turn the device OFF.

The RTMU is programmed to transmit the data on specific instructions with an internal threshold of 25°C. The device will feature predetermined transmission rates.



Normal rate is when the RTMU wakes up and sees the temperature below 25°C, it will store the data and then send the bulk of readings/data every 12 hours. Fast rate of the RTMU is when the temperature exceeds the threshold of 25°C and the CRT alarm thresholds that have been set. When the RTMU wakes up, if the temperature is above 25°C, then it will keep transmitting data to the server every 30/60 minutes.

All data is accessible through the Yeltech app if specified or through a web server allowing you to easily identify your device and the temperature measurements.

Key features & benefits:

Accurate rail temperature data, allows you to identify when speed restrictions need to be put in place.



Low power battery, cable free, and completely mobile.



Super lightweight design with magnetic plate that can easily be fitted within seconds.



When the outlined alarm has been reached, a warning will be sent to the desired recipient via text or email.



Easy access to Yeltech online server to view and measure data.



Readily available App to locate and measure all your RTM's on the go and get real-time data.



Technical Bit

- Lithium battery-powered 13Ah 3.6V
- Up to 3 years continuous operation
- Readings/alarms sent via GSM/email
- Compatible with Network Rail II system
- Configure settings via text message
- Operation temperature -20 to +70 °C

After-sales Service

Service & Calibration

Yeltech would recommend that the RTM is sent back for a health check and re-calibration each year.

Technical Assistance

Yeltech is available to help with the RTMU, be it problem solving or operational training. Yeltech is also available to visit your depot and carry out training for your employees.

How big is it?



For more information contact Yeltech

info@yeltech.co.uk

yeltech.co.uk

0845 052 3860



Watch our video to find out more about our RTMU



Running Dynamics (EN 14363)

ASC accelerometers and IMUs record train drive dynamics and thus make it possible to assess derailment safety and other parameters. Furthermore, our ASC AiSys® smart sensor systems can even detect material weaknesses at an early stage.

Bogie Stability (EN 13749)

Train bogies are subject to heavy loads. ASC's OS series capacitive accelerometers are ideal for bogie stability testing because they can easily withstand heat, cold, humidity, and dust (IP68).

Driving Comfort Test (EN 12299)

Our accelerometers will win you over with their low frequency and measuring ranges. They are therefore ideal for ride comfort measurements, where the smallest of linear accelerations and low-frequency vibrations have to be recorded.

Window Monitoring

Navigation

Bogie Frame Monitoring

Box Axle Bearing Monitoring

Wheel Set Bearing Monitoring

Brake Tests

Record Track Geometry (EN 13848)

ASC's piezoelectric accelerometers detect the vertical acceleration on trains. Uniaxial gyroscopes also measure the track geometry in the bends. This way, errors in the longitudinal height of the track superstructure can be detected quickly.

Infrastructure Monitoring



ANALOG • DIGITAL • SMART

The evolution in sensor technology

For maximum safety and comfort in rail transport

High-precision measurement of smallest vibrations in vehicles and infrastructure is a basic requirement for safe, comfortable rail transport. Inertial sensors therefore play a key role in the design and localization of trains, as well as systems for monitoring tracks and bridges. Many manufacturers have long relied on accelerometers, gyroscopes and inertial measurement units from ASC for these tasks.

Based on this know-how, smart sensors from ASC enable new solutions for real-time monitoring, early detection of future material weaknesses as well as efficient and predictive maintenance applications.

With ASC, customers don't just get a sensor, but an individual comprehensive solution for its use.





PRODUCT INNOVATION CALIPRI X: FULLY AUTOMATED ON-TRACK WHEELSET MEASUREMENT SYSTEM

CALIPRI X is a fully automated on-track wheelset measurement system that delivers significant productivity gains and operational cost savings to the rail sector.

Combined with CALIPRI Predictor - an easy-to-use cloud storage and analysis tool for all CALIPRI devices – all measurements are automatically, instantly and securely stored in the cloud and wear evolution is evaluated to enable planned downtime based on the as-is and forecasted condition of wheels. This enables predictable and safe operation of the fleet and unplanned downtime caused by wheel condition is eliminated.

To get in touch with us: nextsense-worldwide.com | hexagon.com



HEXAGON

NEXTSENSE

Highly Precise Profile Measurement for Predictive Maintenance



With its unique CALIPRI® technology from NEXTSENSE, Hexagon is one of the world leaders in mobile profile measurement systems for wear measurement of wheels, rails and tracks.

With its latest product developments Hexagon allows rail operators to safely run their trains with longer, more predictable maintenance intervals, less downtime and reduced life-cycle costs.

The multifunctional and market-proven CALIPRI C4X series enables the combination of several inspection tasks in one measurement device. For example, if

you combine the modules for wheel profile, brake disk, wheel diameter and wheel clearance, you have a measurement device for evaluating a complete wheelset. The non-contact measurement devices are based on laser light section technology, thus ensuring highly accurate and reproducible measured data. In a matter of seconds, the most important measured variables appear on the sensor and are automatically compared to individual limit values. Due to the various export and report functions it guarantees an improvement and simplification of the whole workflow.

The latest development from NEXTSENSE, part of Hexagon's Manufacturing Intelligence division, CALIPRI X is a fully automated on-track wheelset measurement

system that delivers significant productivity gains and operational cost savings to the rail sector. With CALIPRI X, the measurement process couldn't be simpler: a train drives slowly over a sensor unit where laser and camera modules automatically measure and record the profile of the wheels. The system measures all wheelset parameters according to the European standard EN 15313 – including wheel profile, diameter, back-to-back distance, equivalent conicity, camber and wheel toe. The most important parameters and variables are known in seconds, and out-of-tolerance areas immediately identified.

CALIPRI X is easily installed on existing tracks and is designed for 24/7 all-season operation. A rugged sensor unit with no moving parts ensures the system withstands the harsh railroad environment and requires minimal maintenance. Temperature compensation allows operation in any weather to ensure reliable results year-round. For the best productivity, the system is designed for installation on tracks where trains frequently run – in front of depots, workshops, washing facilities or in sidings. This allows frequent measurements to be made without extra effort or costs. With no start-up delay, it is always ready to go. The solution ensures full traceability and allows secure 24/7 access to results and analytics for fleet technicians, workshop owners, maintenance workers and other company personnel, wherever they are located worldwide.

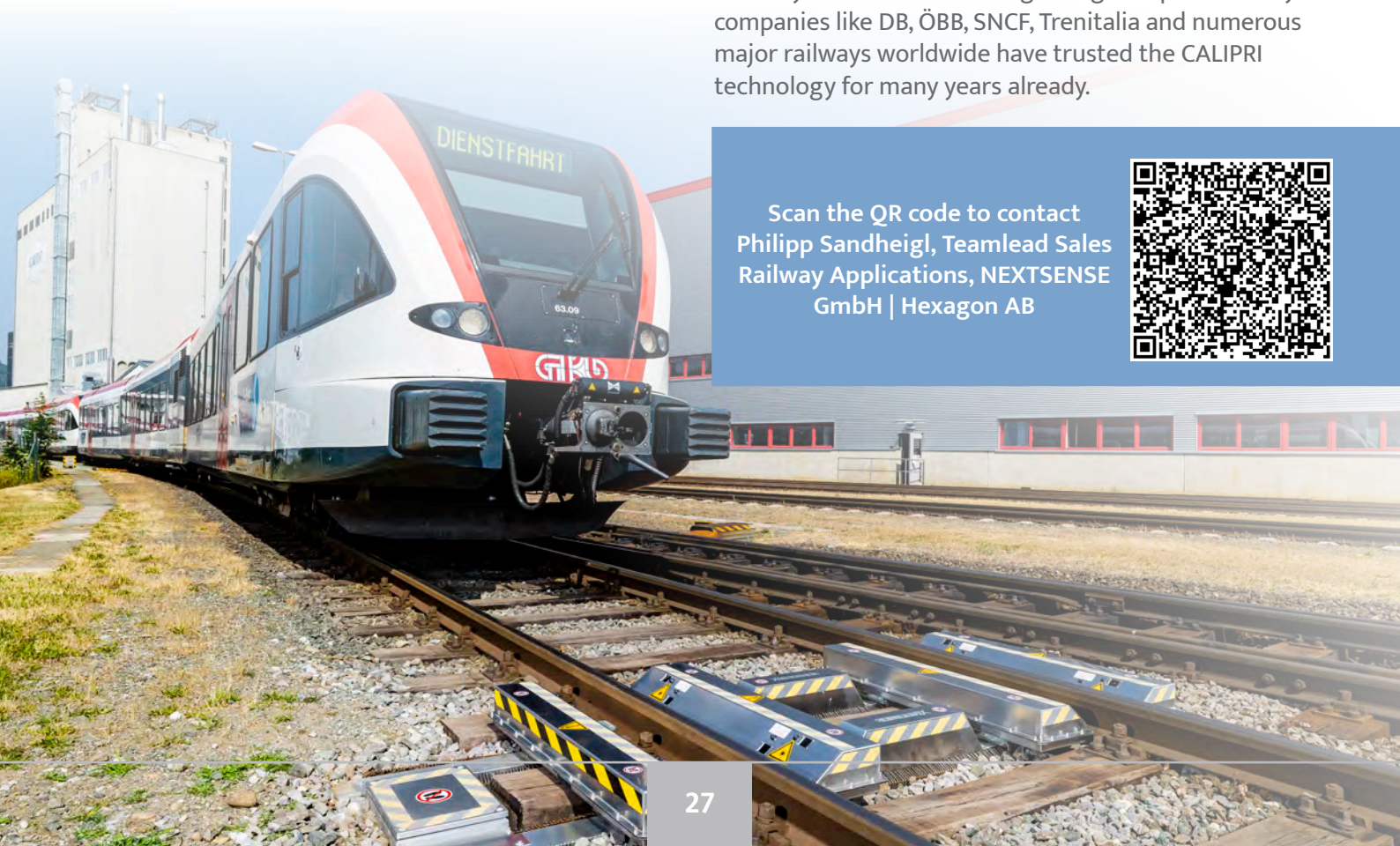
Combined with the analytical capabilities of the easy-to-use cloud storage and analysis tool CALIPRI Predictor, all measurements with CALIPRI devices are automatically and instantly stored in the cloud. The CALIPRI Predictor optimises life-cycle costs by ideal asset utilisation and presents the as-is condition of the whole fleet in a fast and easy way to the fleet technician, workshop owner, railway maintenance worker or non-technical personnel.

The solution offers data access from all over the world through cloud-based technology. It means you can work at any time and from any end device. It also provides direct leads for a plannable maintenance task and procurement management. Through profile comparison the technician can analyse the wheel wear evolution of each wheel in your fleet and the maintenance schedule can be adjusted to the condition of the vehicles. This enables predictable and safe operation of the fleet.

Together with the measurement data from the CALIPRI measurement systems, actionable information is generated and the feedback loop in railway maintenance can be transformed to be more productive and cost-efficient. Filtered notifications for personnel free up the information channels and an easy share mechanism can be used to connect to 3rd parties.

With these latest product developments from Hexagon, predictive maintenance comes to life in the railway industry. Customers including all big European railway companies like DB, ÖBB, SNCF, Trenitalia and numerous major railways worldwide have trusted the CALIPRI technology for many years already.

Scan the QR code to contact
 Philipp Sandheigl, Teamlead Sales
 Railway Applications, NEXTSENSE
 GmbH | Hexagon AB



 Directory

Data & Monitoring

Rail Vision

Israel Railways Orders 10 Rail Vision Main Line Systems



Israel Railways has ordered 10 Main Line Systems – and related services – from Israeli-based tech company Rail Vision.

The contract, valued at 1.4 million USD (1.3M EUR), is Rail Vision’s largest to date and heralds the first major commercial deployment of AI-based vision technology for main line rail industry operations.

Shahar Hania, Co-founder and CEO Rail Vision, said: *“This is our biggest contract to date, opening the*

door for more business in the future by solidifying the industry’s trust in Rail Vision’s solutions.

“It’s a major milestone for us, and the first time ever a railway operator will commercially use a novel artificial intelligence (AI) powered solution.”

AI-Based Vision Technology for Main Line Rail Operations

Rail Vision’s **Main Line System** is a cutting-edge

solution that detects and identifies objects and obstacles near, between or on the railway.

This can help reduce downtime and delays, increase safety and improve traffic volume and to date it is the only system on the market that will be installed on commercial passenger and freight trains.

The system combines sensitive imaging sensors with artificial intelligence and deep learning (DL) technologies to quickly and accurately detect and classify obstacles within its extended visual range of up to two kilometres in diverse weather conditions and any light conditions.

This includes obstructions such as humans, vehicles, large animals such as cows, horses, wild boars and more.

The system then generates real-time visual and acoustic alerts for the train operator and as an option to the command-and-control centre. And it doesn't end there. Rail Vision's advanced image processing capabilities can also enable image-based navigation, predictive maintenance and GIS mapping.

Pilot Proves Solution Meets Israel Railways's Requirements

Israel Railways currently operates around 700 trains daily, travelling along 1,138 kilometres of track and Rail Vision's Main Line System will be deployed on intercity passenger trains and freight trains.

The Israeli railway operator ran a pilot of Rail Vision's Main Line System on a freight rail locomotive operating in southern Israel, which tested the system in a wide range of weather conditions.

Drivers were taught how the system works and provided feedback throughout the trial, which proved the system met all of the operator's necessary requirements.

[Noam Peleg, VP Rolling Stock at Israel Railways,](#)





said: *“It was a pleasure working with Rail Vision on the pilot, we received all the support we asked for from installation and training through to operation management.*

“We’d had a few collisions with objects and animals in the past and were looking for a solution that would help prevent these happening in the future by enabling the driver to see far enough ahead that they could stop the train in an emergency.”

System Validation

Rail Vision’s Main Line System outperformed in all aspects of testing during the proof-of-concept with Israel Railways, which **CEO Shahr Hania** believes is a strong validation of the system and bodes extremely well for other **pilot programmes** underway or recently completed.

This includes a four-month pilot on Rio Tinto Iron Ore’s AutoHaul network – the world’s first automated, long-distance, heavy-haul rail network.

“This is our biggest contract to date, opening the door for more business in the future by solidifying the industry’s trust in Rail Vision’s solutions.”

Shahr Hania, Co-founder and CEO Rail Vision

Shahr Hania, CEO of Rail Vision, concludes by saying: *“We currently have several main line and switch yard pilot programmes underway globally and the conversion of these pilot programmes into commercial contracts is expected to accelerate and drive sales growth momentum in the quarters ahead.”*

This article is sponsored by Rail Vision.

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Rail Vision
INTELLIGENCE ON TRACK



 Directory

Data & Monitoring

Cohesive

Connectivity & Wi-Fi

Helping Hanoi Metro Collect, Manage, and Utilise Data in Its Project Delivery and Railway Operation

The Client

Hanoi Metro Railway Board (MRB)

The Challenge

Hanoi MRB sought to digitally transform how it collects, manages and utilises data in its project delivery and railway operations. This upgrade, from its current analogue processes, is designed to improve productivity and reduce risk to programme and budget. Hanoi MRB engaged with a team, led by CrossRail International and including Cohesive. They focussed on Metro Line 5, the next line to be designed and constructed, to test and develop approaches that could be extended across other lines. The work was funded by the UK Government Department for International Trade through a global programme delivered by Innovate UK.

Our Role

Hanoi Metro Railway Board (MRB) is the delivery body for a rapid transport system in Vietnam. It currently has one operating line and one line, Line 3.1, under construction. Hanoi Metro Line 5 is a complex urban transport project involving multiple stakeholders, assets and entities, and therefore multiple disparate data sources. Cohesive, and our partner DPA Ltd, developed a strategic vision, recommendations for action and the implementation roadmap for a complete digital transformation, including:

- Creation of a comprehensive master data management strategy

- Integrated common data environment
- Process development for data integration
- Foundation for future innovation
- Enhanced data security
- Practical asset information management

Client Benefits

This project was described by Crossrail International as “A world-class reference for how to transition from analogue to digital”. Hanoi Metro now has a clear roadmap for developing digital capabilities across its people, processes, technologies and data. It is embedding this plan into the design, delivery and operation of Line 5.

Rennie Chadwick
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"Advancements in going digital are driving improvements on major railways projects, leading toward the breakthrough advantages of infrastructure and of rolling stock digital twins."

Richard Van Dongen
Director, Cohesive EMEA



Cohesive

Nomad Digital

Connecting Everything for the Intelligent Journey

Nomad Digital is a world-leading provider of passenger, fleet-management and monitoring solutions to the transport industry.

With a global presence and a team of rail industry experts, Nomad brings its systems architecture and integrator capabilities to provide modern processing, monitoring and connectivity solutions to trains.

Partnering with train and freight operators, rolling stock owners and train builders globally to facilitate a significantly enhanced service from passenger Wi-Fi to infrastructure monitoring, Nomad Digital proudly celebrated its 20-year anniversary last September.

Data-Driven Intelligence

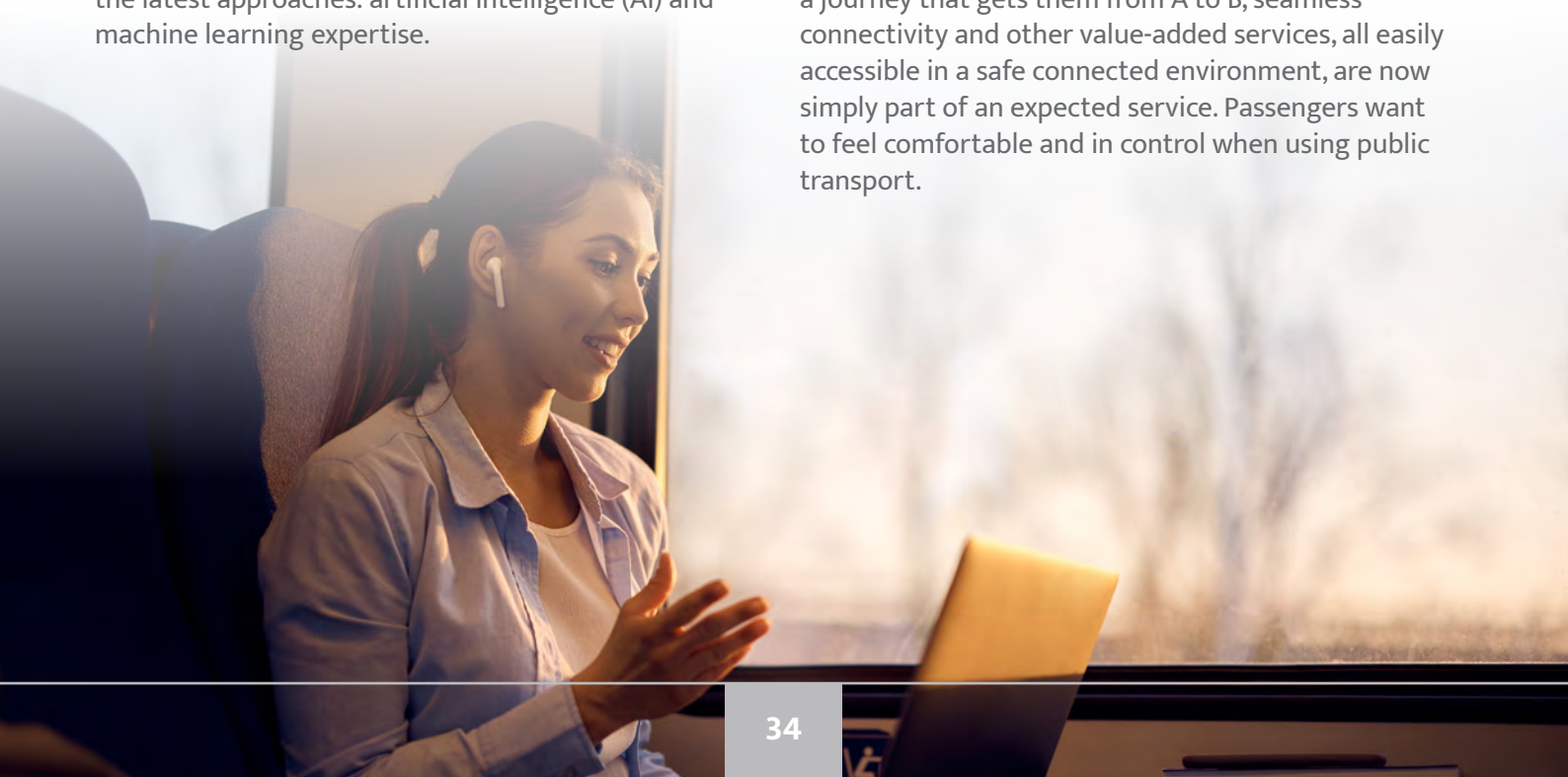
Through understanding the potential unlocked value of data collected from rail journeys, Nomad Digital also supports operators with achieving operational efficiencies through real-time fleet monitoring utilising the latest approaches: artificial intelligence (AI) and machine learning expertise.

This includes supporting the development of proactive **rail maintenance** strategies with robust rail connectivity and edge processing at the core. Providing operators with in-depth fleet intelligence for data-driven decision-making can help tackle operations and maintenance challenges early, thus preventing costly fleet downtime.

Nomad Digital also offers an extensive range of infrastructure monitoring solutions with its powerful Onboard Data Centre (ODC) providing edge processing capabilities to report on 'events' detected by onboard monitoring systems.

More than Travelling from A to B

As passengers continue to seek more than just a journey that gets them from A to B, seamless connectivity and other value-added services, all easily accessible in a safe connected environment, are now simply part of an expected service. Passengers want to feel comfortable and in control when using public transport.



With this in mind, Nomad Digital continues to have one eye trained on the future to develop innovative, AI-supported solutions to meet ever-evolving industry demands for a fully connected, end to end **passenger experience**, as well as supporting Mobility-as-a-Service (MaaS) initiatives.

Leading the Way in Connected Transport

The modern-day landscape of rail services with connectivity at the heart of everything is where Nomad Digital comes in. The integration of Nomad's products and services into the on-train environment improves the passenger journey and delivers efficient technology, both operating on one common platform. Nomad Digital's aim is to add intelligence to what were once passive fleet sensors, eradicating the need to rip and replace.

Integrated and Scalable Solutions

Among all of the available solutions within Nomad's portfolio its offerings include:

- Fleet and rail connectivity
- Trackside networks
- Real-time fleet management
- Historical reporting
- Security-as-a-Service
- Wi-Fi and internet access
- Remote online condition monitoring
- Onboard Data Centre
- CCTV
- Engage Portal
- Passenger and on-board information systems
- Mobile engineering applications
- Infrastructure monitoring solutions

The Train Future

Improved utilisation of available data and extracting more value from existing onboard and wayside sensors is key to the future of rail and public transport. Being able to harness more insights from existing data sources and fill any gaps with AI techniques will help build passenger and operator confidence. From a passenger perspective, they will be alerted when issues have arisen along their journey and will be aware of alternative options which may not necessarily be using

a traditional mode of travel i.e., e-scooters. Operators will have the ability to detect potential issues with their rolling stock or the infrastructure they operate on and be able to act before service-affecting failures occur.

Increased edge processing will make the reliance on data transmission less demanding with only event data being sent. Connectivity will improve with the rollout of 5G and eventually 6G networks, but it will also see satellite connectivity become a viable alternative with the development of new phased array antennas, LEO satellite constellations and falling data costs.

The latest innovative communication solutions, which include **trackside radio networks** can revolutionise the rail industry by providing a flawless, uninterrupted connection for the end consumer with rail operators benefitting from the savings in long-term use. Every indicator is pointing to an increasing demand and higher expectation from rail passengers for fast, consistent, and reliable Wi-Fi communications during their journeys. With the introduction of 5G technology for the train to ground link, some of these measures will be met, however, there is still a strong argument for a private trackside radio network for when the digital experience of passengers becomes priority.

The Future of Mobility

As rail industry requirements continue to evolve, Nomad Digital is committed to innovation and the development of industry-leading solutions to champion the digital train becoming a reality.

To speak with the Nomad Digital team of experts, please contact experts@nomad-digital.com or visit nomad-digital.com.



Leading the way in connected transport

As a world leading provider of passenger, fleet management and monitoring solutions to the transport industry, we are committed to continuous innovation and development of industry leading solutions.

experts@nomad-digital.com |  



UNPARALLELED PASSENGER VIDEO STREAMING EXPERIENCE

IS WITHIN REACH

Excite your passengers with enhanced onboard Wi-Fi performance by enabling seamless internet video streaming from popular content delivery providers, without consuming precious train-to-internet cellular bandwidth with Netskrt's eCDN technology.



www.netskrt.io
info@netskrt.io

Netskrt Systems

Meeting Passenger Wi-Fi Expectations as Sustainability Drives Rail Travel

And Going Beyond, Giving Passengers the Video Streaming Services They Want



Demand for rail travel is growing, driven in part because rail is the sustainable choice.

As rail travellers return after Covid, they come with new expectations – developed as they filled time at home watching video streaming services. Rail operators can take this opportunity to re-invent the onboard experience, offering passengers the option of watching their favourite streaming services while they travel.

The global passenger rail transportation market is expected to reach **\$307 billion** in 2025, despite a recent **70%** average drop in ridership due to the pandemic. One of the drivers is the focus on choosing sustainable

modes of travel. A **recent report by the European Environmental Agency (EEA)** concluded that rail travel is the best and most sensible mode of travel, apart from walking or cycling. The report says that a shift from air to rail travel can play a key role in meeting the goals of the European Green Deal, which aims to reduce greenhouse gas emissions from transport by 90% by 2050 compared with 1990 levels. To support this shift, some European countries are banning domestic short-haul air travel when rail is an available alternative.

This presents a challenge and an opportunity for rail operators. If passengers are forced to choose rail, it will be all the more important to give them a satisfying travel experience. Two technology-driven trends combine to present a great opportunity for

rail operators: the consumer switch from TV to video streaming services, and new edge caching technology that can bring video streaming to consumers on trains and, at the same time, improve Wi-Fi performance.

Returning travellers are coming back with new entertainment desires. As far back as May 2021, Nielsen reported that streaming platforms pulled in a bigger share of viewers' time than broadcast networks. This switch was further fuelled while consumers stayed at home during Covid, and streaming providers pushed to deliver more and more new and exclusive content. In their [Media Nations: UK 2022](#), Ofcom found that "Subscription video-on-demand (SVoD) services like Netflix and Disney+ were used by 67% of UK households by Q2 2022." And while this was a slight decline from the height of the pandemic, "Collectively, these services have broadly retained their share of viewing after achieving a surge in take-up in 2020, accounting for 18% of total TV viewing in 2021 (19% in 2020), or an average of 58 minutes viewing per person per day." As consumers increasingly turn to their streaming subscriptions for entertainment – from Netflix to Disney+ to Amazon Prime, they are also expecting to be able to watch these subscriptions wherever they go. According to [Conviva State of Streaming report](#), video streaming time on mobile phones jumped 22% in 2022 over 2021.

Before this shift to streaming video, rail operators were already struggling to meet Wi-Fi expectations. According to the [2020 UK National Rail Passenger Survey](#) fewer than 40% of passengers were satisfied with the railway's internet connectivity on board. Onboard internet connectivity ranked dead last in terms of passenger satisfaction. Limited internet bandwidth means passengers accessing email share bandwidth with those browsing, and those watching their favourite streaming services. While emails may come in quickly, web pages are slow to load, and video watchers suffer from endless buffering and pixelated images. The walled-garden video-on-demand (VOD) services offered by some rail operators don't offer enough choices to satisfy customers, not to mention the substantial video content licensing fees. And blocking video streaming to protect email is a recipe for customer dissatisfaction. Rail operators need a new solution to improve internet connectivity and the onboard customer experience.

Intelligent edge caching presents a new, affordable,

and easy-to-deploy and manage solution. Content delivery networks already help video streaming service providers deliver quality viewing experiences to subscribers' homes, by caching content close to users. Netskrt's edge Content Delivery Network (eCDN) solution brings that same improved viewing experience to rail cars. With Netskrt on their trains, operators can encourage passengers to use their own devices and subscriptions to stream video content as well as select live broadcasts, such as sporting events.

Combining cloud-based machine learning with network-aware edge caching, Netskrt's eCDN delivers a high-quality video streaming experience – just like at home. Once in place, Netskrt's eCDN will also enhance onboard internet access for other services and improve passenger satisfaction, by minimising the use of precious train-to-internet cellular bandwidth.

Rail networks have seen substantial growth over the past ten years and technology will drive new innovation in the market in the years to come. With the climate crisis increasing customer demand and as the industry works to overcome new challenges brought on by the pandemic, operators cannot only restore passenger numbers to pre-pandemic levels but also offer an overall enhanced end-to-end rail travel experience. Internet connectivity is necessary for passengers and now is the time for rail operators to bring internet video streaming to the absolute edge with Netskrt's eCDN solution.



televic GSP

Smart Lifetime Extension Makes Your Railway Fleet Last

Intelligent technology is becoming increasingly decisive for passenger information systems. Consequently, the maintenance of your software deserves as much attention as that of your infrastructure. A new approach is therefore required, especially since market trends are pushing for more sustainable solutions.



Mark Lütkefend,
Business Development Officer at Televic GSP

Growing Complexity and Importance of Software

The basics of passenger information system (PIS) maintenance have not changed. They are still mainly focused on repairs and spare parts. The complexity of integrated electronic devices, however, has increased enormously over the years. No wonder, with PIS getting more and more interconnected and delivering more detailed information in real time.

Relying on PIS support is vital if you want to keep both your hardware and software in pristine condition. *“Historically, a lot of effort has been put into the close monitoring and maintenance of rail vehicles’ hardware devices,”* says Mark Lütkefend, Business Development Officer and former head of Televic GSP’s customer support.

“But the same effort should go into regular software check-ups and updates. This is a mindset that is not yet fully established, even though PIS are now packed full of sophisticated software. It is important to understand that the intelligent technology that is being used today

simply will not live up to the industry standards in, say, 10 years’ time.”

The Search for Sustainable Solutions

A different approach towards the after-sales services for rail vehicles is needed if you want to make the best use of your resources. Not only because of PIS devices’ ever-increasing complexity, but also because the next emerging trends are propelling a growing demand for sustainability in the industry.

Green Technology

To avoid obsolescence and unnecessary waste of materials as much as possible, train builders and operators are increasingly looking for long-lasting support to face challenges that come with ageing equipment. This means that spare parts or like-for-like replacements should remain available for repairs during their fleets’ entire lifetime.

Mark: *“That is why we already take into account the need for longer product and component lifetimes from the design phase onward, an approach we follow for both software and hardware. By effectively planning for the future, we are safeguarding continuity in the event that components break or malfunction.”*

“Next to that, we are using components based on the latest state-of-the-art technology for repairs. For instance, today’s used capacitors have better properties and often a longer lifetime than 10 years ago.”

Intelligent Obsolescence Management (iOM)

Continuous technological advances keep enhancing your PIS, and thereby passenger satisfaction and on and off-board safety. At the same time, these automatically imply that your system will be more quickly prone to obsolescence.

Mark: *“Upgrading entire systems is time consuming and usually requires lots of administrative work. Luckily, with a proactive obsolescence-management plan in place, it is not necessary to change everything. If, for instance, 80% of your system can be retained (e.g. the entire audio system and its devices), we will advise you to upgrade only the 20% that are strictly essential (e.g. your PIS controllers).”*

The Answer: Services Focused on Smart Lifetime Extension

Maintaining PIS devices and software punctually, and carefully anticipating obsolescence are key to keeping your fleet running as long as possible. But organising the processes involved is no easy task. That is where our services team can make all the difference.

After a series of collaborative training sessions and workshops we are able to draw up maintenance plans and service level agreements which can significantly increase the lifetime of your fleet.

1. **Workshops:** first, we need to know the present state of your PIS, how you are using them, your specific requirements and which risks are involved.
2. **Training:** if required, we can guide your technicians and share practical tips to get more out of your passenger information systems and devices.
3. **Custom SLAs:** based on your specific needs, we will work out a maintenance contract or service level agreement. Beside basic maintenance services, a multitude of other modules can be added, such as:
 - proactive advice for annual repairs or replacement of obsolete components
 - a roadmap for every product with its anticipated lifetime
 - fixed prices for repairs for a predefined period
 - express repairs for critical devices or applications
 - refurbishments of single products

By relying on our experts, you can minimise downtime, avoid resulting penalties, eliminate costly emergency repairs and save money in the long run.

If you would like to have more information, contact us at televic.com or send an email to televicgp@televic.com.



Televic GSP is dedicated to provide innovative and reliable:

- › Passenger Information Systems
- › Condition Based Maintenance technology
- › Services & Lifecycle Support

With over 35 years of experience in the rail industry, we design, manufacture and maintain globally our products and solutions.

Find our technology on-board over 60 000 vehicles worldwide.

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- › Visit our website for more info!
- › Or contact us at televicgsp@televic.com




 Directory

Data & Monitoring

PaxLife Innovations

Introducing paxCMS

A Single Platform to Easily Create and Flexibly Manage Your Passenger Information and Infotainment across Any Vehicle Fleets

In recent years, public transport operators have been discussing technologies, strategies and opportunities that can encourage the public's return to rail and other shared mobility offerings.

In this perspective, improved passenger information (PIS), whether on board of vehicles, at stations or on the passenger's smartphone, is a service that can play a significant role in enhancing the travel experience, increasing satisfaction during the journey, as well as growing the business and elevating the brand of transport operators.

Until now, managing fleets of screens, whether on-board or at station platforms, is often a source of complexity and increased effort, and hinders the consistency of information or the delivery of attractive content to passengers.

That is why PaxLife Innovations has developed a simple, efficient, future-proof and flexible solution. PaxLife's paxCMS makes it easy to manage, update, upgrade and

operate fleets of passenger screens, even if they are not consistent across manufacturers or vehicles, to gain efficiency, improve the consistency of the information provided and deliver a far more engaging experience.

One Software Solution Independent of Vehicles Specifics

Based on PaxLife's core product, the railSTACK platform, paxCMS enables the abstraction of the actual on-board equipment via a simple interface (API), provided by PaxLife Innovations. This means that the passenger information software application no longer makes any difference between the display hardware installed on board – or even whether the passenger information is running on board a train, a bus, a tram or at a station. The major advantage is that paxCMS offers transport operators the possibility to easily manage their PISs with a single software package, regardless of the vehicle's specifics or heterogeneity. And it also allows the content of the on-board display to be visible on the passenger's smartphone.

Simplify Building the PIS Solution with a Layout Editor

paxCMS includes a tool for transport operators to

further simplify the construction of the PIS system without programming knowledge required: updating information, splitting the screen, adding external elements such as new information (weather or news), advertising, videos, images, defining sequences or content to be viewed under certain conditions, e.g. while driving, when approaching the stop, when stopping etc., all this via a simple drag and drop procedure similar to building a website.

Content and updates can be deployed on individual vehicles or entire fleets of vehicles at the touch of a button for a chosen period of validity. It is now very easy for transport operators to set and homogeneously transform the message or look and feel of passenger information systems at any time.

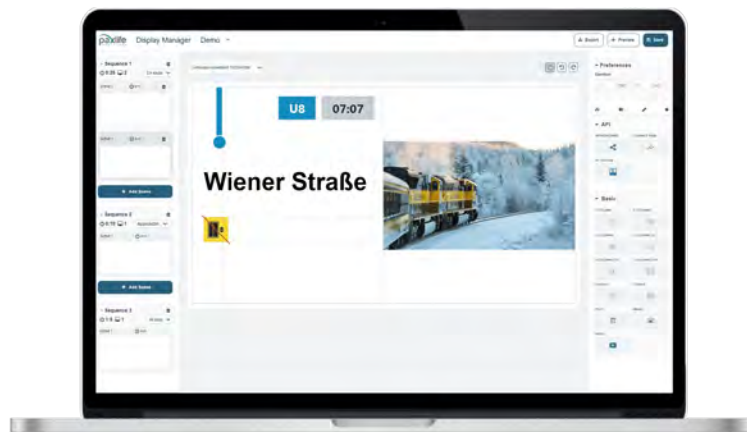
The information or elements to be displayed (such as journey information, delays, etc.) are implemented once, consistently and in the same format for all vehicles. In the case of fleet expansion, this is a great advantage as it facilitates and accelerates the deployment of known content/information on new vehicles.

Automating the Generation of Ancillary Revenues from Advertising

Finally, with regards to information and content, paxCMS now offers the cutting-edge capability to acquire and integrate in the PIS layout structure, dynamic data – internal or from third-party systems – to be displayed on passenger screens. In addition to standard travel information, data can also be daily news, current weather or even dynamic acquisition of advertising content from digital out of home (DOOH) and their best bidders platforms; moreover the display content can be programmed to follow a set of display rules at appropriate times or target a separate set of displays.

Overall it allows transport operators to leverage the full potential of their fleet of displays and their display systems in place for passenger information – on-board or at stations – to generate additional revenue from advertising or any other content in an automated and optimised manner.

PaxLife Innovations is a German software company that specialises in information, content and digital services



A layout editor to easily build your PIS

delivery in rail and public transit. paxCMS is currently being deployed in the regional transport system in South Tyrol and in the subway section of Berlin's public transport system. If you want to know more or request a demo, get in touch with us!

Key Benefits

- One software platform to provide consistent information across fleets – on-display screens, passenger smartphones and even at stations
- Ease of use to create your PIS, no programming knowledge, no constraints, no limits
- Maximum control over what information to be displayed on board and when
- Additional revenue potential from advertising and content providers
- Enrich the PIS with news, information or third-party providers to enhance passenger experience
- Cost-effective, scalable and future-proof solution

For more information please contact:

Delphine Ehret

+49 331 243424-0

sales@paxlife.aero



Frauscher Insights

Intelligent data platform making data from railway operations available via various applications

Benefits

- optimisation of ongoing railway operations
- central data storage and secure processing of data
- data accessibility from anywhere
- enablement of smart maintenance
- reduction of maintenance costs





Intelligent Data Platforms as a Key Driver for Digital Railway Operations

By Thomas Hartinger | Product Manager

In this new era of digital transformation, using future-proof data platforms has immense potential for railway operations.

Operators are generating more and more data – from control command and signalling technology to infrastructure monitoring. In the course of digitalisation, data platforms allow existing and new data to be collected, intelligently bundled, and more efficiently used than ever before. With optimised data, the availability of railway infrastructure can be increased, and operations can be cost-efficiently adapted to existing as well as future requirements.

Data as a Key Asset for Digital Transformation

Why is intelligent data key to managing the myriad digital challenges of rail operators? Perhaps the most important advantage is the flexibility to monitor the status of the network and all parts of various systems. To do this, a system must collect and evaluate various existing or newly integrated data and make the results available as required. Intelligent data platforms offer clear advantages for operations, for example, through predictive maintenance. As a result, critical infrastructure conditions can be identified at an early stage and rectified quickly. Other maintenance and repair work can also be planned more precisely as required, whereas until now, they have mainly been scheduled according to fixed maintenance periods.

‘Frauscher Insights’ as a Solution for the Intelligent Use of Data

Frauscher Sensortechnik is a technology pioneer in the railway industry. For more than 30 years, the company has been breaking new ground with its products and services. This also applies to the intelligent use of data, since the latest technologies of Frauscher focus on the digital challenges that railway operators are facing. Frauscher’s solutions and services are combined with the established procedures for train detection to form a digital ecosystem (see Figure 1).

The inductive wheel sensors transfer information to the established digital axle counting solutions, where it is processed. This data – together with further information from rail operations and external content – is collected on the data platform and made accessible

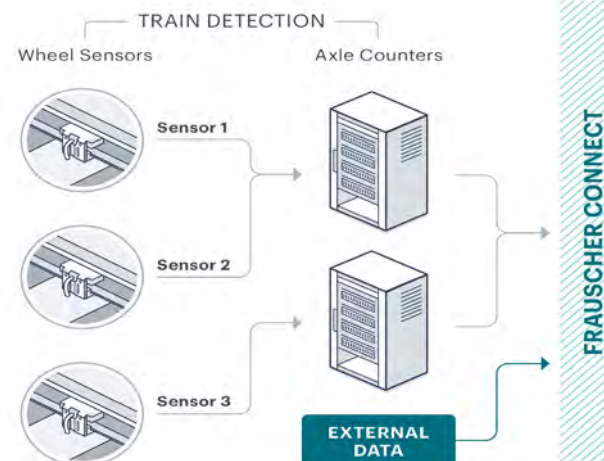


Figure 1: Schematic representation of the data platform Frauscher Insights



Figure 2: Visualisation of task management as a use case

to numerous different applications. This networked and flexible approach opens the way for more possibilities in the future of rail operations.

A Data Platform as a Digital Ecosystem

Frauscher sees the use of data platforms as a crucial success factor in the digitalisation of railway operations. In the age of rapid technological advances, it is important to combine and store information from complex technical systems in a future-proof manner. In the field of rail technology, the data from the operator's secure network is stored centrally and made available for various applications. Since it involves complex networking of multiple data sources and application interfaces, such a solution can be referred to as a digital ecosystem.

The strengths of Frauscher Insights – at a glance:

- Expandable modular structure: additional information such as status information or meteorological data can be integrated into the data platform at a later time
- Scalable digital applications: railway operators can optimise operations and the associated infrastructure through the intelligent use of data
- Diagnostics: the Diagnostics application displays all data collected on the track on a user-friendly

dashboard and sends a notification where necessary, which allows negative changes in the condition of components to be detected early

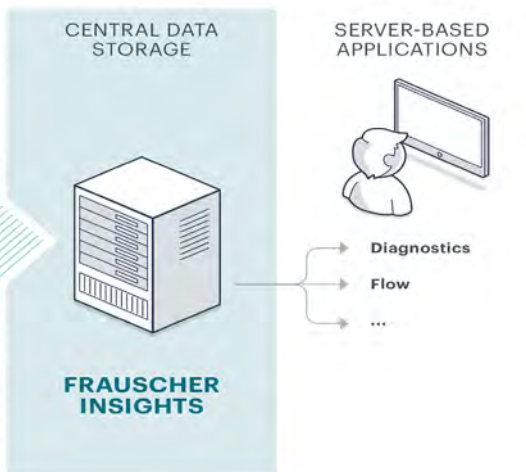
- Task management: with the Motion application, maintenance and service work as well as commissioning can be planned and organised efficiently, with tasks even being assigned to specific employees. The dashboard also uses real-time data to show which maintenance tasks have already been completed or are still open (see Figure 2).

Conclusion

Innovative technologies such as a data platform enable rail operators to intelligently use existing and new data together. The numerous advantages in terms of capacity, availability, efficiency, safety, economy and other factors make such solutions a crucial tool for the industry in the near future.

A digital ecosystem that allows for the seamless integration of different data sources is no longer an option but a necessity. The great challenge is combining data from the complex technical systems of railway operations with other information in a scalable, future-proof manner.

With Frauscher Insights, Frauscher has developed a sophisticated solution for the intelligent use of data that meets the requirements of operators and offers additional options for future integration. Its flexible and scalable applications empower railway operators to solve digital challenges in areas ranging from diagnostics and predictive maintenance to efficient task management.



In case of questions, contact Harald Muraier

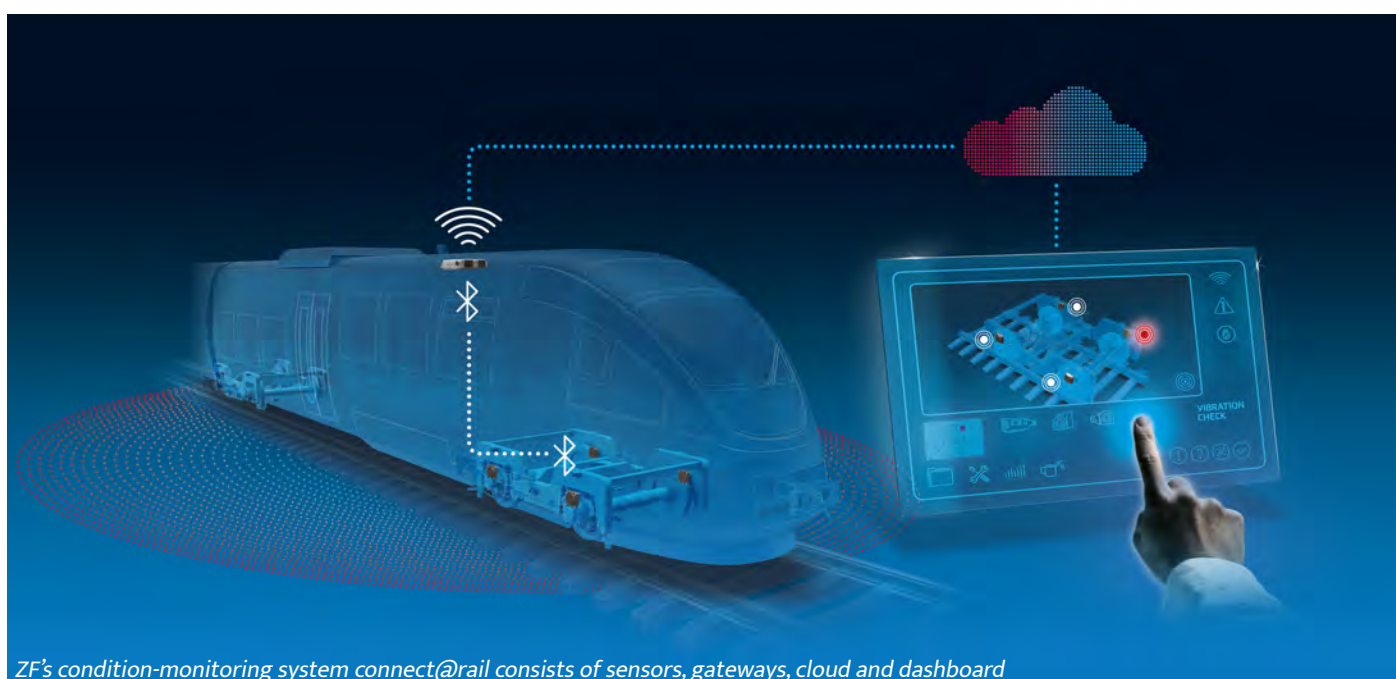
Sales | Business Development

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ZF Friedrichshafen AG

Keeping an Eye on Everything with ZF's connect@rail Solution



ZF's condition-monitoring system connect@rail consists of sensors, gateways, cloud and dashboard

Reliability in rail transportation – be it cargo or people – is more important than ever.

Operators and manufacturers must keep downtimes to a minimum, safety and comfort at a maximum, and avoid failures at all cost. Fortunately, ZF is able to support companies with its smart and digital connect@rail system for condition monitoring and maintenance management.

Smart. Thorough. Digital.

Connectivity and digitalisation have become an integral part of our everyday lives. The enormous quantities of information available everywhere and in real time make

new functions and business models possible that were unthinkable a few decades ago. With connect@rail, ZF leverages its extensive expertise as a leading global company for driveline, chassis and safety technology. The system is a comprehensive and modular approach to fleet maintenance management and condition monitoring, with the following components:

- Heavy Duty TAGs, battery-operated Bluetooth wireless sensors that are placed on the vehicle bogies. There, they measure acceleration, vibrations and other parameters.
- Gateways, the VCU Pro Onboard Units, with CAN interfaces, several analogue input and digital output ports that support Wi-Fi and all common GNSS. The gateway is able to store and pre-process data gathered by the sensors.



With connect@rail, ZF supports smooth operation in the rail network

- The ZF IoT Cloud, accessed via said secure onboard gateway, uses the collected and enriched data to detect wear, damage and abnormality early and precisely.
- A dashboard for desktops and mobile devices that gives end-users a comprehensive overview of all parameters, reports, maintenance schedules and more.
- Digital typeplates with an integrated RFID chip that log actual installation position and hours of service of individual components. They both facilitate and keep records of scheduled maintenance.

With these hardware and software components, the connect@rail infrastructure and driveline monitoring system is able to monitor flat spots, wheel-tread wear, tracks and even driveline components. As it can be integrated and retrofitted into existing vehicle platforms and is not dependent on ZF-proprietary hardware, it offers manufacturers and fleet operators an efficient way to reduce downtimes. Thus, it helps keep public and cargo transport running efficiently.

Eco System

The modular designed connect@rail platform is a turnkey solution. ZF not only delivers the matching hardware, but also offers the required software, the advanced analytics and the associated platforms. If requested by the customer, more sensors, evaluations and monitoring functions can be added. ZF is also

meeting the challenges of digitalisation by creating and implementing Eco Systems, leading to shorter periods for market launch of innovative and tailored solutions that meet rapidly changing customer requirements. The open, customer-specific software and hardware architecture of the connect@rail system allows it to integrate partners into the ZF Eco System.

ZF Friedrichshafen AG

Industrial Technology
Marine & Special Driveline Technology

Phone +49 7541 77-3610

rail@zf.com

zf.com/connect-at-rail

Click or scan the QR code below to find out more about ZF





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



Proven Tier 1
monitoring technology
supporting rail
operators since 2018

4
YEARS

TRANSFORMING THE SAFETY, PERFORMANCE & EFFICIENCY OF YOUR RAILWAY SIGNALLING POWER SUPPLIES SYSTEM

CableGuardian is a Network Rail approved Tier 3, Tier 2 and Tier 1 cable monitoring system as specified in NR/L2/SIGELP/27725 – Insulation Monitoring and Fault Location Systems for use on Signalling Power Systems.

 **£5M SAVED**
in penalty payments

Our unique technology provides unparalleled insights across the lifecycle of a system, moving to a true condition-based asset management approach that allows cable faults to be quickly and accurately located.

 **30K AVOIDED**
in delay minutes

Improve signalling resilience by turning data into information and insight. Realise safety, performance and efficiency benefits for your operational assets with proven results since 2018. Network Rail Approved: PA05/06538.

 **£150K SAVED**
in maintenance costs

 **CABLE
GUARDIAN®**
A VIPER INNOVATION

Helping passengers arrive on time

Find out more...

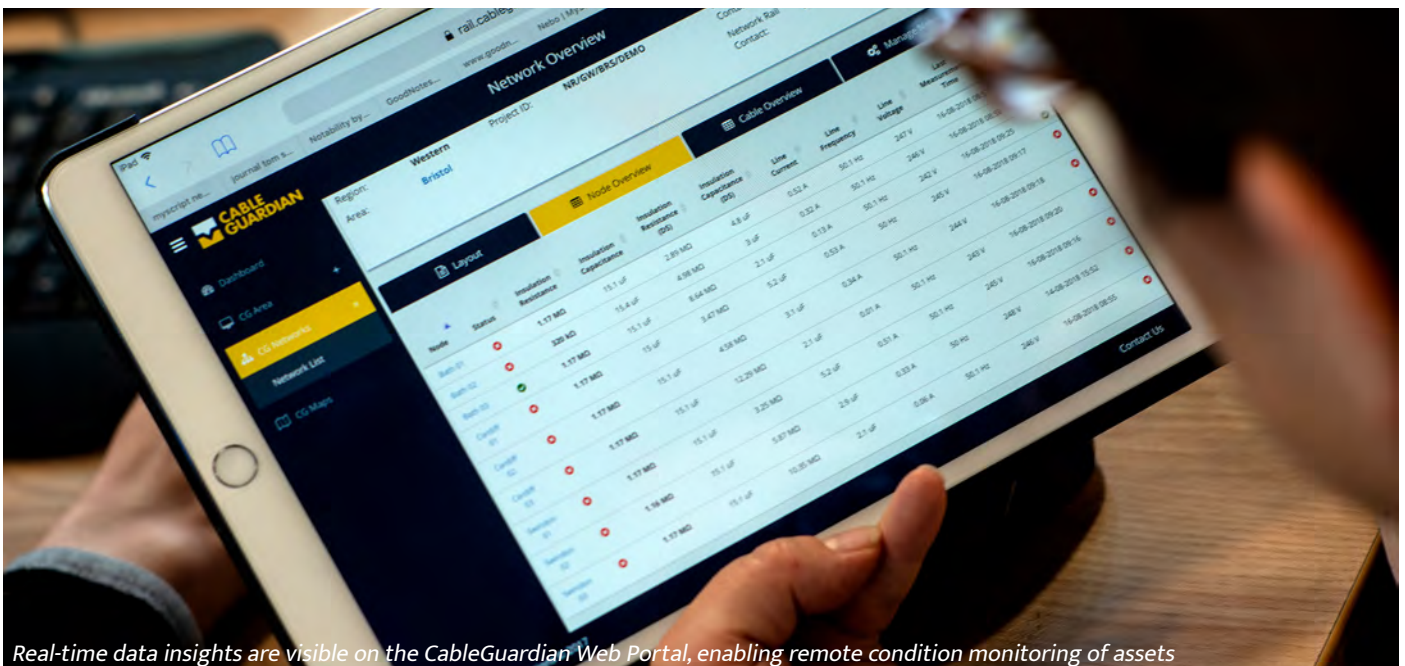


www.viperinnovations.com/cableguardian



VIPER INNOVATIONS

UK-Based Technology SME Supports Rail Operators with CP7 Challenges



Real-time data insights are visible on the CableGuardian Web Portal, enabling remote condition monitoring of assets

Reviewing the High-Level Output Statement from the Secretary of State for Transport, laying out the desired objectives from Government to the Office of Rail and Road for Control Period 7, it is clear that the industry will be challenged to deliver outstanding performance, accessibility for all and world-class environmental management. All while improving efficiency, operational effectiveness and ensuring a solid underpinning of safety management.

The big picture states that rail will play a prominent part in the levelling-up and green agendas for the UK will be very welcome across the industry and society-at-large. Twin this with strong statements on creating supply chain stability, SME spend and the visibility of project pipelines, there is much to be positive about. It cannot be ignored, however, that there is a significant portion of the document given over to the need to modernise and drive ever-greater efficiency into the system.

Strong statements on the need to improve long-term asset sustainability will undoubtedly drive improved punctuality and provide the financial efficiency required for a world-class railway. Strong collaboration with local authorities will move towards delivery of a timetable that meets local needs and will cement the devolved railway's regional relationships. R&D will be hard-wired to the objectives in the HLOS and will be delivered collaboratively between academia, industry

and the Rail Safety and Standards Board. This will be monitored using a data-driven, closed-loop approach of the effectiveness of innovation expenditure – with this statement on demonstrable benefit giving an indication of where the industry will need to apply efforts in the next control period.

Viper Innovations welcomes the objectives set out in the HLOS and the spirit of continuous improvement that the document is undoubtedly striving for. Driving forward modern maintenance and asset management practice and contributing fully to a team-based approach to a data-driven railway is in Viper’s DNA. The requirement to demonstrably deliver forward-thinking asset management and innovation, best-in-class safety performance with excellent value for money mirrors our vision of the rail industry.

Viper’s CableGuardian system is already delivering vastly improved safety, huge efficiency improvements and significant delay minute savings in CP6 and will deliver even more in CP7 and beyond. The unique technology and proactive service model has provided a never-before-seen opportunity to gain an insight into this most critical of railway assets – signalling power supplies. Viper’s malleable technology and collaborative service model fits perfectly into both the spirit and requirements specified in the HLOS, providing the user a ready-made opportunity to deliver the railway we all need moving forward, whilst also offering the opportunity to contribute to UK PLC as an exportable system.

Signalling power failures are a key asset, accounting for a vast amount of delay minutes, whether these are caused by cable theft, impact damage, rodent ingress, design issues or age and environmental degradation. These failures directly oppose all of the aspirations from the HLOS requirements.

Viper has worked collaboratively with Network Rail to implement this technology and is supporting a change in company standards to enable working practices to be made more efficient and develop a product and service providing asset insights to really improve railway performance. Underlying asset problems have been identified months before becoming a service-affecting issue, and failure modes not previously detectable are now being monitored and prevented. A change in standards would eliminate the need to perform a wide range of expensive and intrusive manual trackside



Installation of CableGuardian units can be completed in under an hour without the need to power down

tests. This collaboration is moving the UK rail industry into a new era of predict-and-prevent maintenance on a critical railway asset.

With respect to asset management, presently, renewals are done across a wide area based on information collected about the asset in a snapshot every 5 years, costing millions every year. This asset information can be seriously flawed as weather and transient conditions can affect the asset at the time of testing, giving a skewed view of asset condition and meaning too much of the asset is renewed.

CableGuardian allows the asset engineer to minimise the scope of renewals to individual elements of the system by continuously monitoring all cables, switchgear and transformers, providing a clear and accurate picture of asset condition. This is enabling spot renewal rather than system renewal, fundamentally changing the asset management landscape for future control periods.

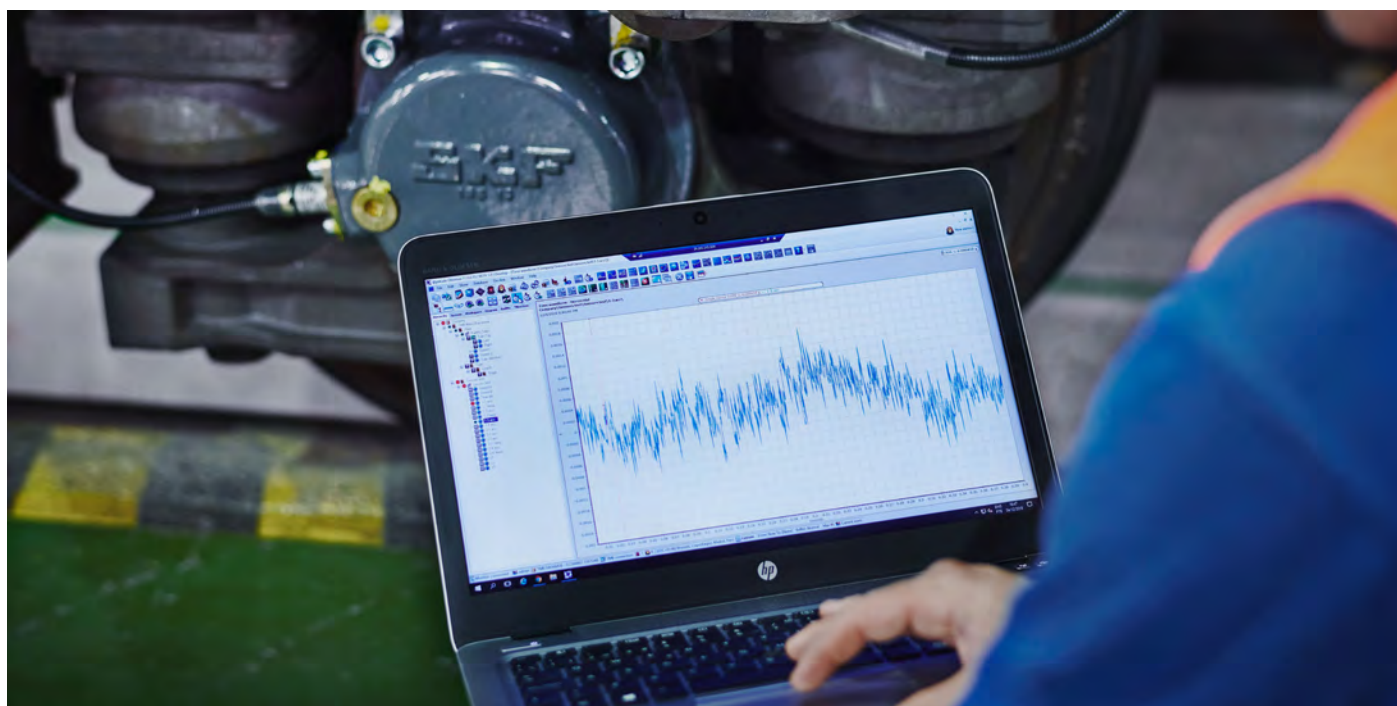
Through its collaboration with clients, Viper Innovations is making fundamental improvements across the board. Exceed your CP7 targets and join regions up and down the country who are already seeing the proven benefits of this outstanding UK technology.

Click [here](#) to find out more.

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Digitalising Rail: The Best Is Yet to Come



Digitalisation of the rail industry has no end station.

It's all about the journey, and the choices made along the way can make it a successful one. What matters now is getting on the right track towards the new era of operational excellence, technological innovation and endless fleet possibilities.

The global rail industry is well on the road to recovery after the pandemic. Sustainability is taking up residency at the forefront of society's mind. Restoring the locomotive to its former glory therefore involves winning back trust and proving how safe, sustainable and fit for the future rail operations really are. After all, mobility is a very competitive market that will require big changes.

And the digitalisation of formerly manual processes is set to play a huge role in this resurgence. If rail is to unlock its maximum potential as an agent for decarbonised and socially inclusive mobility, operators and fleet owners must adopt future-proof technologies and make best use of the data that the industry provides in abundance.

Fleets of the Future

Big data has already proven immensely beneficial in many industries and rail is no exception. It is a mystery then that 80 percent of data produced worldwide is either misused or simply not understood.

Even today, most maintenance schemes and underlying processes are centred around experience, historical observations and assumptions (not to mention a

lot of paper!). These approaches are, however, time-consuming and don't allow operators to get the most out of their components' potential service life.

Terabytes of data are being generated from sensors embedded in industrial equipment, such as bearings in train bogie systems.

By basing decisions on accurate real-time condition data, rail operators can optimise maintenance scheduling and enjoy extended maintenance intervals – reducing both maintenance and life-cycle costs. The risk of experiencing unplanned stops and unwanted downtime is also significantly reduced through remote monitoring.

All for One, One for All

That said, the industry will need to move forward together – innovating beyond simply monitoring parts in application. Companies should look to form partner ecosystems and take advantage of relevant skills and drive innovation.

A lack of market share could be holding back the long-awaited widespread adoption of things such as hydrogen fuel cell technology and battery-powered traction. So, what more can be done?

A Rail-volution in Integration

If rail is to pioneer a decarbonised transport and logistics sector, the integration of strategies and systems will be a likely catalyst. SKF increasingly looks to create a digital experience which both itself and its customers can share. We call this 'Railway Business Transformation'.

A holistic solution, encompassing the entire bearing supply chain and including all sales and service data, Railway Business Transformation handles data integration, data management, data sharing and cyber security.

Terabytes of data are being generated from sensors embedded in industrial equipment, such as bearings in train bogie systems.

All information – tracking orders, service contracts, refurbishment analytics, purchasing trends and so much more – is visualised in a shared web interface. The end goal is to create a comprehensive digital thread, controlling the whole bearing life-cycle digitally and contributing to improved bogie efficiency and operation.

Power to Act

A deep understanding of rotating equipment will be vital in creating sophisticated algorithms that allow SKF and its global rail network of customers to understand and process the data and transform it into valuable and actionable information. And our engineers and data scientists are merging new data in our rail operations every day, meaning scalable platforms for digital collaboration will continue to evolve as the industry itself does.

After all, one of the most important decarbonisation agents is digitalisation. Only by continuing to build on a digital thread, can rail companies encourage a modal shift away from cars and back to the tracks. That is how the rail industry can deliver value for cities, communities and companies.

Find more information on [digitalisation, sustainability](#) and get [Railvolutionary updates](#).

skf.com/group

Railvolutionary

How are you keeping up...

...with today's revolutionary and evolutionary innovations and developments – or just the big and small ideas that are changing the Railway industry? How do you get the knowledge and insights to make your job easier and more successful?

What if you could just use the Railvolutionary knowledge platform to get it all: webinars, articles, films and other updates to get relevant insights and grow your knowledge with SKF.

Curious to learn more? Go to **Railvolutionary Updates** and learn about our webinar schedule and more.



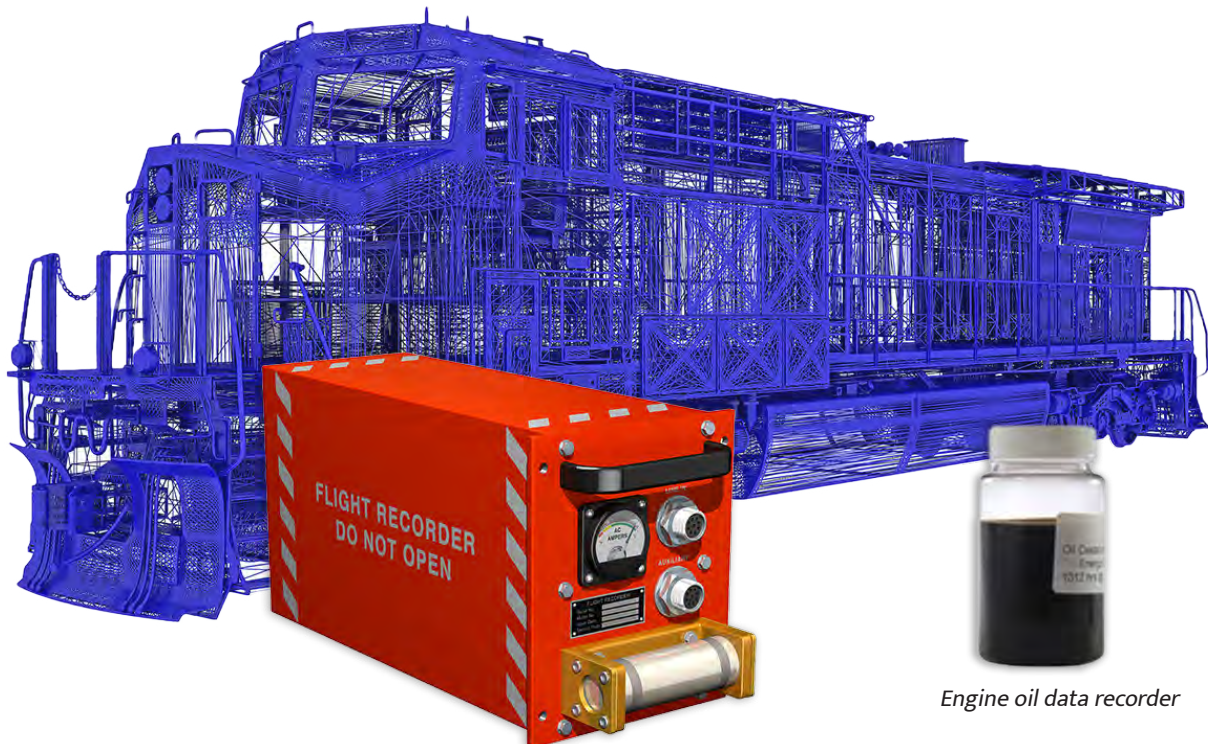
4Atmos Technologies, LLC

Predictive Oil Analytics – Beyond the Lab

Boom!...followed by violent shaking.

On a hot July afternoon, a passenger train was travelling at full throttle with its passenger carriages nearly full. The engineer on the lead locomotive heard the explosion and saw the warning lights and gauges on his console flashing at the same time. He could smell the smoke as the train quickly slowed and stopped on the tracks. The radio call went into dispatch: “We have an emergency.” The engine had experienced a catastrophic

failure on the line of road and all emergency protocols were put in place. A rescue locomotive was sent out, rail traffic on that line was suspended. In the aftermath, it would be discovered that the engine had suffered a complete failure with a large hole in the engine block. There had been no advance warning and the public agency operating the locomotive was forced to pay for a new engine. 4Atmos Technologies was contacted and sent only the previous 6 months’ oil sample sheets from the lab and was asked: “What do you see?”



Engine oil data recorder

Oil is a molecular flight data recorder. When sampled on a regular basis, it provides insight on the locomotive health as well as how the equipment was run operationally. Additionally, outside of the oil itself it can give indications of external factors (e.g. flat spots on wheels, lateral motion). How do we know? For more than 10 years, 4Atmos Technologies has been analysing millions of oil samples. This analysis is performed on data received from the oil labs who processed the samples sent in. So what is different? Rather than looking at individual thresholds, we cluster the elements into groupings that are based on known failure modes (e.g. bearing wear, turbo, crankcase overpressure, fuel leaks, contamination). These failure modes allow us to look at the health of the engine in terms of its overall risk. Our experience has also shown us that most catastrophic failures happen well below critical threshold limits provided by the manufacturers... sometimes 50% lower. Oil is also the ‘blood’ in the engine system.

When we received the oil histories from the railroad, we could see that there was a trend / pattern / rate of change that pointed us to an inspection back as early as April (three months before the failure). One observation was that the oil lab had reported all the samples as being good and provided no warning or advice of impending failure.

Beyond identifying risks / criticality, the 4Atmos team also provides prescriptive recommendations (with step-by-step instructions including photos where applicable) to help in locating and repairing the deficiency.

The oil labs play a critical role in processing the oil samples collected globally. 4Atmos takes that data and extends the value proposition by comparing those samples against similar fleets, looking for matches to known failure signatures, tracking rates of change and predicting the lead time ahead of a failure. Put in perspective, we’re making recommendations based on data that is measured six digits below the decimal point.

Over more than ten years, we’ve helped our freight and passenger rail customers confirm thousands of ‘good catches’ and recognise rapid return-on-investment (ROI). One of our customers saw the ROI in only 31 days. IoT solutions don’t require big data... they require big



Shattered main bearing

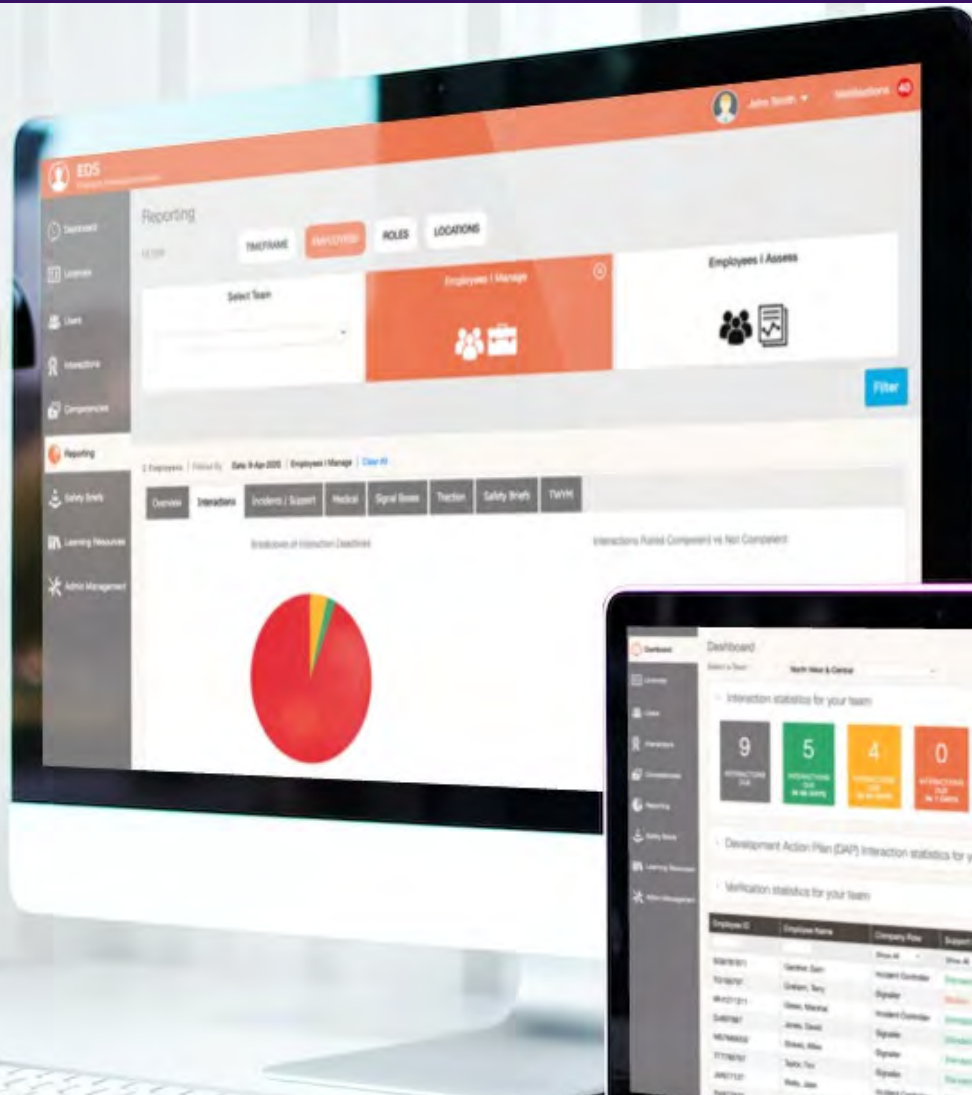
thinking. AI and predictive analytics based on probability and past failures have allowed 4Atmos to develop proprietary processes that create greater long-term value to our customer partners using fewer resources and offer insights to action a long time before alarms go off or vibration can be detected.

4atmos.com

4ATMOS
Technologies, LLC



RailSmart[®]



Delivering digital transformation with RailSmart

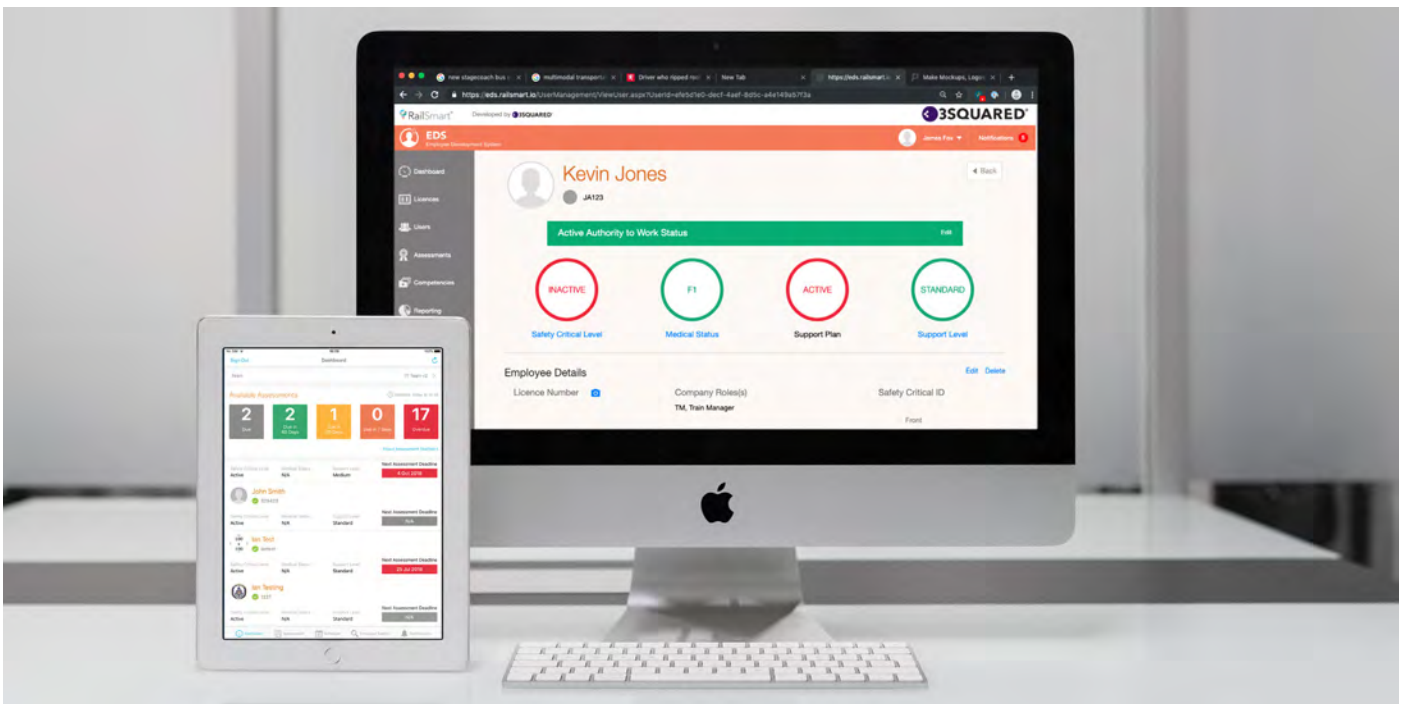
Manage operational safety, reduce incidents and improve performance

Developed by

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3SQUARED®

Driving the Rail Industry Forward through Innovation



We have seen far more innovation over the past five years within the rail industry than ever before.

From smart ticketing, to digitalisation, to electrification, there has been a significant step-change in the adoption and integration of technology across the sector, and this shows no signs of abating any time soon.

Unsurprisingly, there is clear potential for more. As we shift our focus to 2023, we naturally lean in to exploring what the year ahead can provide in terms of new innovations and technologies, which will drive the industry forward.

Here at 3Squared, we are proud to have played our part in delivering game-changing technological solutions

throughout the past twenty years. However, we don't like standing still and look forward to introducing even more, this year and beyond. So, what needs to be done to create a greener, technologically-enabled railway fit for the future?

Creating a Digitally-Enabled Network

We only need to look at history to see how new ideas and innovations come to life. For example, in the first quarter of the 20th century, the 'Big Four' emerged – a term used to describe the four largest UK railway companies (Great Western Railway; London, Midland and Scottish Railway; London and North Eastern Railway; and Southern Railway).

Formed as a result of the Railways Act 1921, the companies were founded to rejuvenate the UK's rail

network at a critical time, when freight and long-distance passenger traffic was a necessity. The Big Four supported the country and helped bring it back to life – they got everything moving in a way not too dissimilar to what we are experiencing now as we emerge from the pandemic and understand passengers’ evolving demands.

What should remain of utmost importance for the industry, and what we pride ourselves on at 3Squared, is the desire for change and making a positive difference. This remains a key ethos within our business and flows through every design decision we make and through every product we create.

Delivering Solutions that Make a Change for the Future, Today

3Squared has been hard at work implementing improvements in response to clients’ constantly evolving needs. We are rolling out a number of changes this year which support the evolution of a more innovative rail network.

Even More Effective Competency Management with EDS

We recently set up a focus group to see how we could further tailor our market-leading competency management system (EDS) to suit users’ evolving requirements. New features are now being added as a result of the feedback, and we are also enhancing existing ones.

Improvements to EDS include the ability for each client to create their own unique incident categories, making the system flexible and completely customisable to their needs. In addition, we are, as a result of user feedback, developing a set of predefined assessment templates. They enable quick selection of a templated assessment with an associated set of competencies for a particular scenario. These will better support rail employees who need to plan a series of assessments, or when assessment needs change quickly. To enhance the user experience even further, we have developed a brand-new interface, with a focus on improving ease of use, that will roll out later this year.

We are working hard to give EDS users better data

analysis capabilities, so they can quantify progress and get the most out of the software to help them drive better interventions. Customers will be able to design their own dashboards and access reporting tools within EDS to evaluate factors that are pertinent to an employee’s job role and performance.

Unlocking Hidden Capacity in the Network for Freight Access

Our ground-breaking PathPlanner solution is set to play a key role for our freight clients in 2023. We are developing a system which allows operators to find empty paths on the network, allowing freight customers to consider running trains along paths that were previously hidden, unlocking latent, spare capacity on the network. The tool is designed to help overcome capacity challenges, enabling freight services to run more flexibly and efficiently.

Looking Ahead

Developing new innovative technology is critical to fostering a greener, digital railway of the future. The beginning of the new year presents a prime opportunity to generate new, innovative ways of working and technologies. We look forward to continuing to play a vital part in this in 2023.

For more information on 3Squared and how they can support you with digital transformation, please visit 3squared.com or contact jason.durk@3squared.com.



netwiss

Improved Efficiency of Passenger Cars



The layout of passenger carriages has a significant influence on the efficiency of rail operations. Properly planned layouts can save you high costs by reducing energy consumption, increasing the seat occupancy rate or reducing delays.

You can also significantly increase operational quality and customer satisfaction, as punctuality is greatly improved, more passengers find a seat and luggage can be stowed much better.

Poorly designed vehicles, where the main focus is on maximising the number of seats, lead to significantly longer dwell time, paradoxically to reduced potential occupancy, a loss of comfort for passengers and increased safety risks.

Based on over 20 years of research and development, netwiss has built up excellent expertise in co-operation with the Vienna University of Technology. In more than 35 international projects, the efficiency of vehicles has been significantly increased through various optimisation measures, from trams and metros to high-speed trains and night trains.

Your Benefits



Save Costs

Already in the design phase of vehicles, you can determine which variants will be particularly efficient and which will be less efficient. This saves high costs in later operation and for any possible necessary adjustments.



Research

TrainOptimizer is an optimisation tool based on more than 20 years of research in the field of passenger behaviour when boarding, moving, stowing luggage and sitting during a journey with public transport.



Observations

Based on exact behaviour observations of more than 400,000 passengers in almost 100 different vehicles, any new vehicle design can be assessed efficiently.



Knowledge

TrainOptimizer is based on the exact knowledge of travellers' needs and the resulting behaviours, which is why the results obtained are particularly accurate in reflecting reality.

Our Support for You

Two – also complementary – services are offered by netwiss to optimise the vehicles:

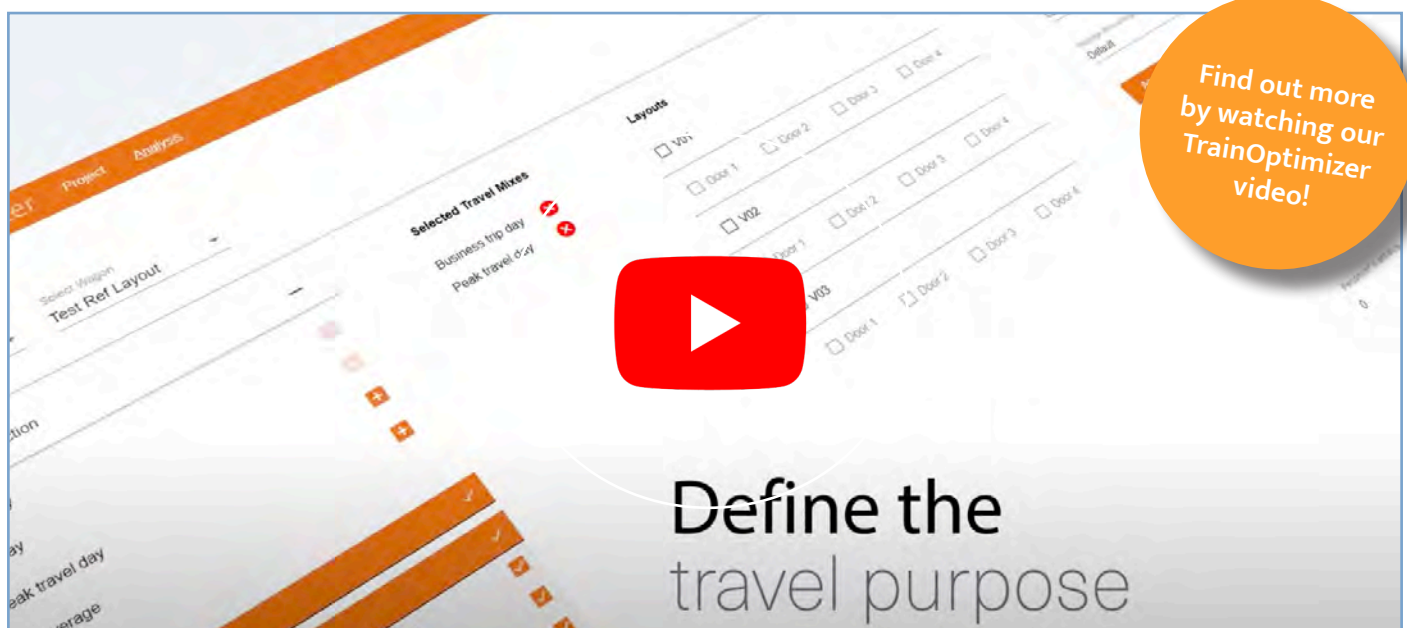
1. We advise manufacturers, operators, planners or purchasers and others from the first planning step and help to optimise all designs with regard to efficiency right from the start. We also analyse existing vehicle concepts and help to increase efficiency, e.g. with regard to redesign.
2. We offer a special software product called TrainOptimizer®, which is very easy to use and with the help of which you can assess and thus optimise

vehicle layouts yourself with regard to their efficiency.

With very little additional effort in the planning phase, very high costs can be saved during operation and, in addition, the operating quality can be significantly increased.

Insights into the software and also into our consulting services can be found at trainoptimizer.com.

We are available for non-binding enquiries at any time, please contact us at info@trainoptimizer.com.



Find out more by watching our TrainOptimizer video!

Define the travel purpose

TrainOptimizer

**Optimize passenger vehicles
and increase efficiency with
just a few clicks!**

Inter-City Trains
Night trains
High-Speed Trains
Local Trains
Light Trains
Metros
Busses

You are a

- _____ rail vehicle manufacturer
- _____ design or engineering company
- _____ railway operator
- _____ purchaser of transport services
- _____ educational institution
- _____ other institution

and you want efficient vehicles with

- _____ short dwell time
- _____ high occupancy rate
- _____ best possible baggage stowing
- _____ high passenger comfort

**then TrainOptimizer® helps you
to optimize your vehicles
with just a few clicks!**

With TrainOptimizer® you can very easily and quickly check any vehicle layout with regard to its efficiency and thus achieve significantly shorter dwell time and higher seat occupancy with increased passenger satisfaction at the same time through targeted optimization measures.



Let us show you TrainOptimizer®
without obligation!

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Passenger Information Infotainment System

next generation



Multi-fleet - Generic - Easy to Use - Flexible - One Software

The management of in-vehicle displays for fleets of vehicles is often a source of complexity, increased effort, and prevents uniform information for passengers.

PaxLife Innovations GmbH has designed a passenger information software solution that **facilitates the management, updating and operation** of various displays/systems spanning several manufacturers.

Based on PaxLife's railSTACK single platform, it enables the abstraction of the actual on-board equipment via an API, allowing PISs to be **easily updated at any time and to be totally independent from vehicle specifics**.

The PaxLife solution also includes a tool for transport operators to further **simplify the construction of the PIS system**: updating, splitting the screen, adding external elements, defining sequences, all without any programming knowledge.

Finally, it offers the possibility of generating **additional revenue from advertising** in an automated and optimized manner.

Visit Us to know more:



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< Track & Infrastructure

J. Lanfranco & Cie

Supporting the Track



Diamonds Canada

Our presence on the international markets is constantly growing, and the track is a very important area of application as it combines two distinct sectors, freight and passenger lines.

Europe has been our latest zone to re-engage with freight and it also has a more limited network, but it's another significant area of expertise.

As a result, we have seen our subsidiaries developing many applications in Brazil, Chile, Canada and the USA.

Europe

The European railway market is better known for its passenger train and equipment manufacturers than for freight and applications development. We also followed

the trend, and this now represents a significant part of our market. J. LANFRANCO & Cie has found its customers, especially for our ESL and ERM locknuts. In recent years, the track, which was often considered as the poor relation of the railway sector, has also received new interest.

Brazil

This is a constantly evolving market, benefiting from the development of the mining sector, transport of construction materials, as well as agricultural and food products. Since 2019, there have been 29 concessions and three early renewals. (The purpose of these rail concessions is to manage and operate the existing railway lines, extensions, improvements, and maintenance in the form of private participation contracts for predetermined periods of about 30 years that belong to the state.)

The aim is to rebalance Brazil's transport core and to double the railway infrastructure. Mining companies often operate the rail network to better control it, as do other major players in the Brazilian industry.

With our Brazilian subsidiary, we have therefore developed our applications for the track: switches, joint bar, frogs, electrical connections and signalling, considering the environment and the assembly conditions.

We adapt to the needs of our customers to ensure their fastener system. For assemblies without critical electrical connections, there are two possibilities: ESL or THU. The most difficult environments with the least amount of maintenance and tools available (only an impact wrench) can rely on the THU.

The self-locking system is obtained by two slots on the same plane, on the nut flange. The deformation occurs on each opposite side. No loosening is possible, reliability is our watchword, 5 possible reuses (according to standard). The ESL has two superimposed slots on the nut flange which is also deformed to obtain its self-locking characteristics.

Freight has many applications, including electrical connections:

Chile

Chile, with its development in the mining sector with companies such as Codelco, also has a significant freight network and EFE, the Chilean state railway company (passenger and freight trains), has an important network for mining, transport, the wood industry, agriculture and containers for the ports to reduce pollution. Investments include railway bridges, line extensions, track maintenance and the creation of specific centres for line maintenance. This has enabled us to provide new solutions for bridges and track (joint bar). A higher level of reliability, faster maintenance and, above all, efficiency, have enabled extending maintenance times so that teams are not mobilised for the same operations. A financial gain because it is no longer necessary to change a reusable nut.

The ESL nut is used to secure sleepers to the track, on electrical deviation systems on sleepers allowing track changes and can be positioned anywhere in tunnels, or on viaducts. The ESL nut is today, together with the



Signal cable attachment Brazil

THU, the only nut that prevents the loosening of the rail joint bar connections.

The ESL ensures that there is no loosening and that equipment subject to a lot of vibration can be installed quickly and safely.

The double-slotted nut design provides greater resistance to vibration, shock, temperature extremes and corrosion. ESL nuts are reusable up to five times and ensure assembly and disassembly without loosening or seizing.

Canada & US

LANFRANCO Inc., our Canadian subsidiary, works a lot with Class 1 railways. These are companies that only do freight, a market specifically for the track. These are very heavy tracks with much higher forces than what you can find in Europe.

Most of the rail network on the freight side is very old and may date back a century. Some railways have 75,000km of track to maintain, which may be in mountains, fields or forests. Conditions are very different from the European market, and unique to Canada, the USA and Brazil.

The equipment and vehicles of the major rail freight companies are required to carry heavy loads over long distances, sometimes in extreme environments and conditions. Some of our customers have experienced loosening on critical assemblies. The most obvious example is the rail joint bar.



Signalling cable fixation with box Brazil



Diamonds Canada

Conclusion

Our products help freight companies in Europe such as Mercancia al tren (which we support) relieve motorway congestion and limit pollution and ensure a new future for freight in Europe.

Contact Us

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commercial@lanfranco.fr

lanfranco.fr



J. LANFRANCO & C^{IE}

ARCOSYSTEM®

Trackside Cable Troughing Made Easy



Need your trackside cabling safely contained over the course of a challenging railway route? The lightweight and versatile **ARCOSYSTEM®** is the ideal elevated cable troughing solution, offering unrivalled durability in all weathers.

- Designed to be post-mounted, wall-hung or fixed to lineside structures such as railings, bridges, hillside slopes, HEA beams, noise barriers or rock walls
- Spans 6m between supports, making installation quicker and more cost-effective than traditional ground-based systems
- Constructed from durable composite materials, with the troughs and lids made from pultruded fibre-reinforced polymers (GRP/FRP) which excel in providing structural and load-bearing performance, supported by laser-cut galvanised steel brackets
- Bespoke range of bracketry enables height and direction changes to be made with ease



UK Distributor



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Hertfordshire, SG6 3PT
T: +44 1462 379000 or +44 7860 147863
E: info@completecomposites.co.uk

UK Stockist



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Track & Infrastructure

Complete Composite Systems (CCS)

An exciting collaboration has made the installation of the rail industry’s benchmark elevated cable management system even faster...

Complete Composite Systems (CCS) recently announced a collaboration with Anchor Systems International Ltd that quickens the fitting of its ARCOSYSTEM® trackside cable troughing.

Scott Parnell Ltd, a CCS partner and exclusive UK stockist of ARCOSYSTEM®, confirmed that Anchor’s patented Anchor Screw can now be used in conjunction with the ARCO troughing to establish the ‘Rapid Route’ system, considerably improving the speed and efficiency of ARCO’s installation.

During one five-hour shift, 124 anchor foundations were installed with no requirement for on-track plant, allowing for the swift fitting of 744 metres of ARCOSYSTEM®.

Installed at six-metre centres, Rapid Route includes a foundation system which replaces the need to excavate and use cast in-situ posts to support the GRP-manufactured ARCOSYSTEM®. Instead, the Anchor Screws, made in the UK from recycled steels, are driven into the ground from the surface following ground clearance checks. The domed connections between the Anchor Screws and ARCOSYSTEM® allow for alignment correction to ensure an accurate first-time installation.

Sharon Meek, Scott Parnell’s Head of Rail, said: *“I’m absolutely thrilled Anchor Systems Ltd have chosen ARCOSYSTEM® to work with the Anchor Screw. We now have two of the very best systems working together to offer the sector significant cost savings, work force safety and sustainable cable management installation.”*



Hadley Smith, Director of Anchor Systems International Ltd, said: *“We are looking forward to developing our partnership with Scott Parnell, the leading specialist supplier to the rail industry, in offering the most rapidly installed cable route system available to the market.”*

Ron Brown, Technical Director of CCS, said: *“The exclusive nature of the agreement means that Anchor Systems’ Rapid Route System can only be used with the leading elevated cable containment system on the market, ARCOSYSTEM®, both available through Scott Parnell, making it the easiest, fastest and most widely available system to install in the UK.”*



ARCOSYSTEM® — Key Features and Benefits:

- Constant working temperature range from -40°C to +80°C
- Carries cable loads of up to 90kg/m and withstands wind loads up to 1.45kN/m²
- Electrically insulating; suitable for HV use with a breakdown voltage almost 50kV
- Twin-walled design of the troughing enables the system to resist lateral forces from embankment subsidence, high snow loads and wind effects from high-speed trains
- Excels in remote locations subject to intense heat or extreme freeze-thaw cycles
- Meets a number of fire standards and proven performance in simulated trackside fires
- Resistant to heat, water, corrosion, UV rays and a wide range of chemicals
- Troughing available in four sizes to accommodate a range of trackside cabling requirements

For more details about how the ‘Rapid Route’ system can meet the cable troughing requirements of your rail project, **contact the technical experts at CCS**, the exclusive UK distributor of **ARCOSYSTEM®**:



Complete Composite Systems Ltd

503 Broadway, Letchworth, Hertfordshire, SG6 3PT
Tel: +44 1462 379000 or +44 7860 147863
Email: info@completecomposites.co.uk

The exclusive UK rail stockist of ARCOSYSTEM® is Scott Parnell:



Scott Parnell Rail Division

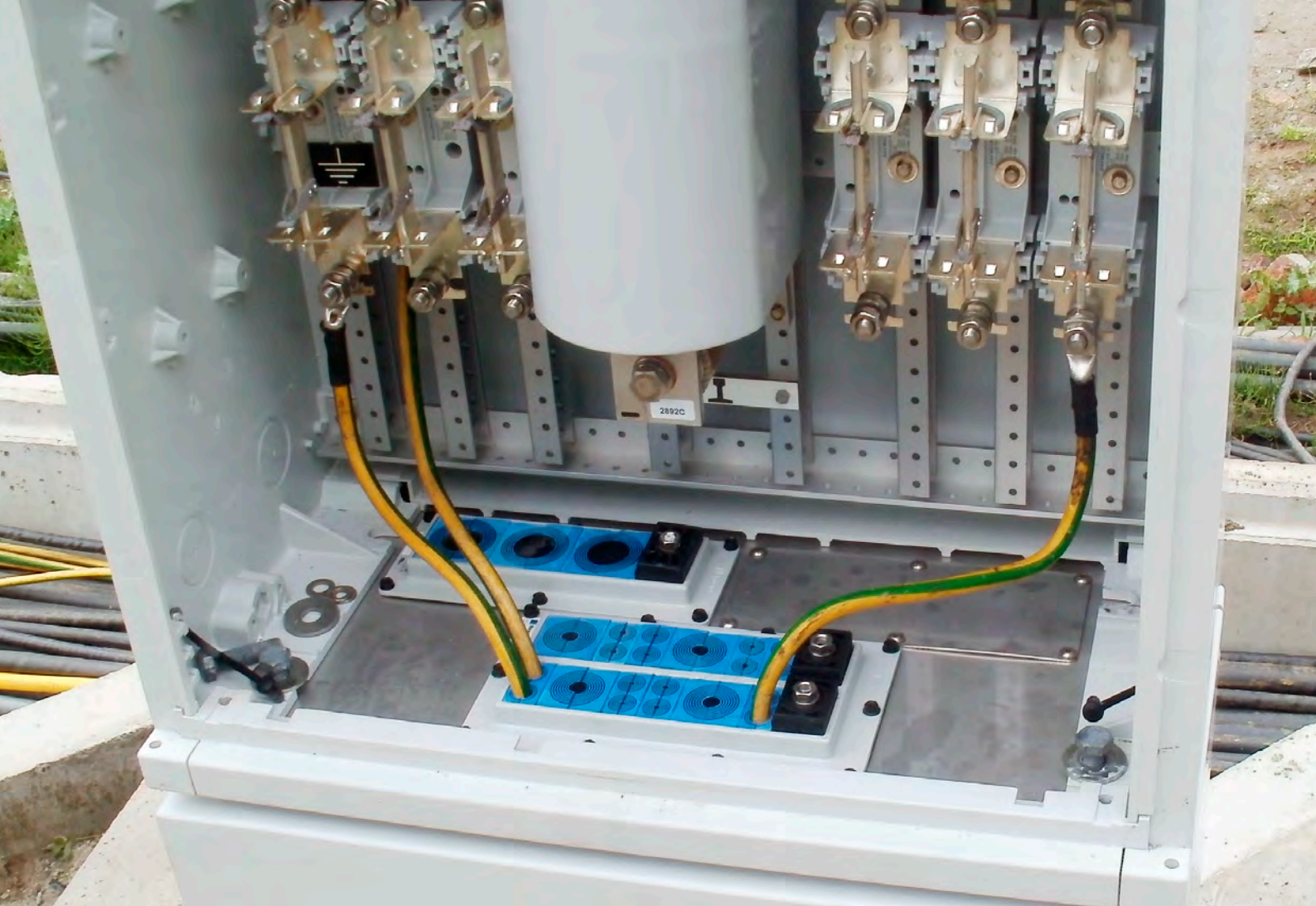
Asheton Farm Business Centre, Stapleford Abbots,
RM4 1JU
Tel: +44 208 8055797 or +44 1135 126898
Email: rail@scottparnell.com

More information about the Anchor Screw can be found on the **Anchor Systems website**.



ARCOSYSTEM® is manufactured by CCS’s Swiss partners, **Castioni Kabelführungssysteme GmbH**





Protect your rail systems

Secure your rail infrastructure and use Roxtec cable, pipe and plastic conduit seals against:

- Fire
- Flooding
- Rats
- EMI

roxtec.com/railinfrastructure





Roxtec

The Importance of Preventing Rodents in Rail Infrastructure

Rodents, and especially rats, are a common threat to critical equipment along the railway.

They can cause major disruption to electrical and signalling systems by chewing through cables. By damaging equipment, rats do not only cause downtime and costly repair work. They also cause fatal accidents. Therefore, it is crucial to seal cable, conduit and pipe entries in a way that eliminates rodent intrusion.

Expensive Rodent Chase

Besides accidents, annoying interruptions and costly repair works, many organisations struggle with the massive costs for chasing pests. Areas where cables, conduits and pipes enter buildings, shelters and cabinets are also entry points for pests. Rats cause problems by chewing through cables, which calls for both costly and risky work such as cleaning, rewiring and outages.

How to Mitigate Rodents?

The solution is to seal all cable, conduit and pipe penetrations by using proven animal mitigation systems, such as the Roxtec cable sealing system. Many contractors still use spray foam or putty when trying to seal around cables, but these materials are not enough to stop rodents from entering. The animals chew until they are able to get into the warm building and use the leftovers to build their nest inside. And when there is an opening, rats and mice are rapidly followed by snakes,

spiders and insects creating risk of fire, power outage and fatal failure.

Never Let Rats Ruin Your Project

Roxtec multi-cable seals are certified and engineered solutions, resistant against pests and rodents. They are also fire-rated, watertight and gas-tight with spare capacity for upgrades.

No More Downtime

Operational reliability is a top priority regardless of whether you are working with urban, suburban, conventional, high-speed or freight rail. There is simply no time for disruption. In order to keep trains and rail vehicles running, you have to secure protection of equipment for electrification, signalling and communication systems, and manage risk by sealing properly around cables, metal pipes, plastic pipes and conduits that enter buildings, shelters and enclosures. That is why successful lead engineers in rail infrastructure recommend Roxtec seals as standard.

Click [here](#) to find out more.

Scan the QR code to
contact Roxtec



🏠 Directory

< Track & Infrastructure

TECHNO-ELEC

Specialising in Responsive Relays

TECHNO-ELEC specialises in designing, manufacturing and selling measuring relays, known as 'responsive relays'. TECHNO-ELEC is a key partner of electrical traction (metros, tramways, trains, high-speed trains, substations).

We manufacture products for both on-board and trackside applications.

Services

Studies

- Measurement relay design, voltage, current, differential or for specific application, based on Servo-Contact technology
- Consulting and expertise on choice of features to size the product according to customer needs

Production & Marketing

- Development, manufacture and sale

Aftersales Service

- Preventive maintenance (product functional checks)
- Curative maintenance (expertise and repair, change of worn parts)
- Specific maintenance contracts

Main Characteristics

- Operation fields: from 1mA to 15,000A / from 10mV to 4,000V (AC/DC)
- Dielectric strength: up to 20,000V 50Hz- 1 min (primary circuit/secondary circuit)
- High overloads on measuring circuit
- Fire resistance according to standards NF F16-101-

102 & EN 45545

- Fully operational whatever the direction

Relay Categories

- Current relays: they are used in applications such as current detection, threshold control, overload detection, ground fault detection, engine start, etc.
- Voltage relays: they are used in applications such as voltage detection, catenary voltage detection, threshold control, voltage monitoring of battery chargers, etc.
- Differential relays: they are used in applications such as DC or AC current differential protection, AC or DC voltage differential protection, etc.
- Custom relays: associated to electronics, we can create more specific relays, such as time-relays on closing or tripping, flashing relays, clipper time relays, etc.



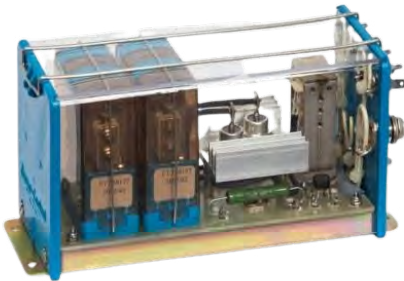
TECHNO-ELEC

Main Characteristics and Benefits



Tailor-Made Relays

- Wide range of adjustment
- Precision, sensitivity
- From 1 mA to 15000 Amp
- From 10 mV to 10000 Volts
- May be mounted in any ways (headdown)
- Fit to unique requests



Reliability and Strength

- Functioning in vehicles for more than 50 years
- Lifetime: 10⁷ operations
- Ambient operating temperature: from - 25° to + 70°C
- Humidity: 95%
- No maintenance



High Galvanic Separation

- Dielectric testing to 20k volts (between HT and LT)

No Auxiliary Supply Required

- Standalone equipment
- Protection of people and equipment

High Resistance to Strong Overloads

- Overload protection (motor ...)
- Overload protection in short circuit



Low Energy Consumption

- From some mWatts to a few Watts (close to zero for current relays)

Self-Restorable

- Customers can repair and maintain our devices themselves
- After sales services
- Plug and play

Respectful to Railway Standards

- IEC 60077 / IEC 60068
- EN 50123 / EN 50124

Flexibility and Reactivity

- Good management of urgent cases
- Manufacturing flexibility

Made in France





ENSCO Delivers

Autonomous and Manned Track Inspection Systems
AI/ML Driven Track Maintenance Planning Solutions
Transportation Technology Center (TTC) & Engineering Services



Accelerating Technology, Leveraging Data, and Increasing Safety
reber.acacia@ensco.com | www.enscorail.com

Keeping trains on track

Minimize the impacts of slip-slide conditions and keep performance, maintenance and safety on track with high speed rail cleaning laser technology.

LPS
LASER PRECISION SOLUTIONS

laserprecisionsolutions.com





Keeping the World on Track



Minimise the impacts of slip-slide conditions and keep performance, maintenance and safety on track.

The fall of leaves from nearby trees makes autumn a dangerous time for rail vehicles. Rail traffic is interrupted as low friction stops trains from accelerating and braking normally, leading to severe delays and accidents. Coefficient of Friction (COF) levels are significantly affected when leaves are compressed into the rails by train wheels and become an oily film on both sides. Train wheels slip and block more easily, creating flat spots on wheels that can result in high maintenance bills.

LPS products help rail networks detect and improve the COF levels of a slip-slide environment and minimise the impacts of weather events to provide safe braking and stopping distances and reduce autumn maintenance costs.

Slip Away from Your Safety Issues

Designed to deliver quality results, the LPS LaserTrain deep cleans the railhead with a laser, securing optimal COF for drivers and 24 hours of slip-slide-free conditions. Improved friction levels prevent train wheels from blocking, which reduces the number of flat spots – resulting in less maintenance, better punctuality and happier passengers!

The technology is the most sustainable rail cleaning option in the market today, with the lowest long-term running costs and CO2 emissions, through its use of pure energy and no by-products. Key features include:

- **Control system:** the control system is easy to operate and combines all the hardware and software for an autonomous clean, so there's no need to hire any extra hands. GIS data enables the



system to switch automatically between modes and avoid hitting rail obstacles.

- **Laser safety:** the system is safe for use without any protective equipment. It will automatically shut off at low speeds to avoid damage to the railhead.
- **Client dashboard:** to keep track of progress LPS clients can access details like the live position of the train, where it has been, slip slide results and miles cleaned.

Tailored to Meet Your Needs

Various LaserTrain features can be customised to suit each rail network's unique needs:

- **Model type:** the technology can either be built into a pre-existing train wagon or installed on to a separate wagon with a container. Both models require a locomotive to operate, lasers clean the rails while the wagon is pulled.
- **Cleaning speeds:** choose between three speed options: 25mph, 45mph and 60mph.
- **Contract:** the system can be purchased outright or on a lease contract.

Due to variations in the design and contract, pricing is based on individual requests.

Proven Track Record

Since 2018, the LaserTrain has helped the MTA Long Island Rail Road (LIRR) tackle the slip-slide season. In 2020, LIRR added a second 25mph system to cover more territory. The trains were in action up to 18 hours per day, covered 2/3 of the network and cleaned vital areas every 24 hours.

Treatment was effective, with an 88 percent reduction in slip-slide events after 12 hours and a staggering

38 percent reduction in wheel truing labour costs in October-November alone.

“The initiative has yielded major year-over-year improvements in service while ultimately paying for itself through reduced labour and material costs.” LIRR President Philip Eng.

Keeping Innovation on Track

LPS engineers have developed two new products to effectively detect and measure COF levels on the rail. Each product can provide full network coverage and a heat-map of key problem areas. The analysis empowers operators to monitor rail safety more easily and to maximise LaserTrain activity (and other treatments).

Originally designed for Network Rail, the LPS Tribometer is a modern update to the traditional hand tribometer. It employs moving trains to provide accurate readings of COF levels on the rail in real-time and is available to fix on any train that allows certified test equipment to be mounted. The device measures wheel slip during (de)acceleration, covering COF over a range of 0.01–0.50.

By analysing friction loss data, networks can detect low adhesion at any location and confirm with ease if rails have been cleaned successfully. Standard and premium models are offered depending on the availability of equipment and level of accuracy and scale required.

The LPS Track Contamination Detection System (TCDS) utilises pre-existing track circuits in the network to monitor demanding areas around the clock. A Track Contamination Device is attached to multiple track circuits, turning each section of rail into a sensor. The sensors calculate the level of contamination by measuring the short-circuiting of the signalling systems. This is a rough but real-time estimate of the rail contamination.

The TCDS is easy to install and is long lasting, providing insights for years to come. Due to the variation in pre-existing track circuits in the field, LPS offers a selection of non-invasive and invasive options to choose from.

Contact LPS for more information and keep up to date with them on LinkedIn.

The logo features a red circle with a black border, flanked by two black shapes resembling turbine housings. Below the circle is a black horizontal bar containing the text "HEDEMORA" in large, bold, black letters, and "TURBO & DIESEL" in smaller, bold, black letters below it.

HEDEMORA
TURBO & DIESEL

NEW TURBOCHARGERS

HS6800 / HS7800

Produced in Sweden

Smart Design
& Reliable

Compact
&
Light weight

Easy
Installation
& Maintenance

Wide
Efficiency
&
High Flow



A SUSTAINABLE TURBO SOLUTION

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an **Engenco** company

Rolling Stock

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< Rolling Stock

capitol industrial batteries

Any Application – Not Just Any Battery – The Perfect Power Solution!



Here at Capitol Industrial Batteries, we have operated as an independent battery manufacturer sales and service centre since 2001.

We have the background, knowledge and ability to meet any customer's requirements and we can supply and overhaul Ni-Cad, wet lead acid, gel VRLA maintenance-free and lithium battery types whilst also offering bespoke manufacturing for specific client needs.

We pride ourselves in our ability to support the market through investment in our stock holding facility as

a core part of our business model which allows us to deliver products more quickly than our major competitors.

Capitol Industrial Batteries makes, supplies and services a comprehensive range of batteries and is fully aware, committed and engaged in supporting the evolving market in terms of the electrification and decarbonisation agendas, which are major themes in most organisations at present.

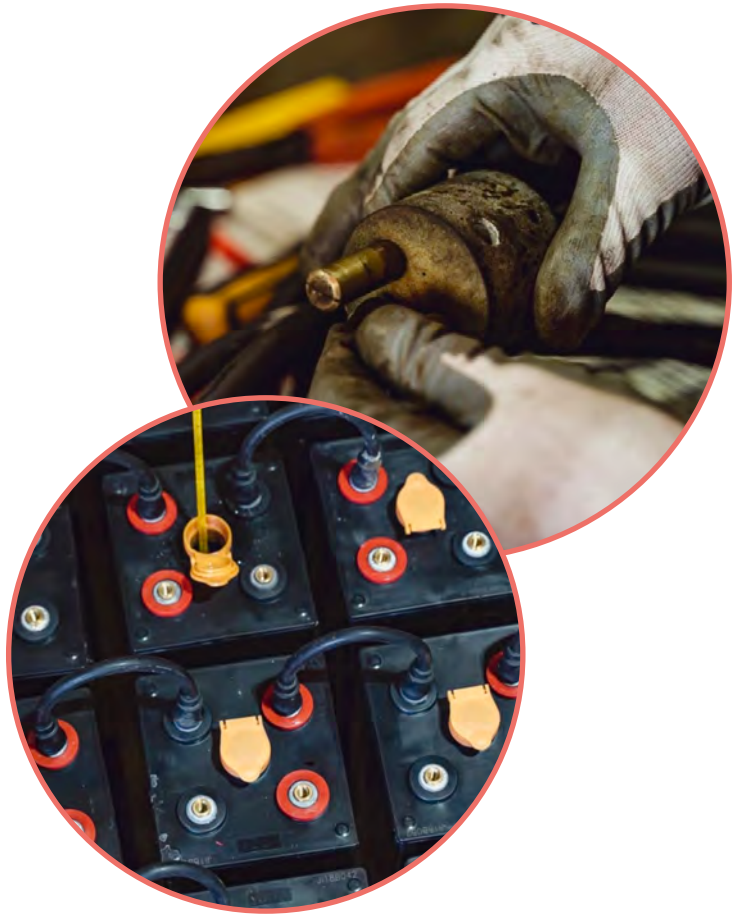
Our knowledge of battery technologies futureproofs our continued ability to supply and service any product type to support the long-term operation of alternative fuel-powered trains.

For more than two decades we have been acutely aware of the need for localised battery production within the UK, which is why we continue with the final assembly and commissioning of our products here in Cumbernauld, near Glasgow. We also have a full maintenance and overhaul facility in Birmingham – something we pride ourselves on.

We have the full backing of our manufacturing partners who have supported this area of our business by providing technical development of our products to ensure they are a safe and reliable option for any and all types of rail vehicles.

Our bespoke customer-focused level of service from manufacturing through to project consultation and close collaboration means that we can tailor the correct battery option from our dedicated product range for use in all rail applications.

www.capitolbatteries.com



RAILWAY

- Full workshop test and overhaul facilities available UK wide
- Battery and charger condition-based assessments
- Battery lifecycle reporting and recommendations
- Complete site surveys and reporting for charging and ventilation requirements
- Manufacturing and design framework capabilities
- Stock holding facility for contract support
- Manufacture and supply complete batteries and components to several EU battery suppliers
- Innovative energy storage system assessments for use on railway depots



Where Service Is Alive and Well

Capitol Industrial Batteries - Perfect Power Solution

Whether you require batteries repaired, overhauled or replaced, Capitol are trusted and relied upon by a wide range of UK rail industry companies, who have come to know that we deliver on our promises to provide exacting standards of product, service, ongoing technical support and commitment in all aspects of our business dealings.

An independent manufacturer with enough strength and flexibility to be able to support mainline customers requirements through stock availability and technical experience, we have consistently delivered on a wide variety of projects ranging from single battery orders, to fleet change out programmes set against customer schedules and agreed service levels.



The Complete Battery Service

For more information telephone

01236 731982

Email: info@capitolbatteries.com



“Any train - not just any battery”

Denis McLeod, Capitol Batteries

www.capitolbatteries.com

 Directory

< Rolling Stock

Dürr Technik

Oil-Free Compressor Solutions for the Railway

Dürr Technik: The oil-free compressor specialist for the important functions of a train.

As a specialist in oil-free piston compressors, Dürr Technik combines its long experience with an innovative spirit to meet the most extreme demands in the rail industry.

We offer a wide range of products and plan the ideal solution for manufacturers and operators of railway vehicles as well as with system suppliers.

From auxiliary air to main air, from raising the pantograph to brake systems, we customise solutions

to the train's individual characteristics. All our products are optimised for maximum performance under tough conditions, saving time, effort and maintenance costs with their robust, innovative technology.

Highest Quality Standards

Our oil-free compressors are manufactured in Germany and meet all industry certifications and standards.

Main Air

For railway vehicles the compressor is the core of the air supply. As the first oil-free railway main air





- Closed protective housing with customised sound insulation
- IE3/E1 motors compatible with variable frequency drive
- Durable and easy to maintain
- Low life-cycle costs
- Optimum dust and stone chip protection due to robust housing
- Low noise emission thanks to special sound insulation
- Reliable start-up even at very low temperatures
- Developed and produced in Germany

compressor manufacturer worldwide, Dürr Technik fulfils the highest requirements for reliability, precision and durability.

Each train has unique and individual requirements. Our oil-free main air compressors offer multiple options to meet your specific requirements. With quality design, reliable performance and German engineering, we offer proven main air compressor models. More than 200 customers from 35 countries worldwide rely on Dürr Technik.

Advantages

Our innovative compressors are economical to own and operate, while our oil-free technology makes them more environmentally friendly too. Consider all these important and relevant factors when deciding on your oil-free compressor choice for rail transport.

MC Series: Oil-Free Main Air Compressors for Rail

The MC series is specially developed for the railway sector. It is based on the know-how and experience of over 40 years of oil-free piston compressors. The MC series is particularly compact. With low vibration it offers an ideal solution for new railway projects that must withstand extreme conditions.

Characteristics

- Operating temperature from -40°C to +55°C
- Various installation positions of the units possible

Customised Compressed Air Systems

Main air compressors of the MC series are suitable for installation in a wide variety of vehicle types and can be custom configured according to the installation situation.

Both the dryer and the welding frame can be individually adapted to the respective vehicle type and installation situation.

VFD-Capable IE3 or IE1 Motors

The main air compressor is operated by a motor with continuous running capability.

The motor has been specifically developed for use in rail vehicles and is designed for operation with a frequency converter.

Withstands High Vibrations for a Lifetime

The main air compressors of the MC series are equipped with very robust wire rope vibration dampers. They protect the compressor and the vehicle from strong vibrations and ensure trouble-free operation. The vibration dampers are maintenance-free during the entire service life of the compressor. Alternatively, other types of vibration dampers can be used where the situation requires.

E-Bull: Oil-Free Versatile and Compact Compressor

With the E-Bull, Dürr Technik has expanded its innovative range of oil-free piston compressors,

Our innovative compressors are economical to own and operate, while our oil-free technology makes them more environmentally friendly too.



which are specially designed for application in rail and commercial vehicles for use worldwide.

- Oil-free 2-cylinder air compressor aggregate with an AC-motor (IE3) suitable for frequency inverter operation and extended operating temperature range
- Extremely long operational lifetime
- Compact solution with variable mounting positions
- Big filter surface of the suction filter guarantees
- A long lifetime and optimal suction behaviour
- Well protected against dust and water with degree of protection IP 67
- High flow rate at low weight only 0.1kg/l/min
- Low energy consumption of just 12.1W/l/min
- Extremely quiet

The E-Bull compressor is ideal for integration into modern compressed air generation and treatment systems.

Based on one or more compressors and in combination with cooling units, drying systems and electrical and pneumatic control elements, main air stations can be designed exactly according to customer requirements and flexibly installed depending on vehicle consumption.

- Modular, redundant and silent
- Easily adaptable electrical, mechanical and pneumatic interfaces
- Flexible control and monitoring
- No frequency converter necessary
- Designed and optimised to withstand tough environmental conditions

System Solutions

You can rely on our unique competence in the development and manufacturing of complete compressed air systems and installations as an

individual system solution in accordance with your specifications.

Receivers, dryers or control units can be integrated during installation depending on the spatial conditions.

To ensure an optimal compressed air supply, we plan your system solution down to the tiniest detail, using the latest technologies, tools, methods and expertise.

Customised Main Air Supply Units

Dürr Technik main air compressors can be individually adapted to customer requirements and supplemented, for example, with an adsorption dryer, vibration dampers or a welded frame according to railway standards.

Our main air supply units are also perfectly suited for installation under frame, in the machinery room or on the roof, as they are compact, light, and low in vibration. Depending on the air demand, an MC series or an E-Bull compressor is used.

Visit our website duerr-technik.eu.



Inspiring With Green Air

PSI Repair Services, Inc.

PSI Repair Services, Inc. Signs Agreement with Dinghan SMART Railway Technology GmbH

PSI Repair Services, Inc. (PSI), a leading provider of electronic repair and engineering solutions services to the passenger and locomotive markets is pleased to announce the signing of a long-term sales and support agreement with Dinghan SMART Railway Technology GmbH (Dinghan SMART), formerly SMA Railway Technology GmbH.

“Our company is excited to enter into this agreement to support our current customers of Dinghan SMART Products.” said Mike Fitzpatrick, General Manager of PSI Repair Services, Inc. *“PSI is very proud to be a trusted resource to the largest transit agencies in the US. We are constantly adding new services and capabilities to meet the strong, ongoing demand from our transit customers. This agreement is a logical next step in providing ongoing support to our customers.”*

About Dinghan SMART

Dinghan SMART develops and manufactures innovative auxiliary power converters for international rolling stock. The product portfolio ranges from single devices such as battery chargers or air-conditioning inverters to complete auxiliary power converters for passenger cars and multiple-unit trains. The system technology is suitable for a variety of applications and characterised by innovative power electronics, high reliability and robustness.

Dinghan SMART has a large installed base of agency



SMA inverter for overhaul

proven auxiliary power supplies featuring the latest SiC technology, which has a wider temperature operating range requiring less critical temperature control support that reduces weight, footprint and operating costs. Dinghan SMART Engineering can adapt this technology as a completely compatible replacement in both rooftop and under train-car applications. From developing new inverter designs to upgrading existing systems, Dinghan SMART is always looking for ways to improve the performance and reliability of transit inverters.

About PSI

Headquartered in Livonia, Michigan since 1967, PSI Repair Services serves several industries including the military, transit, wind, industrial and semiconductor markets. For the transit markets, PSI provides electronic and mechanical repairs as well as engineering of replacement solutions to extend the life of electronic assemblies. These solutions provide transit agencies with replacement options for otherwise obsolete equipment.

At PSI, we are proud to be known as the go-to provider for transit power electronic, inverter and auxiliary power supply repair. PSI's comprehensive experience supports the repair and rework of a broad spectrum of technologies from thru-hole to surface mount component repair and replacement. Reverse engineering services can allow manufacturing of replacement devices as well as upgraded solutions to problematic equipment.

Quality is another important consideration for PSI. We are certified to ISO 9001:2015, train our technicians to IPC-7711/21 rework and repair, and have ASQ-certified Six Sigma Green and Black Belts on staff. These programmes ensure quality deployment of high-volume repairs and allow us to provide extended warranty coverage.

About the Partnership

PSI will be able to leverage Dinghan SMART's extensive network of experts and resources. From highly trained technicians to advanced diagnostic tools, PSI will have access to everything it needs to keep its customers' transit inverters in top condition.

In addition to providing maintenance and repair services, PSI will also be able to offer its customers a range of consulting and engineering services. Whether it's helping customers with a new design or upgrading existing ones, the company's team of experienced



Bombardier ICON-M inverter after repair

professionals will be able to provide valuable guidance and support.

If you require repair, maintenance, or upgrade services for your transit power electronics, look no further than PSI and Dinghan SMART. Our teams of experts are ready to help you get your systems up and running again, and we are confident that you will be satisfied with the quality of our work

Michael Fitzpatrick

psi-repair.com

+1 734-853-5275

michael.fitzpatrick@psi-corp.com



PSI REPAIR SERVICES, INC.

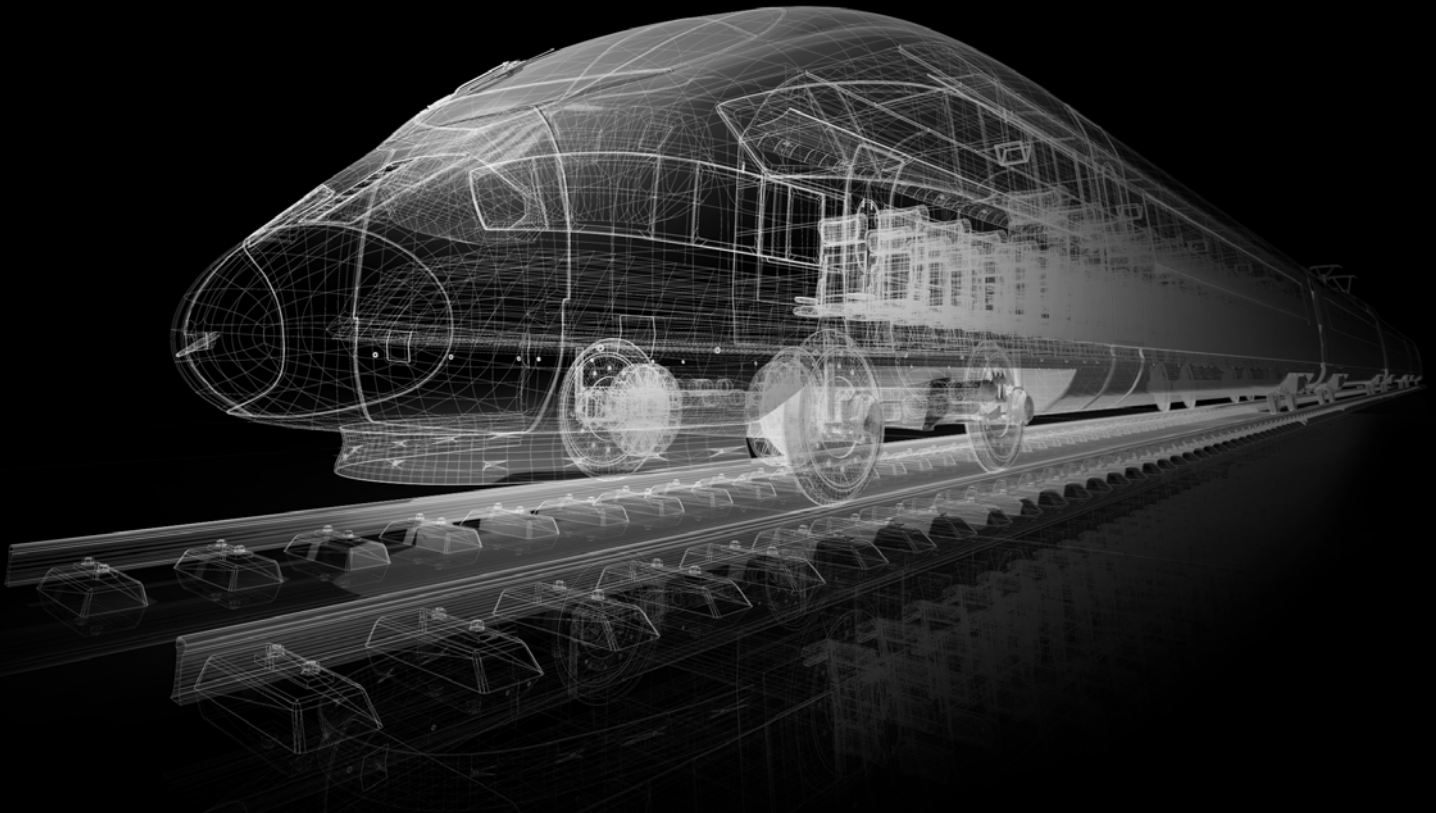
Watch our video!





NILES-SIMMONS-HEGENSCHEIDT

MACHINE TOOL MANUFACTURING



Industry Leaders in Wheel Set Production, Maintenance & Automation



Simmons Wheel Presses

- full line of railway wheel set and bearing presses
- customized to process your wheel set components safely and efficiently
- APTA and AAR-compliant equipment

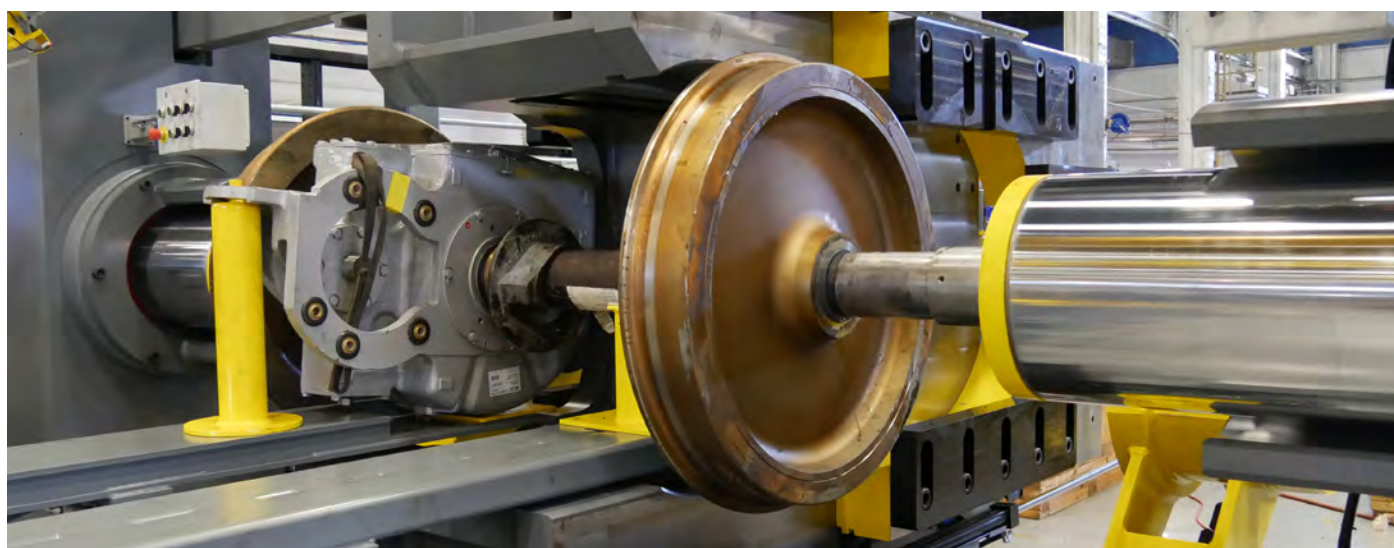


HEGENSCHEIDT-MFD Mobiturn®

- first and only mobile wheel set machining system in the world which comes to the rail vehicle
- reprofiling of all current wheel sets in installed and dismantled condition
- Relaunch in 2024

NSH Group

The NSH Group: Commitment to Railway Set Maintenance Advancement



The trains (be they transit or freight) do not stop running – so railway companies need dependable solutions that they can count on for maintenance.

The NSH Group (Niles-Simmons-Hegenscheidt) and its North American subsidiary NSH USA Corporation (Albany, New York and Sterling Heights, Michigan) are partners in that equation. With a complete product line of railway maintenance and production equipment, the NSH Group sets the standard worldwide. The key to the group's prominence is a commitment to continuous improvement of its machines and practices.

The Simmons wheelset and bearing presses are utilised throughout the world to mount and demount wheelset components safely and efficiently. Regardless of the production goals and work piece requirements, the group manufactures a press to meet those expectations. The machines are designed for flat-floor installation, removing the need for a pit or special foundation and speeding up the installation process.

The lightweight tooling is customised for the end-user's work pieces and is easily installed or removed during operation. Automatic and semi-automatic operation is possible through the intuitive controls.

Recent updates to the product line include an integrated measurement system. The contact precision measurement probes allow for high accuracy in an often unforgiving and rugged wheel shop environment. The system automatically measures radial and axial runout as well as wheel set back-to-back inspection.

The presses can also include an overhead positioning system that eliminates the need for manual operator-positioned devices for visual or electronic position feedback to mount components. All of the presses now come standard with an energy efficient and quieter on-demand hydraulic power unit. The design of the presses additionally accommodates a variety of automated or manual loading options.

Railways worldwide depend on Simmons's AAR and APTA-compliant wheelset and bearing presses.

Hegenscheidt MOBITURN®2 Mobile Wheel Lathe

Hegenscheidt-MFD (Erkelenz, Germany) is no stranger to continuous improvement efforts regarding its railway wheelset maintenance equipment. The MOBITURN®2 Mobile Wheel Lathe is a direct result of leveraging the success of service-proven Hegenscheidt wheel lathe technology in a new and unique configuration.

The Hegenscheidt U2000-Series Underfloor Wheel Lathes are the choice of transit railways worldwide for wheelset maintenance, while wheelset production facilities rely on Hegenscheidt's Portal Wheel Lathes. Both product lines require a pit, which can be a challenge for facilities that have space restrictions or are looking for more economical solutions.

The MOBITURN®2 was designed with those customers in mind. The system is the world's first and only wheelset maintenance machine that travels to the rail vehicle. The versatile wheelset machining system reprofiles railway wheels, wheelsets and brake discs on rail vehicles in both the installed and detrucked states. The mobile wheel lathe is transported by rail within the railway maintenance facility or even by truck to other facilities. It is positioned under its own power beneath a lifted rail vehicle or bogie to perform maintenance operations. The mobile design allows the lathe to be stored wherever is convenient in the facility. The system's unique design has led to increased interest throughout North America – and with an eye towards

additional refinements in the future, this system will be maintaining transit rail vehicles throughout the world.

The system incorporates the robust precision machining capabilities that are the hallmarks of Hegenscheidt's wheel lathes. Integrated precision measurement, CNC control and powerful safety features extend wheelset component livelihood while safely and efficiently reprofiling wheel profile and brake discs.

The variety of installation configurations for Hegenscheidt's wheel lathes means there is a maintenance solution to fit the space, budget, and production requirements for all railway wheel set maintenance facilities.

Jason Steven Murphy

nsh-usa.com

+1 (518) 462-5431

sales@nsh-usa.com



THE NSH GROUP

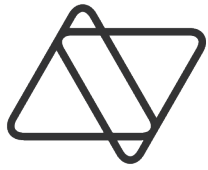


A sustainable turbo solution from Sweden



info@hedemoratd.com
+46 225 595 800
hedemoratd.com





YELLOW WINDOW

Beyond Reality



Central to the digitalisation of Industry 4.0, production increasingly benefits from ‘digital twinning’. This real-time simulation and assessment of a virtual product leads to an improved development process for the ultimate physical realisation. The benefits to the rail industry are clear, but a lot of the potential remains untapped. Even as parties embrace digitalisation, not all improve their customer centricity or development processes to match.

Rail design expert Yellow Window shares its insights on what an ideal digital pipeline can look like to make the process better, faster and more collaborative.

What Is There to Improve?

Design is a step-by-step process that combines both analytical and creative techniques, with a multitude of

decisions taken throughout. Not all realise the value of this process or appreciate well-designed products as worthwhile investments. Many rail projects that take years to build to last decades in service, could well be born out of creative design trajectories of under three months.

We also experience that qualitative or intuitive attributes of design are hard to evaluate, making



Extended reality: presenting virtual solutions in real environments



Meeting in VR for better understanding and communication

fact-based decisions difficult. Thus, during these ‘three months’, the challenge is to give decision-makers the right information at the right time, with the most suitable visualisation technique, to maximise the success of this rapid initial process.

The rail design industry has long relied on computer-generated images as the only material to precede actual production. To validate end-user experience, present to the customer and test the product in real life, a 1:1 mock-up may be offered but is not always guaranteed.

Mock-ups in public transport have major shortcomings: they require a significant investment, have limited reach (user involvement) and mostly see the light as the design process nears its final stage. This makes them too late for actionable feedback with fundamental 3D changes becoming too expensive to implement.

Without a mock-up however, the preceding development processes offer limited immersion and not enough spatial information to support sound decision-making.

A Faster – But Better Process

As design trajectories become ‘3D’ in ever earlier stages, presenting a virtual or augmented experience can convey spatial and interactive information more effectively. Today, virtual and extended reality (VR & XR) are improving the process of creating, simulating and manufacturing designs. VR can offer convenience and a sense of reality, immersing oneself to fully understand

a space. A designer can immediately ‘feel’ the product or environment and customers can experience how a design would perform in a specific context. Starting with VR, but taking the interactive part further, digital twin technology can run in parallel with the total product development. The potential to create, design and alter products becomes infinite. In a ‘digital twin’, customers can take part in an interactive simulation in various scenarios to experience and interact with the space, all prior to production.

Digital twins provide feedback data and spot areas of concern, just like a mockup, but far sooner in the process, with more flexibility and at a much lower cost.

Unreal Workflow

Interacting with and adapting products in their entirety and context in real-time is a very powerful tool in the hands of a designer. As specialists in the use of participatory techniques in design processes, we also wanted a portion of this experience accessible to stakeholders.

To make the link between our typical 3D CAD workflow and a presentable real-time environment where stakeholders could also interact with the design, we chose the Unreal platform for its programmable potential and stunning realism. To aid our collaboration goals, Yellow Window required the development of interaction and communication features beyond what is available from Unreal.

Meet, Share and Co-design in VR

To benefit the quality of the design, and to provide clear added value to all stakeholders, Yellow Window strives to apply participatory techniques more often and at strategic points in the design process.

To that end, a client-facing platform was developed (with the help of fellow Antwerp digital agency Soulmade). Through this platform 3D designs and presentations can be shared with anyone invited – all in real-time, with the ability to join in a VR headset or directly from a desktop PC.

Beyond allowing designers to gather early feedback on their work, connecting stakeholders with the virtual and augmented reality design offers opportunities to reduce errors and save time.

The digital platform has infinite reach, allows for universal collaboration and improves decision-making. The involvement of a wider group of stakeholders and end-users no longer needs to wait for a mockup at the end of the process. Now, more concepts can be tested with more people – it's more collaborative, immersive and inclusive.

Yellow Window XR Tool: Real-Time Collaboration in 3D

Digital mockups (DMU) enable design teams (operators and OEMs) to:

- Use the platform for collaboration
- Exchange themselves and have virtual meetings in the 3D space
- Meet in VR for co-creation
- Enjoy (remote) access from anywhere in the world
- Have better integration of stakeholders and participatory techniques
- Replace prototyping (test ergonomics, leave comments)
- Take up less time / fewer resources
- Accelerate the design process from concept to engineering
- Have good content management (access, distribution, meetings)

“A realistic, virtual, multiplayer experience, in-person or



Where virtual reality (VR) shines in upfront definition and validation, augmented reality (AR) finds use cases in refurbishments where new interventions can be tested on-board

remote, that facilitates collaboration + co-creation in and around a 1:1 (vehicle) environment.”

YWXR STUDIO is a virtual prototyping tool that allows anyone to experience mobility concepts, streamlining the design process and even replacing the need for a mockup. Based on high-end visualisation software, the resulting image quality is stunning, while its virtual nature enables simulations impossible in a physical mockup.

When connected online, the software allows stakeholders (operators, OEMs or end-users) to see, experience and discuss interiors in real-time, from anywhere in the world. And its programmable nature allows for functionality or interactions to be virtually prototyped, allowing for faster iteration with fewer limits to who can co-design or critique during the process.

For an example of this software in action, watch our [video](#).

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Mankiewicz

Powerful Design on Track

Mankiewicz, the Global Coatings Manufacturer, Puts Its Design Expertise on Rails

Covid has made permanent changes to travel and its effects will reach far into the future. Local and long-distance public transport became much less attractive during the pandemic.

Not only due to the possibility of infection, but also due to changes in the working world with home working and the like. According to the German Federal Statistical Office (**Destatis**), the Covid pandemic in 2021 prompted fewer passengers to use regular bus and rail services than the already reduced count in 2020. The number of passengers fell to the lowest level since recording of them began in 2004. Destatis reported passenger numbers of around 7.9 billion for 2021, which is 4% lower than for 2020 and 34% below the level of pre-crisis 2019. A similar picture is evident in other countries. Nonetheless, passengers are expected to return after the pandemic. At the same time, the mobility revolution and the desirability of a sustainable society have been hot topics for several years.

All are reasons enough to refocus the awareness of potential passengers on public transport, such as trains and buses. In addition to the obvious advantages like shorter travel times and better safety, key inducements for passengers are comfort and ambience. It is important that passengers feel at ease, avoiding any impression they are being carried to their destination in a purely functional means of transport that was solely designed to carry the greatest numbers of passengers.

The interiors of trains play a particularly important role in making the rail experience as pleasant as possible for travellers, whether they are commuters, families or tourists. Interior designing requires creative approaches in terms of colour and design language as well as the technology increasingly expected by passengers. If we take a look at the Deutsche Bahn's model project **IdeenZug** or the **Avelia Horizon** concept of French train maker Alstom, they certainly show where the journey is headed: more comfort, more aesthetics, more infotainment.



Despite all this concern for design, it should not be forgotten that the surfaces in public transport vehicles are exposed to enormous stresses and have to withstand a service life of around 15 years. In addition to statutory requirements, such as fire protection, they have to cope with a lot of mechanical stress, such as the impact and abrasion caused by luggage. Furthermore, they must have a high chemical resistance to aggressive cleaning agents so that, among other things, graffiti can be removed from surfaces without damaging them.

Design Expertise at Mankiewicz

Unlike in other industries, such as automotive, the main focus of coatings for trains is on technical aspects such as fire protection, abrasion resistance and cleanability. This is highly understandable, given the long service life of trains: a timeless design is needed that is as suitable as possible for the public and will still look modern many years from now. That's why, unless you're touring with the Orient Express or Rocky Mountaineer, trains are predominantly characterised by restrained colours and a simple design language. In many trains, the design focuses on 'producing calm and not appearing stressful'. This could change somewhat in the future, as seen in the projects already mentioned and with some other striking designs, particularly those for private operators. While they remain discreet, more unusual designs for mass passenger transportation could gain traction in the near future.

This is where the global paint manufacturer Mankiewicz comes in. Thanks to experience gained in developing coating solutions for a wide range of industries, Mankiewicz products are able to satisfy all the requirements of the rail industry, including robustness and long service life as well as for design and ambience. After all, much of the interior of a railcar is painted: from the seat shell and armrests to panelling, doors, and trim, right through to the buttons and display holders. Coatings therefore play a central design role in the interior of trains, both visually and haptically by way of roughened or particularly smooth surfaces.

Mankiewicz looks back on many years of supplying products to the rail sector and is also able to leverage synergies from other industries where design aspects also play a major role, such as automotive, aviation and yachting. These equally call for meaningful



Timeless design and durability must go hand in hand for high-touch areas

ways to tackle a combination of stringent safety requirements, durability and design needs. To ensure that functionality and design go hand in hand, at its in-house design department Mankiewicz develops colour trends for the world of tomorrow to accompany its technologically innovative coating solutions. For example, the Hamburg-based coatings manufacturer publishes its 'Colours of the Year', picking up on contemporary social moods and influences each year and compiling them into three shades of colour. Naturally, its customers in the rail industry also benefit from this design expertise: *"We make it possible to reproduce simple register colour shades, such as from the RAL or Pantone colour charts, as well as to adapt colour shades so they appear correctly on specific substrates, such as powder-coated or Formica surfaces. We also consider the rough design ideas of customers and develop design proposals for them, which are then further optimised together with the customer. Of course, it is particularly exciting for us when we are allowed to develop a complete design proposal from a blank sheet of paper. That's when the know-how of our design team really comes into its own,"* says Thorben Bahrenburg, Sales Director Rail Coatings at Mankiewicz.

Advantages of Our SelfTex Coatings

The notion that the needs of functionality and design will inevitably conflict has already been disproven time and again in the automotive industry. With its innovative coating products, Mankiewicz is a leading light in this respect. In the rail industry, for example, the coatings manufacturer manages to do this with its ALEXIT® micro-effect coatings. These are SelfTex



With its Colours of the Year, Mankiewicz regularly gives impetus to colour trends

paints that meet the stringent requirements of the rail vehicle industry and are certified by many systems houses (OEMs) and large vehicle operators, as well as being compliant with DBS 918 300 and NF F. The coatings also make numerous design ideas possible, thanks to the almost unlimited range of colour shades and variety of surface finishes such as gloss, metallic, matte and textured. Particularly in the case of metallic paints, the ALEXIT® micro-effect coating scores highly with a textured surface that has a significantly greater brilliance than conventional textured paints.

The Mankiewicz micro-effect paint also has a number of other advantages that have a positive impact on efficiency and quality. Conventionally, textured surfaces are applied in two stages: a smooth coat is applied first and then the texture is speckled into it. Since the ALEXIT® micro-effect coating is self-texturing, it saves a complete process step. Although primarily desired for design reasons, the textured surface offers an added benefit: its matte and textured surface is able to conceal many of the irregularities in the substrate, often eliminating the need for pretreatment.

The coating produces a highly homogeneous structural appearance, which means that greater process reliability can be ensured. This is particularly important when, as is often the case when constructing a rail vehicle, a large number of suppliers from all over the world have to deliver the various components and these are painted under widely different conditions, but all of which have to look identical in terms of their colour and structural characteristics. This is where Mankiewicz's comprehensive consulting approach scores: with the arrangements of local Mankiewicz affiliates on site, in the form of visiting technicians or the specialised training of painters, the component suppliers receive global support to ensure consistent

surface quality. Equally, the testing effort to maintain consistent standards remains high, and many different substrates must be tested under varying conditions. These are all challenges that Mankiewicz is well placed to meet, with its own state-of-the-art technology and training centres worldwide.

Will the Future Be Futuristic?

What will the design-oriented future of rail travel look like? Will it be more colourful and eye-catching, or will we continue to see many more shades of quiet grey, blue, green and burgundy? No massive revolution is likely to occur, but there are certainly some new approaches that could augment the tried-and-tested design language of the rail sector in a sensible and refreshing way.

There is probably scope for a new development known as ShyTech, which is already causing a stir in the automotive sector. With ShyTech an otherwise plain surface can be designed to light up on demand. When switched on, the background lighting reveals areas lasered on to a substrate before it was covered with a layer of paint, often with a mixture of striking patterns, delicate lines and symbols. Such technologies, developed by Mankiewicz together with partners, could conceivably be used for the ceiling lighting in night trains, or for the control panels of future passenger technology, for example.

Wherever the journey leads us, Mankiewicz will stand at the side of manufacturers and operators of the rail industry as their reliable partner to help develop the design ideas of the future.

mankiewicz.com/en

rail@mankiewicz.com

+44 (0) 116 2847780

MANKIEWICZ
Coating Concepts of the Future





ONE STOP SHOP for Rail Coating Solutions



Finding the perfect coating system means combining design aspects, application properties and resistance attributes to create a unique customized solution.

As an experienced partner, we help you to simplify your coating process and increase efficiency to achieve significant competitive advantages.

- **Tailored solutions**
for Interior, Exterior and Bogie Coatings
- **Benefit from our cross-industry experience**
in highly demanding markets such as Automotive, Aviation and Yacht Coatings
- **Global availability, local service**
our experts support your projects worldwide to help you fulfill technical requirements and quality standards

Evident/Olympus

Axle Inspection Made Easy with Phased Array Technology

Rail car axles are critical components that encounter a high level of stress during operation. As such, ensuring their inspection and maintenance during manufacturing and service is of utmost importance.

Approached traditionally, non-destructive testing (NDT) of rail axles presents a laborious task using conventional methods such as magnetic particle inspection (MPI) or conventional ultrasonic testing (UT) approaches. In the case of MPI, reliable data can be gathered, but a full disassembly of the wheelset is required, which is both time-consuming and costly when rail car downtime is taken into account. UT on the other hand, enables axle inspection without disassembly, but yields less reliable data and remains time-consuming as multiple single element transducers are required to inspect critical areas for defects. Furthermore, UT can be costly due to the need for expensive gantry systems. In either case, these methods are imperfect when seeking to implement a robust axle inspection in a timely and cost-effective manner.

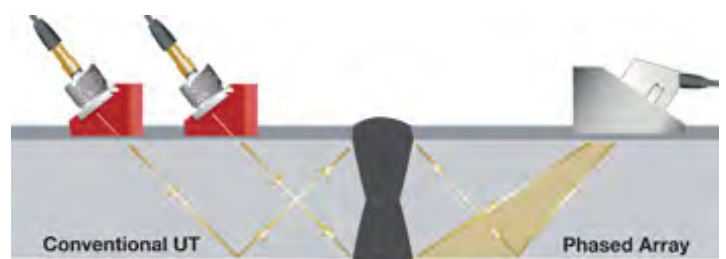
Axle inspection poses many challenges, yet is a central process for every rail maintenance depot to detect axle faults such as manufacturing flaws, defects and fatigue cracks. Since axle inspection is key to ensuring safety on the railways, solutions that can make the inspection process more convenient, while simultaneously detecting faults with high reliability, could provide great value to stakeholders in the railway maintenance sector.

Phased Array Ultrasonic Testing

Phased array ultrasonic testing (PAUT) is an advanced NDT method that can be harnessed for almost any test where conventional ultrasonic flaw detectors have traditionally been used, but is especially pertinent for axle inspection. Unlike conventional UT that is reliant upon multiple single element transducers, PAUT utilises probes that contain an array encompassing multiple elements. Rather than having to manually calibrate, move and adjust the transducer as is required in conventional UT, PAUT transducers can be calibrated, focused and swept electronically, greatly speeding up the inspection process.

PAUT technology also increases the likelihood of detecting potentially dangerous indications through its ability to generate wide-angled beams thanks to the multi-transducer array. During a scan, each transducer is pulsed independently, creating its angled beam by applying delays to each individual pulser of the UT equipment. PAUT technology therefore provides more

Conventional UT versus PAUT: by testing multiple angles/depths at once, the likelihood of detecting anomalies or faults increases significantly



value than traditional UT because a single PAUT probe is able to test multiple angles and depths, scanning all critical areas during a one-rotation scan.

A Dedicated Portable PAUT Solution for Axle Inspection

In light of the myriad advantages PAUT technology can bring to axle inspection, Evident Scientific has developed a tailored PAUT solution designed especially for axle inspection applications. Compatible with Evident's phased array instruments, like the powerful OmniScan X3, this scanner stands to make the process of axle inspection more convenient and reliable, saving time and money while improving safety.

The solution is a portable instrument that benefits from the latest PAUT technology and can be used for axle inspection both on and off the vehicle. Weighing just 1.5kg, high portability makes it ideal for use as a frontline tool for field applications as well as in rail depots, making for a highly versatile solution. A full scan can be completed in a matter of minutes thanks to increased automation, while its simplicity allows axle inspection to be carried out without the need for specialist training. Some of the additional benefits include:

- 16-element array that allows minute defects to be detected deeper into the axle compared with conventional UT
- Axle CAD drawings can be imported and displayed on top of the acquired data, making for a clear visualisation of any flaws detected
- An integrated encoder captures C-SCAN data that can be reviewed live or after the scan is complete
- Interchangeable centring pin allows for multiple axle configurations



Deployment of the scanner and probe with OmniScan™ X3

Empower your axle inspection workflow further by combining the scanner with the latest phased array solution from Evident, the OmniScan™ X3. This next generation flaw detector stands as a complete phased array solution. The OmniScan™ X3 series comprises total focusing method (TFM) imaging and advanced visualisation capabilities. Coupled with a user-friendly interface, the OmniScan™ X3 range can enable you to complete your inspection with greater confidence.

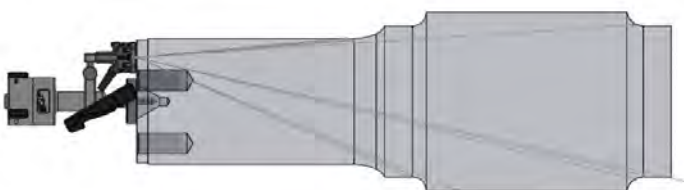
Bring the Power of PAUT to Your Axle Inspection

Why not discover the power of PAUT for your axle inspection applications? With complete solutions from the specialised scanner to the powerful OmniScan™ X3, Evident can provide robust solutions and expert advice to help simplify your axle inspection workflow and save you time and money.

Want to find out more?

Contact our expert team today.

olympus-ims.com



Representation of tailored solution (left) attached to axle centring pin during scan

Expand Your Inspection Capabilities

Comprehensive Inspection and Measurement with PRECiV 1.2

Upgrade your product evaluation and measurement workflows with PRECiV 1.2 inspection and measurement software. Whether you're in the inspection room, quality control or R&D, PRECiV 1.2 has a host of powerful new features for all your inspection needs—delivering rapid, accurate and efficient analyses. Also supports standard DIN 50602, method K for non-metallic inclusions.



Discover the benefits:

- **Versatile:** Supports a wide range of imaging conditions including brightfield, darkfield, polarization and all standard imaging conditions
- **Simple to Use:** Advanced imaging and measurement tools make it easy to conduct measurements that comply with international standards
- **Complex Image Analysis:** TruAI Technology segments images to quickly and easily separate features that cannot be handled by purely analytical solutions
- **Semiautomated Inspection Support:** Controls all Olympus microscope cameras as well as select third-party Z-focus drives and motorized stages

To learn more about PRECiV software, visit: [▶ www.olympus-ims.com/en/microscope/preciv/](https://www.olympus-ims.com/en/microscope/preciv/)
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ADVANCED FLOORING SYSTEM



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BAULTAR

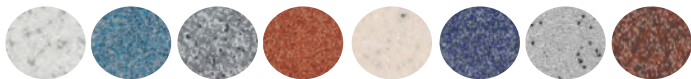
Advanced Flooring System

Baultar is a Canadian company that creates and manufactures innovative products for the transportation industry (railway freight, railway public transit, buses, infrastructure).

Baultar's flooring division offers an advanced flooring system called Abrastop™. The Abrastop™ family of composite products, specifically designed for the

transportation industry, ranges from floor coverings to complete flooring systems. It integrates many different options that can be tailor-made according to the technical and design needs of clients. These flooring solutions have two main objectives: to offer superb durability that reduces maintenance requirements and life-cycle costs, and to simplify product procurement and vehicle manufacturing by offering an all-in-one solution that integrates functions seamlessly, maximising the value for the client.

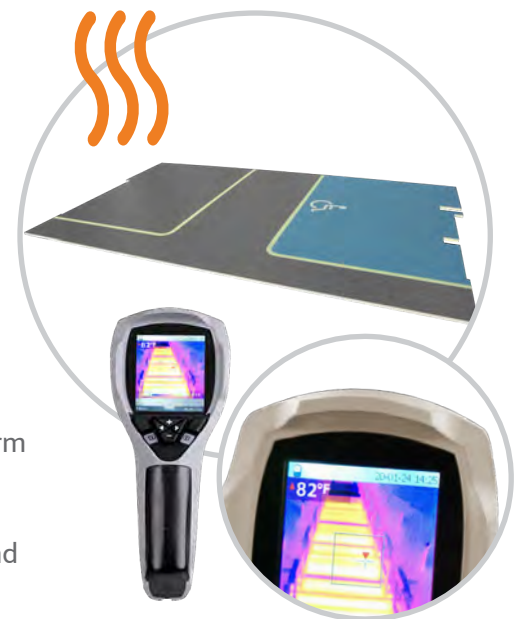
Customisable Colours



Flooring Options

Heating

The advantages of an Abrastop™ foam radiant heated floor include: uniform temperature distribution throughout the whole vehicle, superior comfort, thermic inertia that keeps passengers warm even when doors open, elimination of the discomfort caused by drafts from forced-air systems, and energy savings.

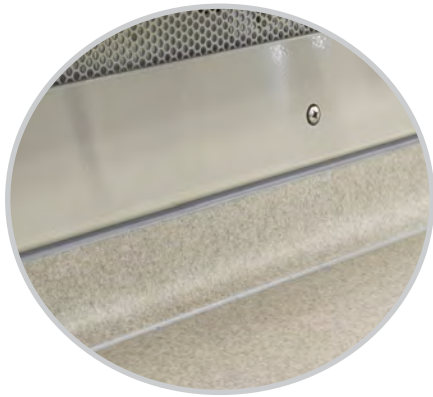
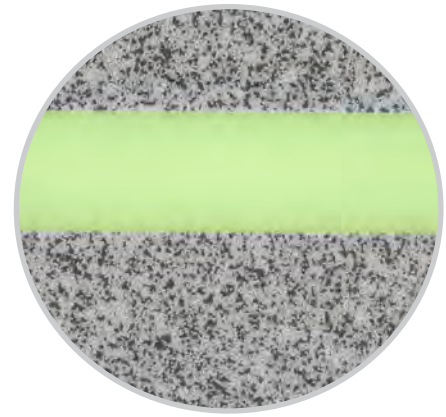


Logos

Logos of any kind or colour can be integrated in the flooring. These integrated logos are manufactured using the same materials as the flooring panels. Sizes and shapes can also be adjusted for any type of request.

Photoluminescent Bands

Photoluminescent bands guide and demarcate specific areas with integrated passive high-performance photoluminescent lighting (HPPL) – staircases, walkways, doors or specific areas with a particular function (such as an area for storing bikes) are just some examples.

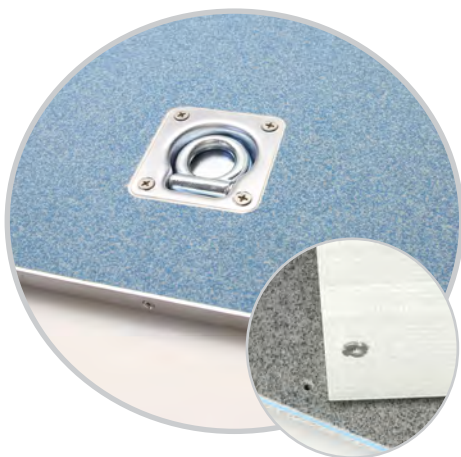
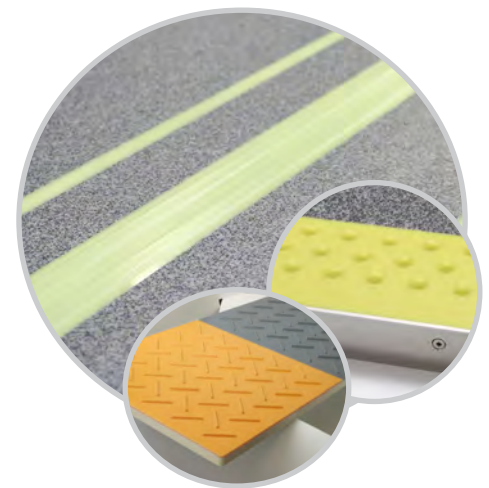


Cove Mouldings

A proper finishing touch and a streamlined look. Can be used for anything from meeting functional needs (such as covering joints, transitioning between flooring and walls, and facilitating cleaning) to serving more decorative purposes, such as fitting different styles.

3D Bands and Surfaces

3D bands and surfaces alert, guide and demarcate. Raised profiles of many different kinds help alert passengers to upcoming hazards, provide them with guidance for safe passage or exit, and / or delimit a specific area of a vehicle.

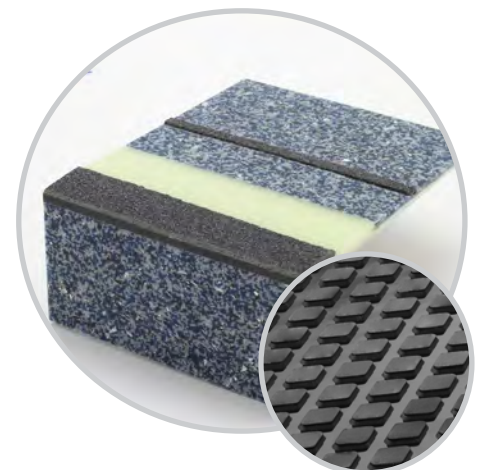


Inserts

Adding even more durability and adaptability for specific uses. Trap doors, supports, reinforcements and mechanical fastening inserts, are just a few of the possibilities for fulfilling specific needs with metal pieces.

AddGRIP Surfaces

In certain access areas where additional anti-slip properties are needed – such as stairs or entrances – areas and / or bands with custom-made patterns can be integrated. Also, the surface grit can be adapted using a variety of different materials.



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Argus Fluidhandling

An Expert in Hose and Rigid Tube Assemblies

Argus Fluidhandling Ltd specialises in the manufacture of hose assemblies, rigid tube assemblies and structures for OEM markets throughout the world.

Our history reaches back over 80 years to 1941. We have grown considerably in size, product knowledge and experience since those days with some memorable moments shaping our direction along the way.

Our investment in the latest technologies has pushed the group to the forefront in its chosen markets and we continue to develop new products and services to meet our customers' ever-evolving requirements.

As part of the Alfagomma Group we have operations based in the UK and Germany and are well equipped to support our European and global OEM customers.

Specifically designed for the rail sector we provide an excellent hose called RailSAFE that meets the requirements of NF F 16-101 – BS6853 and EN45545-2 and has been specifically developed for the rail sector utilising the knowledge gained through our relationship with this sector over many years.

- Part code: Railsafe AF45 hose range – EN45545:2013 approved
- Manufacturer: Argus Fluidhandling – Alfagomma

Additionally, we are so confident in our RailSAFE hose that we are subjecting the RailSAFE AF45 hose range to an extended one million cycle input test. The AF45 hose range is designed specifically for the rail industry and is often used to replace the standard EN854 R3 hose for railway air brake applications.



Group capabilities include:

- Hose development and validation
- Hose assembly manufacture, small & large
- Fitting design & manufacture
- Tube bending
- Laser profiling
- Robotic welding
- CNC machining

Certified to ISO9001 : TS16949 : ISO14001

Please contact us on 07595821434 or email joe.mack@hiflex-europe.com for further information.





DEDICATED TO
PROVIDING BESPOKE
RAIL SOLUTIONS

Assenta Rail

Our expertise covers a wide variety of vehicle types including passenger stock and freight wagons. With projects ranging from small modifications on individual vehicles to large fleet refurbishment and replacement.

As a certified Entity in Charge of Maintenance (ECM), we adhere to strict control processes and systems at all times in line with regulatory requirements.

Assenta Rail has an expansive range of depot facilities including: Paint Shop, Bogie Press, Vehicle Lifting Jacks, Overhead Crane and Workshop with Pits.

Specialists in:

- Heavy Maintenance
- Light and Running Maintenance
- Vehicle and Component Overhauls
- Modifications and Repairs
- Vehicle Painting
- Project Management
- Design and Consultancy



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HAMILTON, ML3 9AT
TEL: 01698 207947

Assenta Rail

Driving Innovative Engineering Solutions Further

From setting new objectives, to understanding your industry's emerging needs, a new year presents a prime time to reflect on achievements, capitalise on opportunities and embrace change.

At Assenta Rail, we are proud to have developed a range of rail engineering solutions since our inception in 2001. Innovation thrives throughout our organisation, and we have developed cutting-edge products that will continue to play a dominant role in 2023.

Developing Innovative Central Door Locking (CDL) Solutions

As mandated by the Office of Rail and Road (ORR), all rail vehicles must now be fitted, and retrofitted with central door locking (CDL) solutions. Affecting primarily heritage railways and operators of historic trains on main lines, the ORR launched an industry-wide consultation on the application of the Railway Safety Regulations 1999 (RSR 99) to Mark 1-type and hinged-door rolling stock, when operated on railway infrastructure where line speed exceeds 40km/h.

RSR 99 was introduced to deal with safety risks, as highlighted by a series of accidents from trains passing signals at danger and collisions involving Mark 1 rolling stock. As a result, it is imperative that the industry implements reliable and efficient CDL solutions to achieve the above. This is where Assenta Rail comes in.

Over the past two years, we have collaborated with a diverse range of clients to deliver bespoke CDL services that can be adapted to different vehicle types. It was a

core part of our business in 2022, and looks poised to grow even further in 2023, honed, in part, through our close client collaboration and engagement with the ORR. We look forward to evolving this along with our other products this year.

Creating Products Fit for Change

Developing products that deliver positive change for our customers is crucial. We have developed controlled effluent tanks (CET), in essence, tanks for toilet waste, to support the rail industry in removing waste safely and hygienically. Historically, train carriage waste was deposited on the tracks. However, this is no longer permitted, thanks to the developing green agenda that is coming into play.

Our CET solution safely stores waste so that it can be transported and disposed of at the depot, post journey. The bespoke system can be adapted to suit different client needs.

Moving forward, all operators are legally required to employ this method. We are one of the few suppliers offering this solution, and also have experience of integrating the product in Europe.

Flange Lubricators

Assenta were approached by a client who had been experiencing significant wheel wear in the North of Scotland – a common occurrence for those operating P8 profiles. At the time, Network Rail were also in the process of changing the profile of the tracks in Scotland.

We were asked to find a solution that would eliminate the need for track changes. Assenta created a flange lubricating solution, where brackets were installed to lubricate the wheels to help them slide more easily and reduce erosion.

The design stage and fit of this process took some time to develop, and Assenta implemented a trial fit in January 2023 with two clients.

Given the radical changes the environment is undergoing due to climate change – e.g. the extremely dry summer we experienced in 2022 – this will no doubt become a key issue for operators, and something that many should seek to implement sooner rather than later.

Battery Boxes

Assenta was contacted by a client who was having trouble finding a manufacturer to supply a physical battery box, since it required an obsolete part. We were able to draw up the design and manufacture the product on their behalf. It was great to be able to offer a bespoke solution to a client in need, and we look forward to doing more of this in 2023.

Nurturing Growth

We established our depot in Hamilton, Scotland as a base for our operations in 2019. One of only two independents in Scotland, the depot has enabled us to bring our engineering offering in-house and provide an end-to-end turnkey service to our clients.

Since launching, we have experienced an increase in volume of business. As such, the focus for us in 2023 will be to increase capacity to support the evolving demand. We have plans to extend the depot to accommodate the increased workload, and look forward to unveiling this later in the year.

We are proud to be delivering for Scotland and working closely with clients both in Scotland and in the wider UK. We will also be looking to grow our team in tandem with the depot expansion.

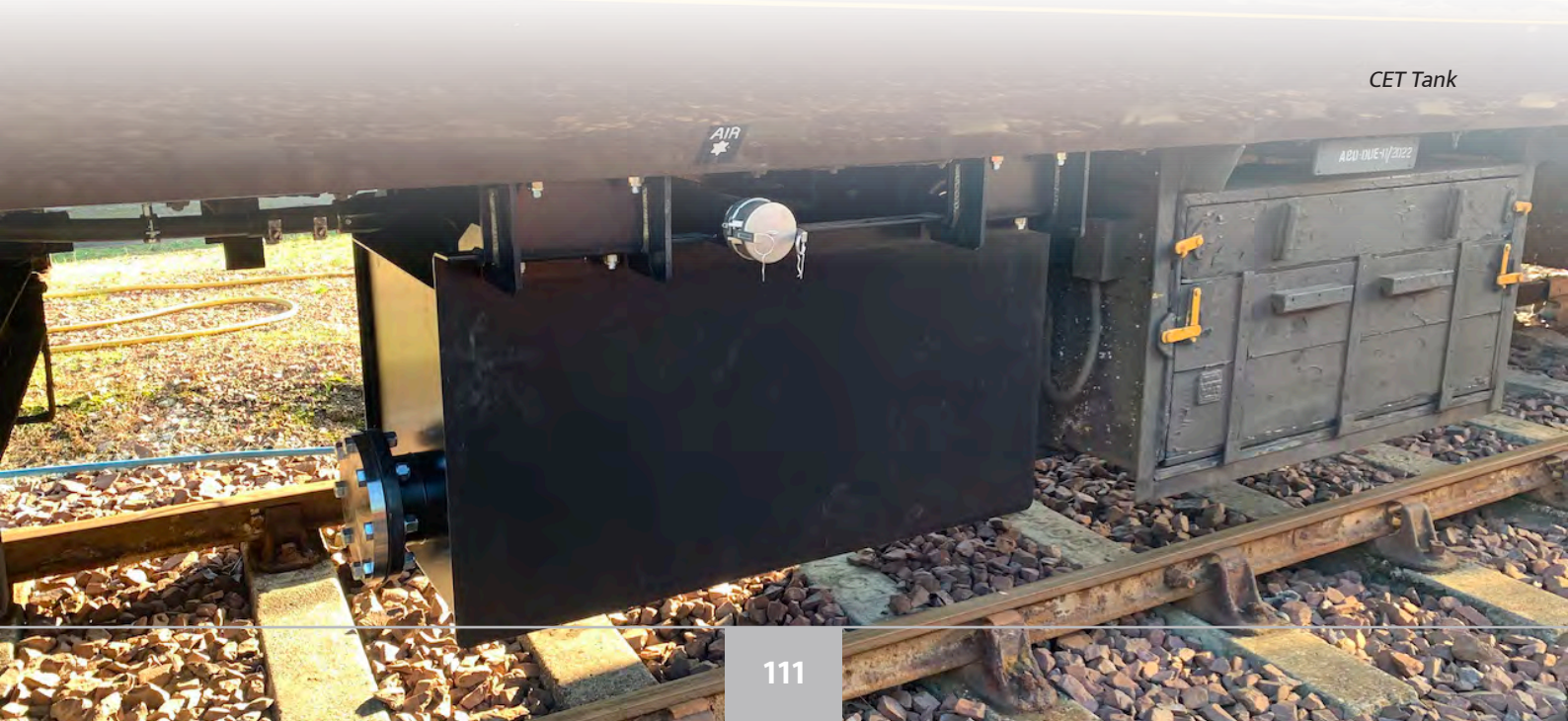
It has been heartening to see the positive impact our products are having on our customers and the rail industry. We look forward to delivering more engineering solutions to our clients in 2023.

**For more information please contact
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assentarail.co.uk



CET Tank

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Roxtec

Fire Protection of Plastic Conduits

Roxtec presents new and flexible Roxtec RM PPS sealing modules. They are especially developed to ensure fire protection for flexible plastic conduit penetrations in the rolling stock industry.

Roxtec RM PPS modules adapt to flexible plastic conduit systems of many sizes. They contain intumescent material which expands to many times its original size to protect conduit applications in the case of fire.

The new modules ensure fire protection, watertightness and dust-tightness as well as proven cable retention and vibration resistance. You can use the sealing modules in four different versions of Roxtec frames depending on the application and your specific needs and requirements.

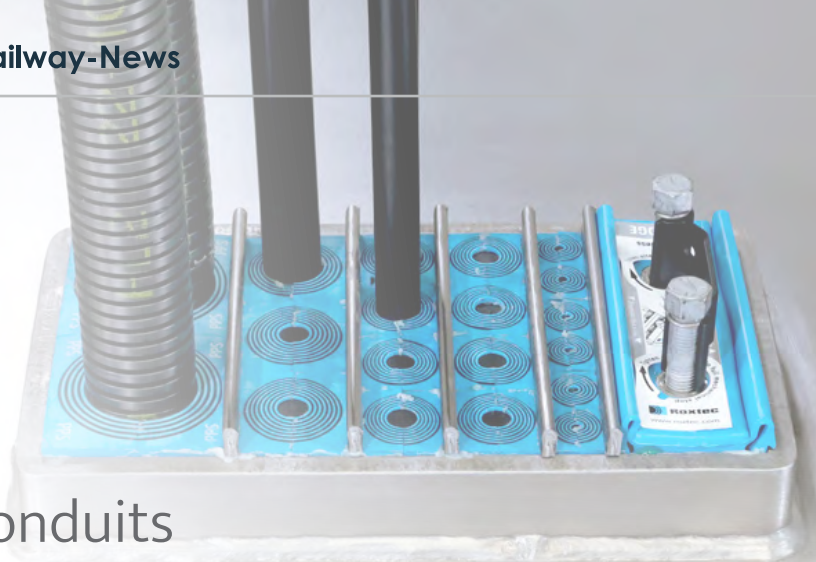
In case of fire, the intumescent material reacts to the heat, expands and seals the void in the conduit and module, preventing flames from spreading. The modules allow you to pass PMA conduit systems through structures without cutting the conduit and adding fire adapters on each side of the transit.

Combinations and Ratings

You can mix Roxtec RM PPS sealing modules with regular RM modules and safely seal both plastic conduits and cables in the same opening. The ratings for all complete transits meet IP 66/67, E60 and HL3 ratings according to IEC 60529 and EN 45545.

Roxtec GH Frame – For Bolting

Use RM PPS modules in the Roxtec GH frame when you need a fire-rated transit for bolting on to even



structures like steel or sandwich walls/floors. It allows for routing of conduits with high cable density.

Roxtec S Frame – For Precise Welding

Use RM PPS modules in the Roxtec S frame if you want a fire-rated transit for welding into precise apertures. It provides a closed and safe space in floor applications and allows for conduits with high cable density.

Roxtec SF Frame – For Simplified Welding

Use RM PPS modules in the Roxtec SF frame with flange when you need a fire-rated transit for simplified welding. It provides a closed and safe space in floor applications and allows for conduits with high cable density.

Roxtec SK Frame – For Extra Depth

Use RM PPS modules in the Roxtec SK frame to get a welded fire-rated transit to cover the full depth of the opening. It protects all high cable density conduits passing through the structure from wear and damage.

Click [here](#) to learn more.

Scan the QR code to
contact Roxtec



epsotech

Getting the Mission on Track – epsotech’s Commitment for a Greener Future

In 2021 epsotech started its green journey supported by the motto ‘we care about plastics’. We want to reduce plastic waste and thus contribute to a more economical and sustainable environment with a high recycling rate.

The group’s ambition was, and still is, to increase the rate of material it collects and reprocesses. With sea plastics made from old fishing nets and ropes from the maritime industry and the launch of its recycling strategy, epsotech was able to set the first significant market accents and assume a pioneering role in the use of post-consumer materials.

The new **epsobr** branding structure is the next specific step on the journey to emphasise and visualise the epsotech way to more sustainability and clear product differentiation.

Sustainability in relation to the products means developing innovative solutions that are tailored to the requirements of the future. It means using natural resources responsibly and carefully so that they remain available to future generations.

For the rail sector, epsotech offers plastic solutions with a significant weight-saving benefit and lower cost than traditional materials and methods. Customers can choose between polypropylene as well as polycarbonate-based materials which are classified in the new **epsobr** engineered product range. Characterised by their high-performance properties such as chemical resistance, flame retardancy and being halogen-free the **epsobr** engineered products perform with excellent surface quality and colour brilliance – in compliance with the relevant norms and standards.

The new **epsobr** products take green travel to the next level!



For more information contact Francois Venisse:

francois.venisse@epsotech.com

www.epsotech.com



MADE FOR A GREENER VISION OF MOBILITY

Plastics solutions doing it the right way

we care about

our people · our products · our planet

Discover our new product-portfolio with a strong focus on CO₂ reduction and alternative raw material sources.

epsoearth

epsoengineered

epsoessential

Because caring is our solution for a greener future

Part of the **epsoengineered** product range – tailor-made polymer sheets for the railway industry:

Excellent impact resistance · High CFE value ·

Compliance with EU standards



HALOGEN FREE



HIGH STRENGTH
TO WEIGHT RATIO



RANGE OF
TEXTURES
VERSUS GRP AND
ALUMINIUM



FLAME
RETARDANT



COMPLIANT
TO A RANGE
OF EU LEGACY
STANDARDS



RECYCLABLE
AND CLEAN

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FinnProfiles

Sealing Solution Manufacturer, FinnProfiles, Is Also Taking Over the Moulding Business!



FinnProfiles's Sales Manager and moulded product specialist, Sari Laihonen, is confident that customers in the railway industry will benefit from the company's new broader product range

The railway industry's trusted sealing profile manufacturer is gearing up to be a comprehensive polymer solution supplier. In addition to its extruded profiles, flat gaskets and wide-ranging post-production services, the company now offers silicone and rubber moulding products.

In recent years, Finland-based FinnProfiles has invested heavily in moulding production, especially silicone injection moulding. Due to hard work, the company is finally ready to announce that the machines are running and production is up and running.

In addition to its silicone injection moulding machines, the company has compression moulding for rubber and silicone products.

Sari Laihonen is Moulded Product Specialist at FinnProfiles.

Question: Why did you expand to moulded products in the first place?

Sari Laihonen: Over the years, several customers have asked us if we can manufacture moulded parts, and we always had to decline. Now those days are over since the combinations of profiles and moulded parts are possible.

Q: Was it a tough call?

SL: I believe that our company's management gave it serious thought and decided that FinnProfiles wanted to be a partner that could deliver the broadest possible service concept. We aim to be a reliable and versatile polymer expert for our customers.

Q: What kind of products are you able to produce with your moulding machinery?

SL: With the current injection moulding machines, we can offer simple seals to challenging multidimensional products with texture, holes, ridges or shoulders. The products are burr-free and high-quality otherwise, too. Thanks to the automated mould technology, we can offer large batch sizes, but smaller series with more affordable moulds are also possible.

Q: How would you describe your advantages as a polymer solutions partner?

SL: We can serve our customers with a 'one-door tactic' since our services include profiles, flat gaskets, moulding products, and a wide range of post-production services, such as taping, surface treatments, cut-ups, perforations and vulcanised joints. I guess flexible and versatile is a proper definition. In other words, partnership with FinnProfiles reduces the number of different suppliers and simultaneously

increases the number of innovative sealing solution options.

Q: What opportunities does your moulding production offer to the railway industry, then?

SL: In addition to profiles and gaskets, we can now manufacture various ready-to-install entreties, such as smaller gaskets, corners, grommets, plugs, bellows or other cover strips from fire-resistant silicone. We can also do overmolding of handles or other aluminium parts in the mould. Our customers' possibilities are now infinite, as we like to say here in FinnProfiles.

Q: What about the materials and their suitability for the railway industry? Are fire and smoke standards met in your moulded parts?

SL: Our materials are suitable for the railway industry. We are compliant with all of the following fire and smoke standards: EN 45545-2, DIN 5510-2, NF F 16-101, BS 6853, NFPA 130.

Q: If I need moulded parts, how would we get started?

SL: All you need is an idea of a product, and we can help you from there. However, in many cases, the customer has a sketch or drawing of a product. Then we map out all the relevant information about the operating



One of FinnProfiles's silicone injection moulding machines



A moulded corner part made of light grey silicone. “This is a fine example of a combined solution. Four corners like this and extruded silicone profiles will form a sealing frame solution for our customer,” Laihonen says

environment and additional exposures that the solution will face. After this, we analyse the entity, draw a draft, or possibly give a few improvement suggestions if the customer already has a drawing. Then we provide an offer and a production time for the mould and create a 3D-printed product prototype. After the mould is ready, the first sample pieces will be made, and then, if you give us the green light, we’ll proceed to actual production.

Q: In which phase of the project should we contact you?

SL: As early as possible since we like to participate in projects already in the design phase. This way, we can help you to get the best possible outcome and possibly reduce mould manufacturing costs. We know the rail industry’s certificates, and due to our know-how of materials, we can also help with material selection.

Q: What are three good reasons why the railway industry should trust FinnProfiles to manufacture their moulding products in addition to its sealing solutions?

SL: This one is easy! We have an excellent knowledge of

materials, and we know the industry’s certificates and requirements, but above all, our moulding products are of the highest quality. Our know-how of material behaviour and ability to create unique products gives our customers a huge amount of new possibilities.

finnprofiles.com



Scan the QR code to contact Sari Laihonen, Sales Manager



FINNPROFILES



Scan the QR code to contact Jarno Halme, Business Area Manager, Rolling Stock



Momentum Builds for Euroguarco Thanks to InnoTrans Exhibition

European rail exhibition gives Euroguarco a chance to showcase its capabilities as a provider of unique integrated train interior solutions.

The coming together of Euroguarco, Intersys and Eurorail under the umbrella of the Euroguarco Group has enabled the companies to consolidate their experience, skills and product portfolio.

Working in partnership with S.B.F. Engineering, the group elevates these companies from suppliers to solution providers that work together to provide customers with a single, integrated and customised train interior solution.

The Euroguarco Group at InnoTrans 2022

Since its creation last September, the Euroguarco Group has been promoting its new services – a highlight of which was at InnoTrans 2022.

This was the first event where the companies exhibited as the Euroguarco Group, which gave them an opportunity to showcase their ability to develop integrated solutions to the wider rail industry.

“They already knew us as single companies, now they know us as a group,” says Andrea Senese, Sales Department Manager, Insulating and Interiors Materials, at Euroguarco. “After several years of not



being able to travel and attend shows, having all the big players under one roof was a great opportunity for us to rekindle relationships with established clients and discuss our capabilities with potential future customers.”

Many attendees were drawn in by the variety of products they saw at the booth and struck up conversations with the team. This provided an opportunity to highlight how each member of the group has its own niche and together they create synergies that lead to new concepts and solutions.

“Instead of separately buying ceilings, LED light systems, air ducts, etc., our customers can come to the group, tell us what they need and we’ll go away and work together to create a single, integrated and customised solution for them,” explains Senese.

Solutions proposed at the exhibition included a new sandwich of materials for ceilings, made with the group’s composite phenolic panels and aluminium, and its prefitted flooring system.

“Our stand was very well visited and each of us had the opportunity to discuss with our current customers such as Alstom, CAF and Hitachi ways that the group as a whole could offer added value through integrated

solutions,” says Rosario Caltabiano, Eurorail’s International Sales Director.

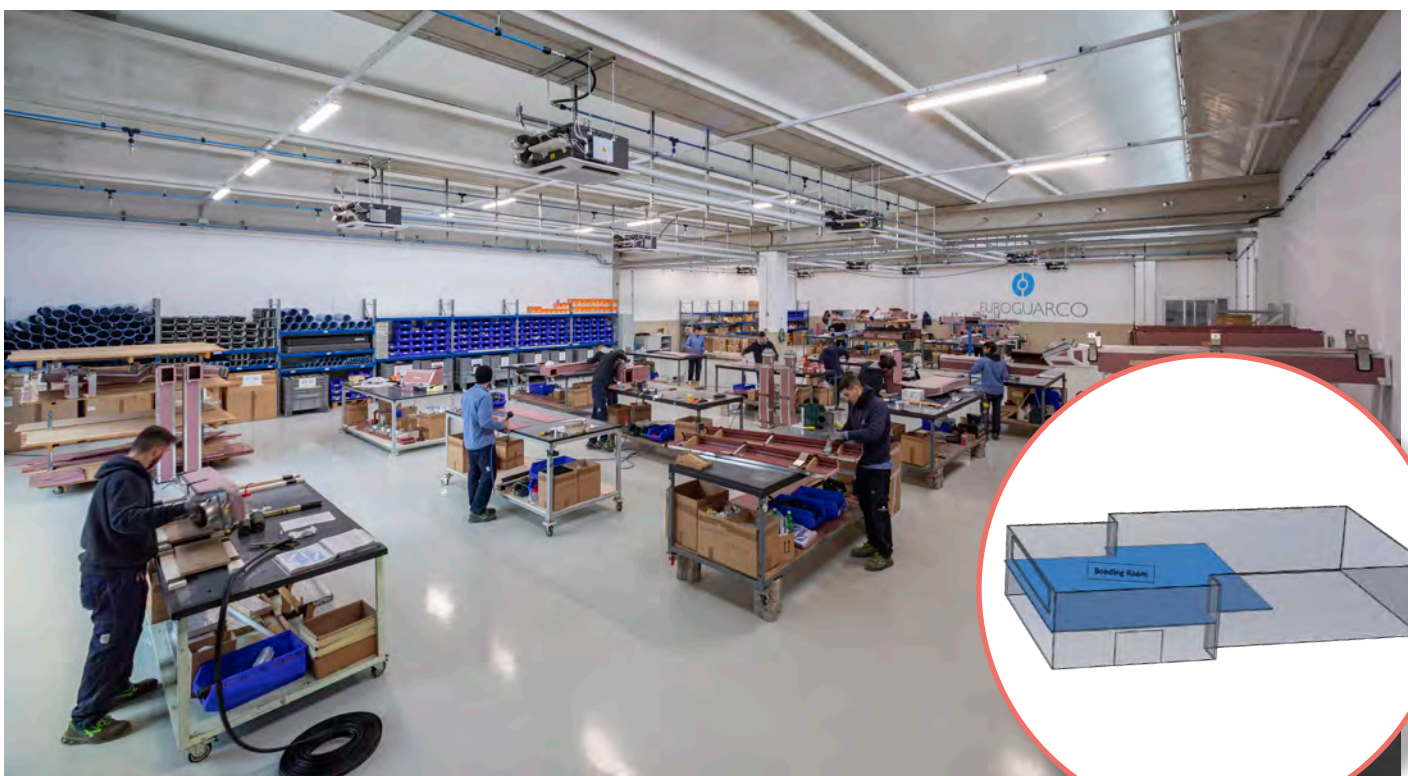
“It was impressive to see the interest in our integrated solutions concept, and this made us realise that we’re a group with a unique offering in Europe. There are competitors that offer similar products, but we’re the only ones who work with an engineering company to provide a complete solution. The response showed us that we’re taking the right path and the interest is there,” Senese adds.

Show Highlights

Highlights of the show included meetings with potential customers including Siemens and Stadler, plus the group was invited to a breakfast event held by Škoda.

“Just a few suppliers were invited, so it was an honour for us to attend as we’d only been in contact with the company since that April. This meant that in just a few months we’d come to be considered a key supplier and their interest in our integrated solutions is high,” enthuses Paolo Bettarini, Sales Director at Intersys.

Over the three days of the show, the team recorded the





interest in new materials and integrated solutions and has since followed up with many of the organisations from the show.

“We met our target, which was to connect with potential customers, and have since made several site visits for talks with these companies. InnoTrans definitely helped us get the ball rolling and we’re excited for everything 2023 has in store,” Senese says.

“We’ll definitely be back for InnoTrans 2024, and look forward to building more relationships then.”

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mobile: +39 327 3768442

euroguarco.com

Members of the Euroguarco Group

- **Euroguarco S.p.a** has more than 60 years’ experience working across a number of industries. Its rail division was launched in 2011 and offers engineering and production of lightweight solutions for major rolling stock manufacturers. This includes air ducting systems, insulating materials and solutions and interior components.
- **Intersys S.r.l.** provides rail companies with a range of solutions from internal LED lighting systems, outdoor headlights and electronic and pneumatic management and control systems for toilets through to pantograph control systems and mechanical electronic control systems for internal and external doors.
- **Eurorail S.r.l.** is a start-up founded in 2020 by Euroguarco S.p.a. and S.B.F. Engineering S.r.l.. In just a few years it has become a reference supplier providing innovative flooring systems in addition to producing sandwich panels, ceilings and external and internal panelling.
- **S.B.F. Engineering S.r.l.** is a leading Italian engineering company with a focus on the rail sector. Launched in 1998 with a focus on mechanical engineering, it has now expanded to also offer the design of pneumatic and electrical systems in addition to technical support.

Selite

Have You Faced an EMC Problem Late in the Day?
Selite Can Solve It.



In a world that is increasingly complex from a regulatory standpoint and more and more 'electric' in terms of mobility, electromagnetic shielding is essential to ensure proper functioning of sophisticated transport and signalling systems, and to protect passengers from continuous and prolonged exposure to electromagnetic fields as well.

The importance of adequate EMC shielding is often not considered from the very beginning of the project, and difficulties emerge when the product or facility has already been completed.

For example, for the railway industry, trains and

electronic devices can be shielded once they are completed, meeting the goal of ensuring compliance with EMC standards.

Over 20 Years' Expertise in the Railway Business

The experience gained in a complex field like the railway sector has enabled the company to develop low-frequency EMC shielding technologies and processes that can respond effectively and promptly to various customer needs:

- Ensuring compliance with EMC compatibility standards
- Ensuring the proper operation of on-board systems
- Protecting the safety and health of people

Like all transportation systems, railways are also evolving: ERTMS will be adopted all over Europe, bringing significant benefits to the industry in terms of sustainability and safety. Selite has been working for years with leading companies in the rail industry to meet all the technical regulatory requirements and design the most appropriate low-frequency EMC shielding to protect the ERTMS system from possible interference. Now more than ever, effective and efficient shielding is important to ensure the reliability of the entire system and enable its deployment throughout the entire European network.

How Can Selite Solve Your EMC Issues after the Project Is Complete?

1. Accepting the challenge, first!
2. Analysing all project features with your internal team.
3. Sharing its R&D experience and know-how to find and propose customised solutions.
4. Adapting and applying its SKUDOTECH® Shielding Technology to the existing project.

Selite has developed SKUDOTECH®, an innovative shielding technology with unique shielding capabilities.

Thanks to its strengths, SKUDOTECH® Shielding Technology is the real and practical answer to any low-frequency EMC shielding problem:

- 1) Effectiveness: it cuts down over 99% of EMC emissions, 4 times more than traditional material.
- 2) Lightness: the possibility of using very limited thickness, even as low as 0.1mm, is crucial for applications that need to be extremely light. Reducing the weight of a transport vehicle has a positive impact on performance, as well as on energy consumption and the environment.
- 3) Practicality: it is easily applicable, including to existing solutions.
- 4) Reliability and durability: it is resistant to corrosion and its effectiveness exceeds the life of the device.
- 5) Sustainability: at the end of the life-cycle of the train or the component it is easy to separate, process and reuse because it is 100% recyclable.

6) Versatility: it adapts to the design without penalising the performance of the vehicle. For example, with SKUDOTECH® Shielding Technology high-tension cables can be wound on to trains without excessive and bulky structures.

It's Never Too Late to Solve a Low-Frequency EMC Problem!

Selite designs low-frequency EMC shielding from scratch (native shielding), but is often involved in EMC shielding projects for existing products, facilities or components that need more effective shielding (adaptive shielding).

This dual approach allows Selite to move nimbly within an industry that is as complicated, including from a regulatory point of view, as the railway industry, and to respond promptly to customer needs. Selite is both an experienced and highly qualified partner when involved in the early stages of a project, as well as a consultant ready to solve problems and find solutions when the need and urgency arise to shield products or installations that are in progress or that already exist.

In a nutshell, SKUDOTECH® Shielding Technology can be applied at each stage of an EMC shielding project: before, during and after. It is this versatility, combined with Selite's adaptive approach, that brings significant benefits in terms of:

- Reduced time to market
- Cost savings

If you have a problem with low-frequency electromagnetic emissions and want to be relieved of the technological complexity the development of an effective EMC shielding solution requires, Selite is always your reliable outside expert.

seliteshielding.com



SELITE



SELITE



EMC problems on board?

SELITE is a Low Frequency EMC shielding problem solver, with over 20 years expertise in the Railway business on an international basis.

Thanks to its innovative and exclusive SKUDOTECH® Technology, SELITE is able to reduce electromagnetic fields by over 99%, 4 times more than a traditional shielding.

Discover all the advantages of SKUDOTECH®

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Reliable service at pit stop speed. Roediger® water & wastewater systems for rail depots and workshops



Freshwater and wastewater management with incredibly short downtimes: This is what we are already providing with the latest vacuum technology for large and demanding train operators worldwide. You too can rely on the perfect combination of service quality and high speed:

- Potable / freshwater treatment and supply
- Preparation and supply of flushing water
- Service stations for indoor and outdoor areas
- Cleaning service cabinets for interior cleaning of trains

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Roediger Vacuum GmbH

Compact Stand-Alone Systems for Small Train Depots

Roediger provides compact and robust stand-alone cabinets for water supply and wastewater disposal for small train service stations.

Roediger has developed the proven supply and disposal cabinets that have been installed in various train service depots for nearly 30 years. Improved design and the selection of modern materials have significantly improved the reliability and the compactness of the modules.

Roediger recently installed such a cabinet at the railway station in Nidda, a small town located approximately 40km northeast of Frankfurt. The client was Hessische Landesbahn (Hessian State Railway), a regional transport company owned by the German state of **Hesse**.

This stand-alone system is a perfect solution for small train stations or train service depots. It contains all of the necessary components for water and wastewater services and can be operated independently.

Features

The stand-alone cabinet is equipped with a service-friendly and reliable peristaltic hose pump. The pump is self-priming with very good suction properties and delivery rate. It is easy to access and to maintain.

Proven Roediger couplings for wastewater and drinking water connections at the train are used. The drinking water coupling is made of high-grade, non-corrosive stainless steel (AISI 316L) meeting all drinking water requirements of authorities and the German Federal Railway Authority (EBA).



Nidda Railway Station, Germany

New Enclosures

The enclosures of the new cabinets are made of GRP sandwich material, which is characterised by its amazing weather and UV-resistance as well as its durability. The enclosures are already in use in numerous applications in the rail sector.

Thanks to the good insulating properties, the cabinets can be installed in extremely cold or extremely hot outdoor conditions.

Safety Features

The usage of water supply and wastewater disposal is interlocked: the two services cannot be operated simultaneously as the drinking water and wastewater components are hygienically separated and housed in separate compartments. This eliminates the risk of drinking water contamination.

In addition, the drinking water supply hose will be automatically flushed to ensure safe and hygienic operation.

Customised Solutions

The stand-alone cabinets include everything necessary for the complete rail coach water and wastewater service. They can also be supplied for water supply or wastewater disposal only. Interior cleaning cabinets



Stand-alone supply & disposal cabinet installed at Nidda Railway Station, Germany



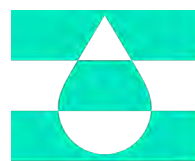
with supply of water and cleaning solutions and storage room for cleaning supplies are available as well.

Apart from the stand-alone cabinets, Roediger provides satellite cabinets that can be connected to a centralised vacuum station.

Advantages

- Small footprint area
- Weather and UV-proof enclosure
- Low investment cost for small train service stations
- Stand-alone solution or satellite system connected to central vacuum station
- Additional storage room and supply of cleaning solutions for interior cleaning available

For more information please contact:



Roediger

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The New Generation at BIOforte

A Look at Sustainability, Growth and Graffiti Removal Trends – an Interview with Anja Mannartz, COO of BIOforte GmbH



Sustainability and growth can seem contradictory at first glance. But not when it comes to successful graffiti removal and prevention concepts.

Graffiti in public or private spaces continues to grow and is increasingly becoming a challenge for companies to manage at a reasonable cost.

Did you know? These are among the most successful concepts:

- Comprehensive graffiti and surface protection (include it in your planning)

- Rapid removal! Successfully protect yourself from copycats
- Economical use of removal products and use of large containers

BIOforte is one of the leading specialist companies and, as a surface specialist, offers customers convincing solutions in graffiti removal and prevention, lacquer restoration, deep cleaning and chewing gum removal as well as glass restoration. Deutsche Bahn, Swiss Federal Railways and various railroad companies in Romania, Croatia and Italy rely on BIOforte products and services.

Let's talk to an expert: Anja Mannartz, Member of the Executive Board & COO at BIOforte GmbH.

Question: BIOforte has a special advantage with a central location in Europe and several sites in Switzerland and Germany. How do customers benefit?

Anja Mannartz: Since smearings are removed very quickly in the best case, we can use this to our advantage being close to fast roads and extensive rail networks. This is often a decisive factor in preventing unpleasant follow-up costs from copycats.

Q: Has graffiti smearing on rolling stock changed in recent years and what are the current trends and challenges?

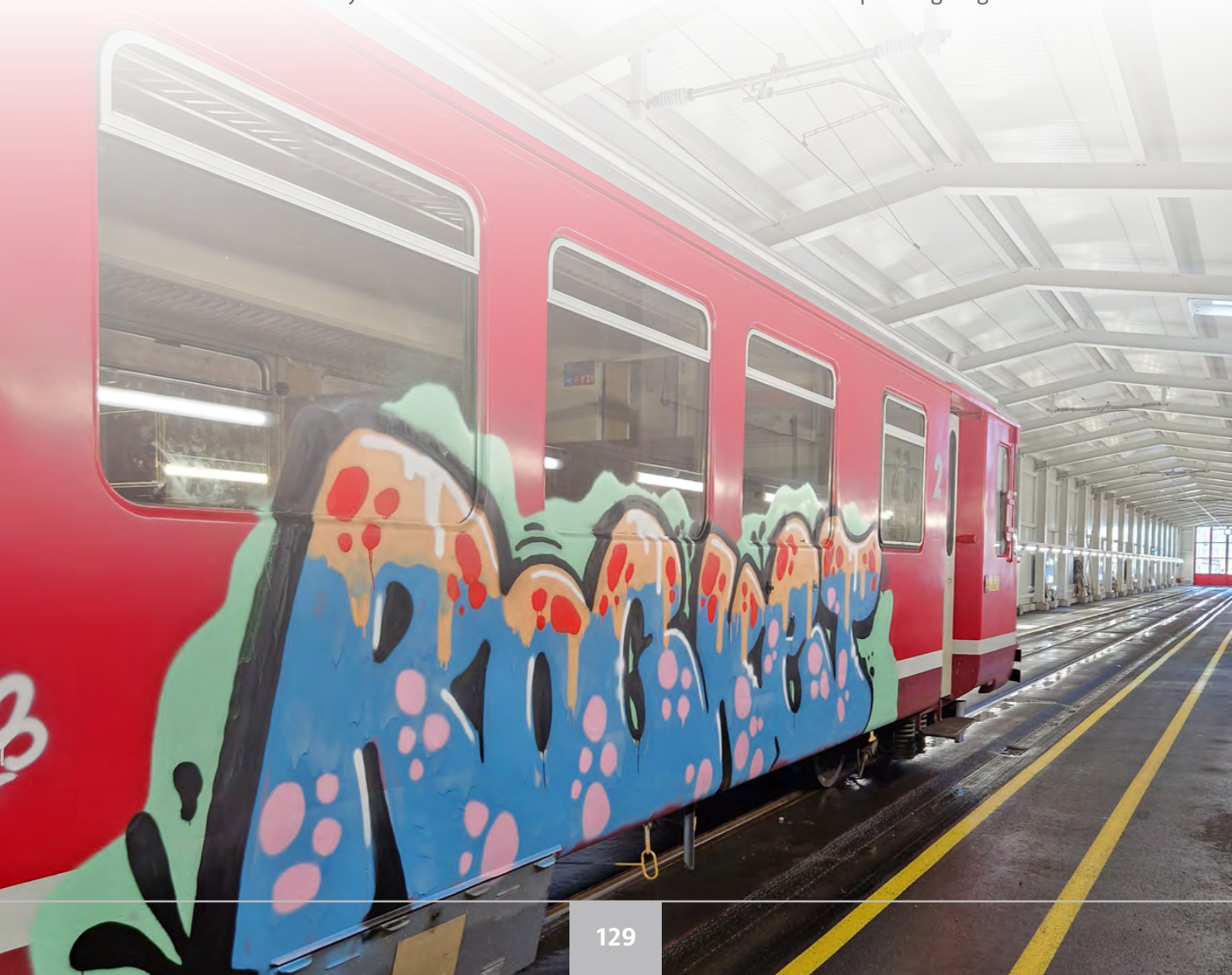
AM: The defilements are continuously increasing. The pandemic with involuntarily more free time has to do with it, but also the social changes of decreasing respect. The material used is also becoming more demanding. Accordingly, we invest a lot in real customer proximity and in continuous testing and product tuning to never lose track of the very best solutions.

Q: How is BIOforte responding to the increasing demands for sustainability?

AM: With our commitment 'BIOforte – naturally strong!', sustainability and biodegradability have been at the top of our priority list for over 12 years, since our foundation. Today, there is no way around continuous improvement in this area. With few exceptions, BIOforte products are biodegradable, VOC-free and microplastic-free. Nevertheless, we are never satisfied and are in constant exchange with laboratories and experts in order to further improve all our services.

Q: Key word: safety. A big topic in the environment of rail travel and transport. Customers want to feel safe, both on the road and in public spaces at stations. Occupational safety for employees is a top priority, too. What can BIOforte contribute to this?

AM: BIOforte is ISO-certified (ISO-9001 and ISO-14001), regularly audited and updated. To this end, we often advise customers at the planning stage of new



buildings so that targeted protective measures and a light design are given the necessary priority. Rapid removal is and remains a key factor. In addition, our nature-compatible products are a further guarantee for safe working.

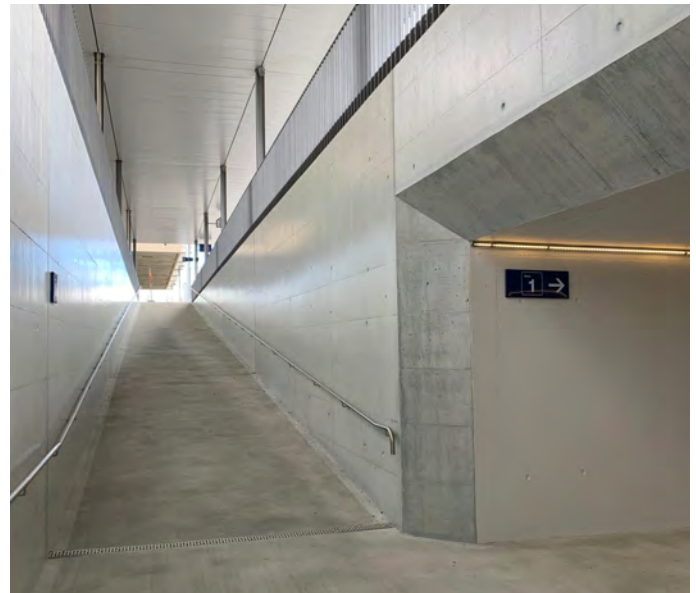
Q: Many a company is struggling with rising costs. What is BIOforte's expert advice against this?

AM: As in other areas, it pays to co-operate and consult with experts in the field. It always pays to take clever preventive measures to avoid costs in the first place. If contaminants do strike, taking active and rapid countermeasures is another success factor.

Furthermore, the economical use of products (thanks to good selection) and the use of large containers are guaranteed cost-savers. They are available at a lower price and have a better ecological balance in terms of waste and transport.

BIOforte stands for the successful combination of decades of experience of skilled experts and the flexibility, creativity and solution-orientation of the young, dynamic team, which Anja Mannartz leads with a lot of passion and commitment. A shortage of skilled workers is currently slowing down the company's growth, but not the wealth of ideas on how to integrate employees into the large BIOforte family with targeted measures, nor the expansion of satisfied customers throughout Europe.

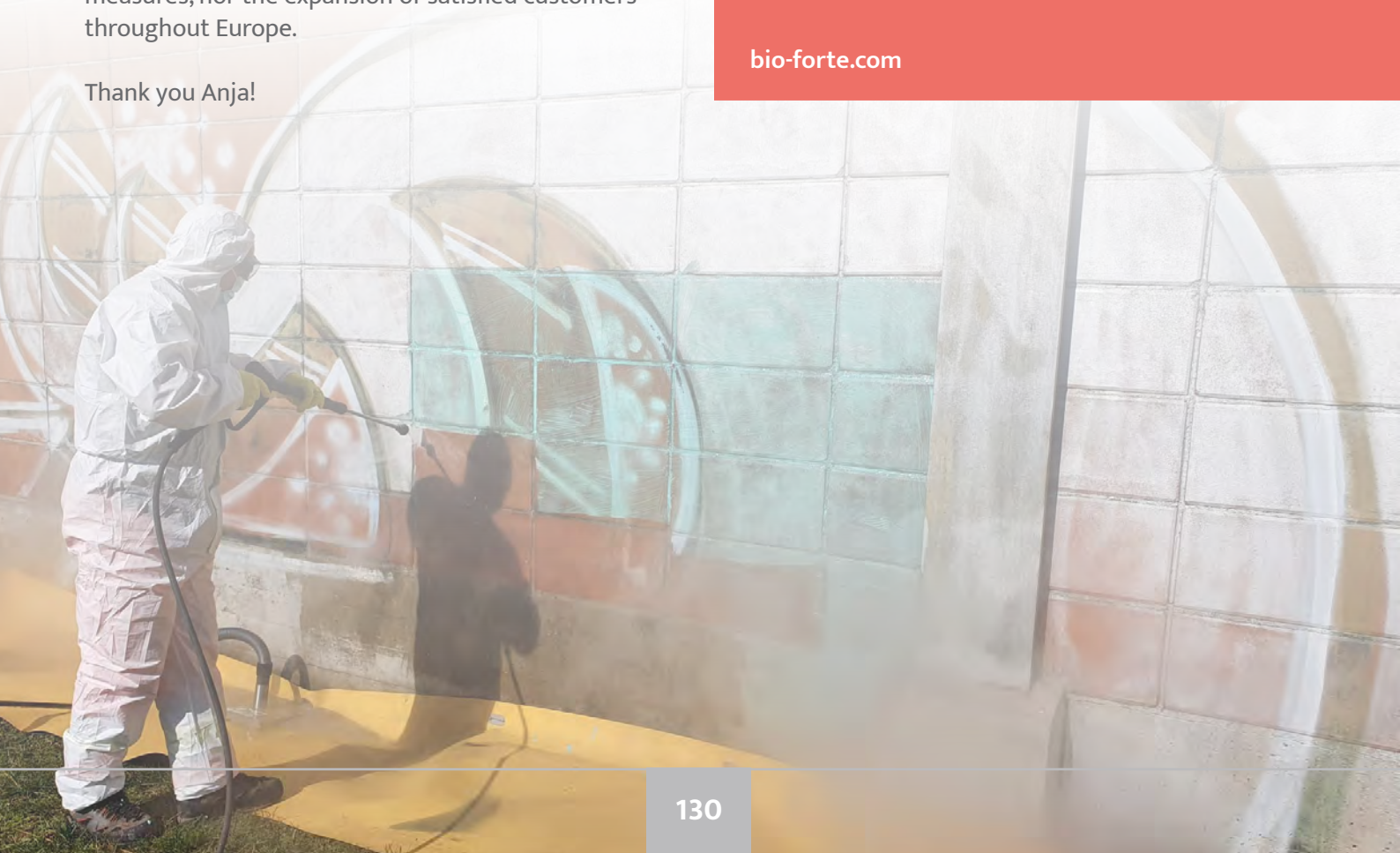
Thank you Anja!



BIOforte – Your Certified Specialist

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Performance

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Challenging
and
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Locations

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Achieved in
a Matter of
Seconds

Long
Service
Life

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in the
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HFC Phase Down Fire Suppression Alternative

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Economical Service & Maintenance
Suitable for Harsh Environments
Compact Modular Design
24/7 Automatic Protection
Ideal for remote locations
Easy Retrofit Options
Long Service Life
Made in USA
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Stat-X Aerosol Fire Suppression Systems are cutting-edge technology that offer superior fire protection without any negative environmental impact while avoiding the installation and maintenance complexities of piped gaseous systems.

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For private companies and the public sector: we work with you to develop solutions that meet your particular needs. We offer you know-how and experience gained from current projects in your industry all over the world. Together with you, we can shape the future – with long-term and individually structured financing. Because the future belongs to those who think ahead. Let's shape it together.



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KfW IPEX-Bank

Green Loans in the Rail Sector

KfW IPEX-Bank's Green Loan Advisor, Sabine Lehmann, on green loans, green financing, KfW's role and trends.

Josephine Cordero Sapién, Railway-News: We hear a lot these days about decarbonising transport in order for governments to meet their net zero commitments. This also includes rail. For example, the UK government has put forward plans to end the use of diesel-only trains on the British rail network by 2040. Such a shift in policy obviously requires major investment by companies. This is where green loans come in. Could you say a little bit about what a green loan is and what specifically makes a loan a green loan?

Sabine Lehmann, KfW IPEX-Bank: Yes, of course, what makes a loan a green loan? That is indeed a crucial question. Mostly people think the loan should be for

an investment in an asset or project defined as green following a specific definition, category or taxonomy.

The purpose of the financing is only one part. And what kind of project or asset can be defined is best described in Appendix 1 of the Green Loan Principles LMA/LSTA/APLMA, which lists all eligible green categories. Speaking of the core elements of a green loan, the use of proceeds has to be clearly focused on the eligible green asset / project financed. Furthermore, the GLP describe that the borrower has to communicate to its lenders its environmental sustainability objectives and the process by which the borrower determines how its projects fit within the eligible categories. Core element three is that the proceeds of a green loan have to be credited to a dedicated account or tracked by the borrower in an appropriate manner and last but not least, the issue of reporting: borrowers have to keep readily available up to date information on the use of proceeds to be renewed annually until fully drawn.



*Sabine Lehmann,
Green Loan Advisor, KfW IPEX-Bank © Alex Habermehl*

JCS: The idea of financing based around environmental objectives has been around since the early 2000s and this is also when environmental, social and governance (ESG) factors were first mentioned in a report titled ‘Who Cares Wins’, which was produced by financial institutions at the behest of the UN. How has ESG reporting shaped the lending market and when did KfW include green loans in its lending portfolio?

SL: Here it is important to differentiate between ESG reporting on the one hand as a derivative of CSR reporting and on the other hand reporting influenced by initiatives like TCFD [Task Force on Climate-Related Financial Disclosures], going deeply into climate physical and transition risks. KfW Group has been disclosing its Sustainability Report for years but getting deeper on the risk side, KfW has been committed to TCFD since 2018. Next to this, when the focus is on risk avoidance, we have seen a lot of initiatives on different levels: the World Bank Safeguards, the IFC Performance Standards and the Equator Principles, all of which the relevant business areas of the Group are committed to.

Our Sustainability Report is in line with GRI and the German ‘Nachhaltigkeitskodex’.

Speaking not only about risk mitigation or risk avoidance, in the last years the positive side of ESG especially the E – environmental, including climate-positive topics – has raised attention:

KfW is famous for Green Bonds with a portfolio

of about EUR 50 billion. Our customers can take advantage of our many years of expertise in financings that make a positive difference for the environment and the climate. This is already part of our DNA at KfW IPEX-Bank and is also a product segment thanks to our Green Loans – Made by KfW IPEX-Bank. KfW IPEX-Bank launched the first Green Loan in line with the Green Loan Principles for Hapag Lloyd in 2019.

JCS: In terms of green lending, are there any interesting trends of where you see this lending segment going?

SL: We hear and see a lot about green lending, very

© MFD Rail



often the term is used for all colours / shades of loans with a sustainable focus. What we see – and we are happy about this – is a more distinct use.

Green loans focus on the aspects described above. When it comes to green assets / projects in sectors not yet fully transformed, we see transition loans becoming more and more relevant with a focus on the net zero path of the company behind.

In the segment of sustainable loans for social projects social loans will play an increasing role in the market.

Next to asset or project-based financing, sustainability-linked loans, which focus on the overall sustainability performance of the company or group, are growing fast in all kinds of sectors.

JCS: Last year KfW IPEX-Bank was the green loan provider to Swiss freight car rental company MFD Rail. What was the value of that green loan and what will MFD Rail use it for?

SL: For the financing totalling EUR 400 million KfW IPEX-Bank gained five other banks as partners: they were participating in the financing by syndication with more than EUR 300 million. The loan agreement is structured as a Green Loan issued by KfW IPEX-Bank and certified accordingly. Together with the previous financing of EUR 100 million from 2020, the total volume financed now stands at EUR 500 million.

The funds will be used to finance up to 6,500 new intermodal railcars, which the company specialises in

leasing as a European platform. The use of intermodal freight cars makes it possible to link different modes of transport to rail transport, making the flow of goods more economical and more environmentally friendly. With financing like this, together with our partners, we are supporting the shift of freight transport to rail and the transition to a climate-friendly transport infrastructure.

JCS: What kind of projects in the rail sector would be eligible for green loans from KfW? Do you specialise in loans for new rolling stock or would you fund retrofits such as installing batteries on trains to allow them to run using electricity rather than diesel on non-electrified stretches of the rail network? Essentially, how is it decided what constitutes a project that falls within the green loan remit?

SL: As to your last question, the definition of eligible green project or asset has to be in line with Appendix 1 of the GLP. There you can find e.g. the definition of 'clean transportation': the category implies transportation without any kind of fossil fuels, neither used as fuel nor transported as cargo.

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Are you interested in Green Loans? Get in touch:

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Ricardo Rail

Virtual Testing

On-track testing of new and modified rolling stock is difficult and can be expensive. Ilse Vermeij, Product Manager Testing at Ricardo, explores how virtual testing can reduce real-life test requirements, improving project performance.



Ilse-Vermeij,
Ricardo Product Manager – Testing

Question: Why do we need virtual testing?

Ilse Vermeij: In the certification phase of new or modified rolling stock, I see traditional on-track testing becoming more and more difficult and consequently more costly for clients. Limited availability of test tracks, stricter safety requirements and high costs to plan and replan test runs are often key reasons for testing challenges experienced.

In addition, on-track tests are not always desirable from a safety perspective as some tests can be damaging to the trains or the infrastructure. Obvious destructive examples are derailment and crash tests. Therefore, to minimise costs and track testing time required, I believe that it is increasingly important to consider and use innovative alternatives where possible, to reduce the on-track testing scope in projects.

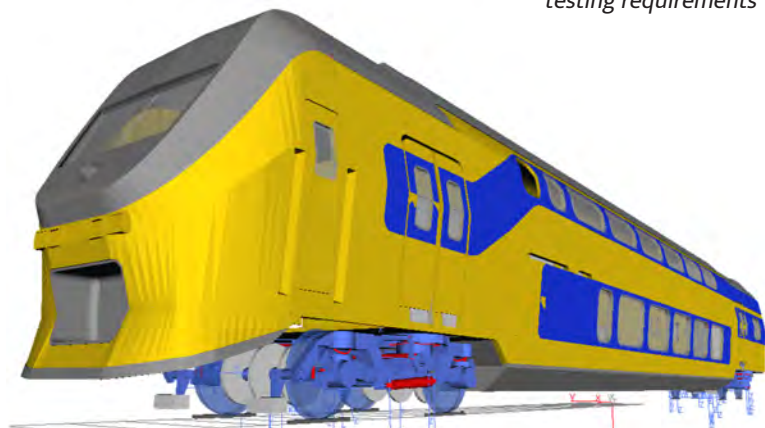
Q: What is virtual testing?

IV: Virtual testing (or virtual certification) is a useful alternative to physical testing. Virtual testing can mean full computer simulations, but it also includes tests where the system to be evaluated is placed in a simulation environment. This is known as ‘hardware in the loop’ or ‘software in the loop’ testing. At Ricardo we have developed many possibilities to test both vehicles

and infrastructure virtually. In my opinion, it is likely that vehicle testing will never be fully virtual, but it can certainly help significantly reduce the on-track test requirements, saving clients both time and money.

Even if you have access to on-track test facilities, you should still consider virtual testing. Its use can reduce both planning and safety risks significantly and reduce the overall project cost. Who can ignore these benefits? How much time and money is saved depends on the balance between the effort needed to create a model, and the cost of on-track testing. If an existing model can be reused, then virtual testing becomes very interesting.

Modelling rolling stock virtually to minimise physical testing requirements



Q: What types of testing can be virtual?

IV: I believe that the following types of testing are most interesting to ‘virtualise’, due to the current high costs for on-track testing:

- Running dynamics
- Brakes and wheel slide protection (WSP)
- Pantograph contact force
- Noise emissions
- Electrical system compatibility / harmonics
- European Train Control System (ETCS)

Of course, with the use of virtual testing, one of the most important aspects is that the models are validated, to ensure they represent the actual system under test. As with all models, they are only as good as their validation. Where virtual testing is already allowed by standards, those standards prescribe how the validation with measurement data needs to take place, (for instance in Annex T of EN14363).

Q: How do you validate a model if you have not yet built the train?

IV: For this reason, virtual testing makes most sense for vehicles based on a shared platform, where the differences with already tested and delivered vehicles are relatively small or where vehicle overhaul and component upgrades and modifications are to be evaluated. In these cases, the validation can take place by gathering validation data on vehicles already in operation, or better still, the measurement data of earlier type testing with these vehicles.

Q: Do you have an example of virtual testing in use?

IV: A great example of using virtual testing at Ricardo is pantograph simulations in accordance with EN50318 (a service we provide with our RiPAC tool). These simulations are often performed in combination with on track contact force measurements, to reduce the number of required physical tests. The model used is validated for a class of overhead line system and the validation is therefore independent of the type of vehicle. This means a model can be reused for other vehicles/configurations quite easily. If there is no



validated model available yet, the results of the on-track contact force measurements can be used for validation of the model in retrospect.

Q: Why invest in virtual testing models?

IV: In my experience, developing a virtual model will always be a wise investment. Once created it can be used to investigate vehicle behaviour in the design, certification and operational phases of a vehicle’s life. To maximise return on investment in a virtual model, multiple stakeholders through the lifecycle of the vehicle can make use of it, for example manufacturer, owner, maintainer and perhaps even the operator. When upgrades and retrofits are completed during the vehicle life, then once again a validated model can be used as a basis to aid the evaluation of the changes before they are physically made.

If you want to find out more about our testing or virtual testing services then get in touch to discuss your testing challenges either real or virtual.

Ilse Vermeij

ricardo.com/rail

ilse.vermeij@ricardo.com



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Multitel

New Test Facility for Korean Train Control System

Multitel and Korea Railroad Research Institute have joined forces to build a test facility for Korean train control system in South Korea.

In September 2022, Multitel signed a contract to deliver within three years a full set of constituents and system integration test bench for Korean Train Control System (KTCS) to the Korea Railroad Research Institute (KRRRI). This marks the reinforcement of Multitel's position on the Korean railway market and the will of both Multitel and KRRRI to strengthen and extend the mutual co-operation in the railway field.

KRRRI is establishing a conformity assessment system including testing and inspection of KTCS constituents and subsystems in accordance with the Railway Construction Act with the support of the Ministry of Land, Infrastructure and Transport (MoLIT) in Korea. With the KTCS test bench, KRRRI aims to become an independent, accredited laboratory for KTCS test and validation, and through this, provide important added value to its current status as a Designated Body in Korea railway industry.

The KTCS test bench is composed of an onboard test bench, two RBC test benches, one system test bench, a calibration tool for the onboard test bench and a calibration tool for the RBC test bench. This configuration enables KRRRI to not only test and validate the compatibility of the full KTCS system: constituents versus the line (area of use) but also test and validate each constituent at the level of the sub-system individually.

The KTCS test bench is currently based on Baseline 2. While Baseline 2 is still commonly being used in South Korea, Europe has been exclusively applying Baseline 3 for new vehicles since 2019.

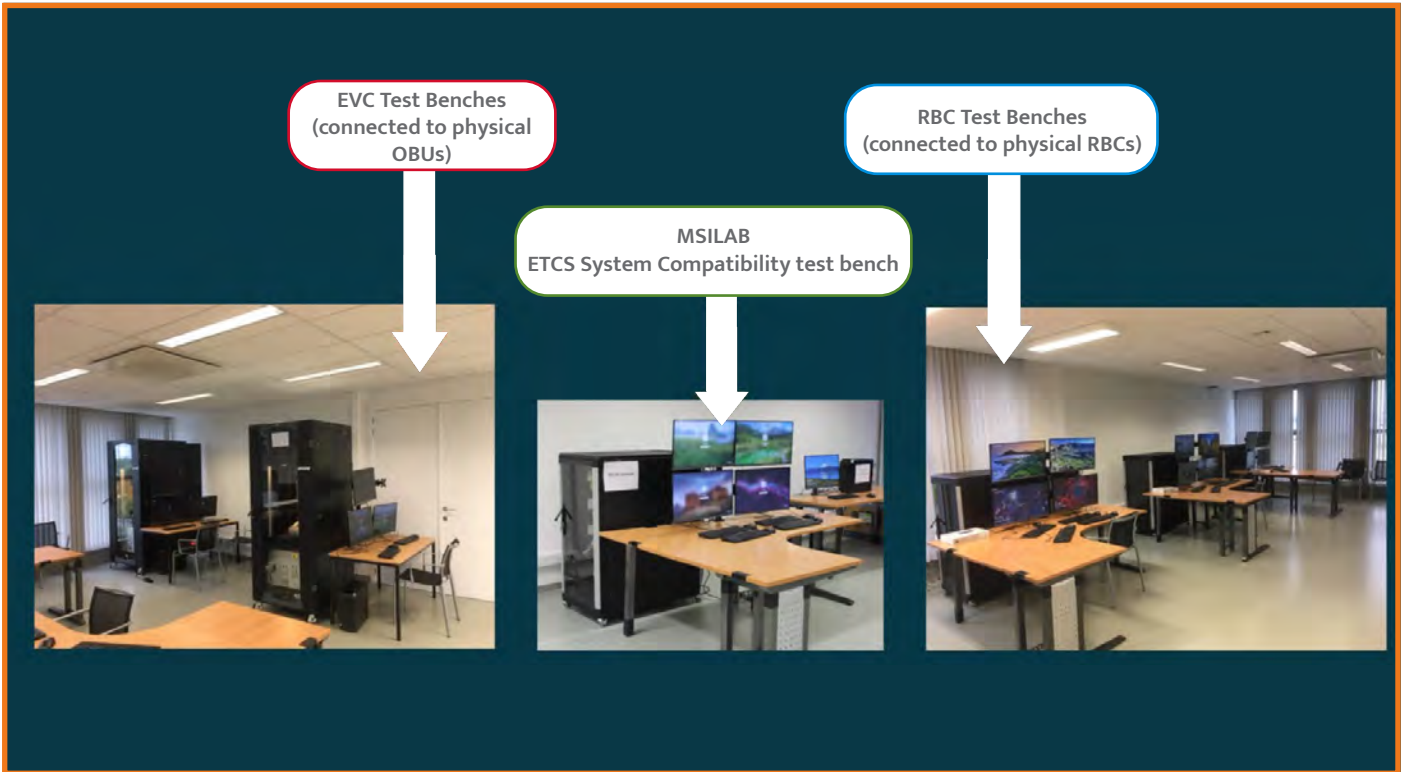
The architecture of the KTCS test bench that will be provided by Multitel is such that it is possible to extend and upgrade it from Baseline 2 to Baseline 3. This is a considerable advantage of using Multitel's technologies.

Testimonials from the Partners

Mr SHIN Duck-ho from KRRRI, Director of Railway Test and Certification Division: "Multitel is known to have participated from the early stages of the KTCS development project and has a very good reputation in Korea for supporting several KTCS projects."

Despite the impact of the Covid-19 crisis, Multitel's team overcame difficulties and successfully delivered a system level test bench testing ESC trials on area use in railway projects for stakeholders in Korea. We know that Multitel is a reliable partner to co-operate with. We hope that the relationship between the two institutes will strengthen over the years."

Mr DERESTIAT Dominique from Multitel, CEO: "KRRRI is the unique public research institute in railway sector. We highlight the co-operation with KRRRI a great deal. As a research institute in Belgium, which is not only active in railway field, Multitel expects to extend the co-operation with KRRRI not only in railway test but also to other railway application domains. As far as the KTCS test bench project is concerned, we are very proud to



Photos of the physical equipment delivered for a similar project

be the technological partner of KRRI. We will do our best to accomplish the project successfully, like what we have done so far for all our projects.”

Mr SHIN Kyung-ho from KRRI, Project Manager: “The construction of the KTCS test facilities is an ambitious project of KRRI that is being pursued with funding from MoLIT and Korea Agency for Infrastructure Technology Advancement (KAIA).

KTCS is scheduled to be implemented to the entire railway network in Korea. In order to assess the conformity of KTCS constituents and subsystems in a timely manner, it is important that KRRI quickly acquire testing know-how and testing facilities and become an independent accredited laboratory for KTCS.

This will be a significant achievement to completing supplementary competences and capabilities, beyond our current Designated Body status.

The KTCS test bench will allow KRRI to perform tests independently and assess the conformity of KTCS rollout and deployment programmes in Korea.

I thank in advance Multitel’s team, in particular Mr Xavier Ricco for the support and positive technical

exchanges related to the project. I hope our project will be smoothly finalised.”

Mr RICCO Xavier from Multitel, Head of Railway & Autonomous Transport Systems department, Project Manager: “The KTCS test bench project is an exciting opportunity for us at Multitel to once again showcase our ability to overcome challenges and achieve breakthroughs in the field of railway technology. With our previous successful delivery of similar projects to Network Rail in partnership with Atkins Limited, we have the experience and expertise necessary to tackle this project with confidence. We are also honoured and proud to be working alongside the talented team at KRRI as we strive to deliver the next generation of railway technologies. Together, we are determined to beat any challenges that may arise and push the boundaries of what is possible in the railway industry. We are excited to see the results of our hard work and look forward to the successful completion of this project.”

About Multitel:

Located in Mons, Belgium, Multitel is a research centre specialised in information and communications

technology (ICT). Multitel has more than 15 years of experience in providing ETCS (European Train Control System) testing services, test tools and test solutions.

Multitel’s testing laboratories are ISO17025-accredited by BELAC (427-TEST) for:

- Subset-076, Subset-094 (European vital computer test)
- Subset-085 and Subset-116 (eurobalise/balise transmission module test)
- Subset-103 (loop transmission module test)
- Subset-RBC® (radio block centre test)
- Subset-ESC® (ETCS system compatibility test) using M-SILAB solution (test bench and test methodology)
- Subset-KMC® (EVC test following Subset-137)

Multitel provides test lab, test benches and railway maintenance tools. Not limited to ETCS, the test solutions of Multitel are adapted to China Train Control System (CTCS) and Korean Train Control System (KTCS). Multitel’s test solutions are widely used in Europe, China, Japan and South Korea.

Furthermore, Multitel’s test solutions are flexible enough for new updates or upgrades, so that it is compatible with the next generation of digital signalling technology (Baselines 3 and 4, FRMCS, ATO, C-DAS and level 3 Hybrid).

About KRRI:

The Korea Railroad Research Institute is a government-funded research institute established in 1996 to contribute to the development of the nation and industry through research and development as well as diffusing research and development outcomes in the public transportation sector, such as railways, public transportation and logistics.

“The KTCS test bench project is an exciting opportunity for us at Multitel to once again showcase our ability to overcome challenges and achieve breakthroughs in the field of railway technology.”

Mr RICCO Xavier from Multitel, Head of Railway & Autonomous Transport Systems department, Project Manager

KRRI has successfully developed an electric multiple unit (EMU) running as fast as 430km/h; the KTX-Sancheon, a Korean high-speed train; light rail transit; an urban railway train; and a wireless tram. Recently, KRRI started operating a world-class comprehensive railway test centre, its finished vehicles test facility and comprehensive railway test track in Osong, Chungcheongbuk-do.

KRRI will present a hope and vision for our future with more convenient and safer technology to enhance quality of life, while leading the era of the fourth industrial revolution with various technologies, such as a hypertube that runs as fast as 1,200km/h; 5G-based autonomous train driving system that allows control over trains through direct communications between them.

KRRI is entrusted by the Ministry of Land, Infrastructure and Transport of Korea to conduct type approval inspections for Korean railway vehicles and constituents. In addition, KRRI is leading the development and promotion of the railroad industry in Korea as an ISO/IEC 17025 testing laboratory, ISO/IEC 17020 inspection agency, and ISO/IEC 17065 certification agency accredited by KOLAS, a Korean accreditation body.



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50 years of experience



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VUZ

VUZ Offers Cyber Resilience Assessment

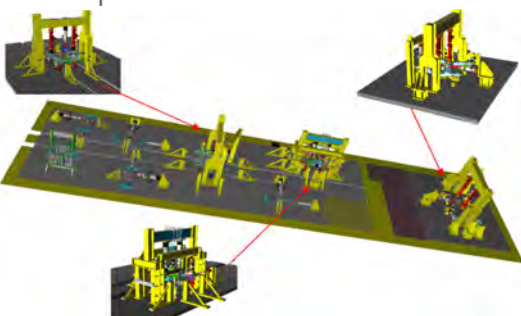
Cyber Security in Accordance with ČSN EN 50129

The new European NIS 2 Directive on cyber security measures to be taken across organisations is entering into force this year.

That is why VUZ newly offers cyber security assessments in the field of railway transport. We perform tests in accordance with our internal standards, as well as with CENELEC 50701. The final assessment report and certificate are issued in accordance with ISO 27000, IEC 62443 or TC 50701.

The standard focuses on assessment of cyber resilience of both standing and driving vehicles, and documentation and IT architecture from the point of view of cyber security; on top of that, VUZ also provides external examinations of IT architecture and acceptance of vehicles from the point of view of cyber security.

Starting from this year, the European NIS 2 Directive is obligatory, and the fine for an infringement may amount to up to CZK 10 million (EUR 416,000), or 2% of the total worldwide annual turnover of the company. In view of the gradual transition to exclusive operation under ETCS supervision, security and cyber security is becoming a factor that needs to be focused on when legal requirements are fulfilled. As the European leader in rail testing and certification, VUZ also offers training or workshops in this field.



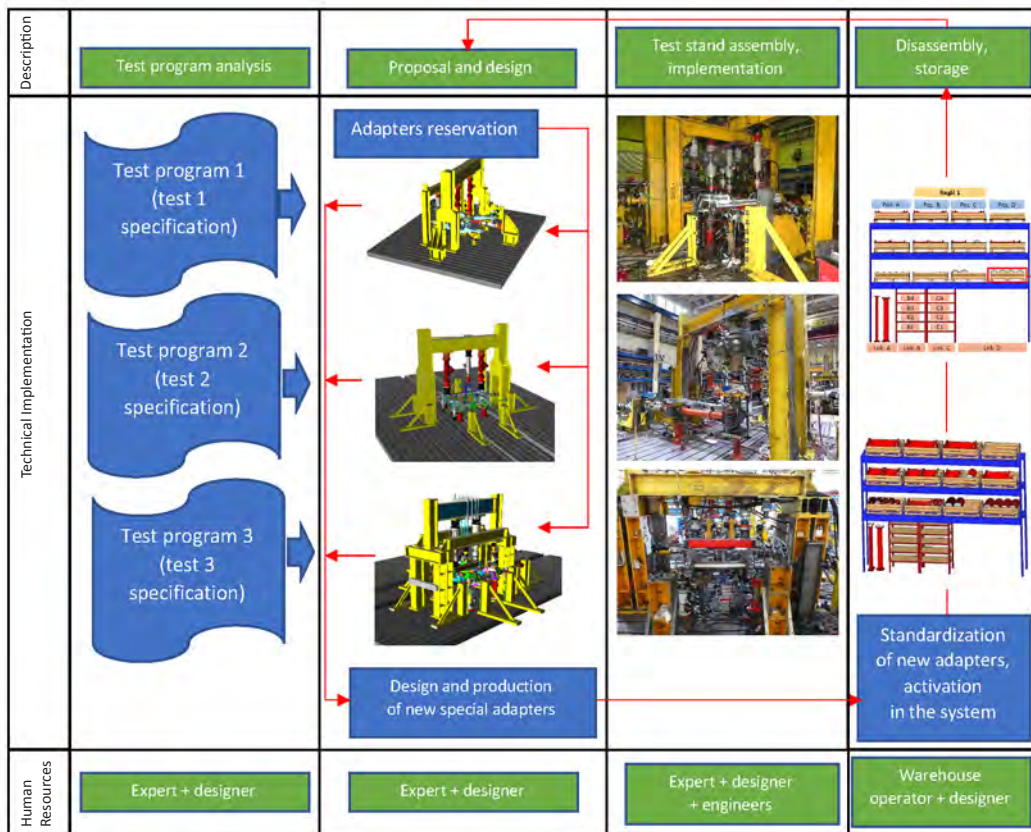
Sample of the 3D design and update of the 3D layout of the VUZ Dynamic Test Laboratory

We Will Calculate Your Carbon Footprint and Help You with ESG Responsibilities

The environmental impact is not the only factor for the companies anymore; in addition to that, ESG is newly coming to the foreground (environmental, social and governance responsibilities).

The carbon footprint, as an indirect energy consumption indicator, determines the amount of greenhouse gas emissions related to company operation. VUZ provides carbon footprint calculation and verification of an organisation as a whole or of a product (Scope 1, 2, 3), and a carbon footprint audit in accordance with the GHG Protocol and ISO 14064. The reported data can be subsequently used in the process of creation of the customer's corporate strategies in the field of environmental protection and sustainable financing.

This year the ESG reporting obligation will start to apply to big companies. It is likely to cover even medium-size and small businesses in the future. But even now many banks and investors take ESG reporting into account, especially when granting loans. VUZ therefore offers the ESG Report in accordance with the EU legal regulations. We guide you through the process of ESG Report preparation, quick analysis and workshop, and determine and help you to set environmental and social factors, as well as sustainable corporate governance and management factors.



DTL project management and planning scheme

Accreditation & Certification

VUZ has been certified by CDP as the first entity in Central and Eastern Europe in the railway transport segment, and we work together with an internationally recognised data verification organisation.

Accredited Fatigue and Strength Tests at the Dynamic Test Laboratory (DTL)

At our testing facilities, we test a wide range of rail components, such as bogie frames, wheels, bearings, axles, rails, sleepers, etc. The bogie frame testing facility is one of the most frequented parts of the DTL equipment. We have therefore expanded its capacity and now we can carry on three mutually independent tests at the same time – mostly tests of bogie frames of railway but also other types of vehicles. The demands on the frequency and overall real-life characteristics of the simulated load tend to grow continuously; the accredited tests performed at our facilities therefore simulate a maximum number of potential situations that can occur or really occur in operation. And that applies to both the static and the dynamic modes.

DTL is equipped with 34 hydraulic actuators in the load range of 30–630 kN, which can be combined

into almost any testing setup and are controlled by the EU 3000 system including TestControl® software. They are fed by four hydraulic pumps set to the total flow rate of up to 500l/min and working pressure of 28MPa throughout the whole main feed pipe. To secure measurement by a sufficient number of strain gauges and other sensors, DTL is equipped by HBM measuring systems with MGC plus measuring control panels. By means of them, up to 2 x 128 channels can be measured simultaneously. On three stands, both static measurements of bogie frames and dynamic tests can be performed at the same time.

For complicated and complex projects, we use a ‘digital twin’, i.e. a complete 3D model created by Inventor® software and a planning system related to it. The tests are performed by an experienced team of experts, leading professionals in their field of expertise ready to carry out and evaluate even the most demanding projects.



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deugro

How Heavy and Oversized Cargo Benefits from the Rail Network in the USA

Rail transport may be the most effective method for delivering big and enormous cargo when the cargo satisfies specific requirements.

Carloads that are wider than 325 centimetres and taller than 335 centimetres, or that weigh more than 68 metric tons, need special approval. The railroad then decides if such dimensions or high/wide loads are feasible based on a clearance process that considers the intended move's routing, distance and other technical criteria. When transporting large items over long distances, rail transport is often more affordable than other modes of transportation.

The U.S. Department of Transportation claims that with a length of approximately 225,000 kilometres, the US rail freight network is the longest, safest and most economical freight system in the world. There are roughly 72,500 route kilometres covered by short lines. The nearly USD 80 billion freight rail business is served by seven Class I railroads, 22 regional and 584 local line railroads. This industry supports over 167,000 jobs in the USA. Additionally, rail freight provides advantages that no other mode of transportation can, including lower costs for logistics, upkeep of public infrastructure, and decreases in fuel consumption, traffic incidents, congestion on the roads and greenhouse gas emissions. A major portion of North America is accessible by the North American railways, which are also continuously increasing their capacity.



Stefan Welch, Head of Specialized Transport, deugro

Moving dimensions and heavy lift cargo by rail in the USA is possible thanks to the relatively uniform North American rail network and its remarkably high weight capacity. Contrary to road transportation, there is no need for time-consuming, multi-state permitting procedures, route changes, costly engineering studies for bridges, or any of the usual third parties.

Intermodal transport, bulk cargo like grain, crude, chemicals, lumber and sand, as well as cars and other items make up the majority of rail freight. More than any other single commodity group, US rail intermodal transport contributes nearly 25% to the main US railroads' annual income. Approximately 1.7 billion metric tons of raw materials and finished commodities are transported by freight trains annually. An average



Each slug catcher measured approximately 26 x 4 x 4 m and weighed 196.7 MT



The cargo was railed from Kansas to Texas using a 70' 8-axle railcar

freight train now carries close to 4,000 metric tons of cargo thanks in part to newly constructed railcars.

Even while the number of dimensional cargo moves is growing, they still account for a negligibly small portion of the railroads' annual revenue.

Earlier in 2022, deugro handled another two identical shipments from Houston, Texas to Lorenzo, Illinois. The HRSG modules had weights of up to 182 metric tons and measurements of up to 32.9 x 3 x 3.6 metres. The dimensions of the 111.54-metric-ton drum vessel were 15 x 2.8 x 3.6 metres. At the end of 2022, deugro delivered two slug catchers by rail. Each slug catcher measured approximately 26 x 4 x 4 metres and weighed 196.7 metric tons. They were railed from Kansas to Houston, Texas on a 70-foot, 8-axle railcar.

When it comes to limiting the emission of greenhouse gases, increasing the efficient use of fuel, and reducing the carbon footprint, rail freight is well ahead of other modes of transportation. Advanced locomotive technology or zero-emission cranes can help to limit the impact on the environment even further. This is in line with deugro's long-term investment and commitment to delivering innovative logistics solutions to support the global energy transition.

deugro-group.com



deugro delivered a total of 18 heat recovery steam generator (HRSG) modules and one drum vessel via rail



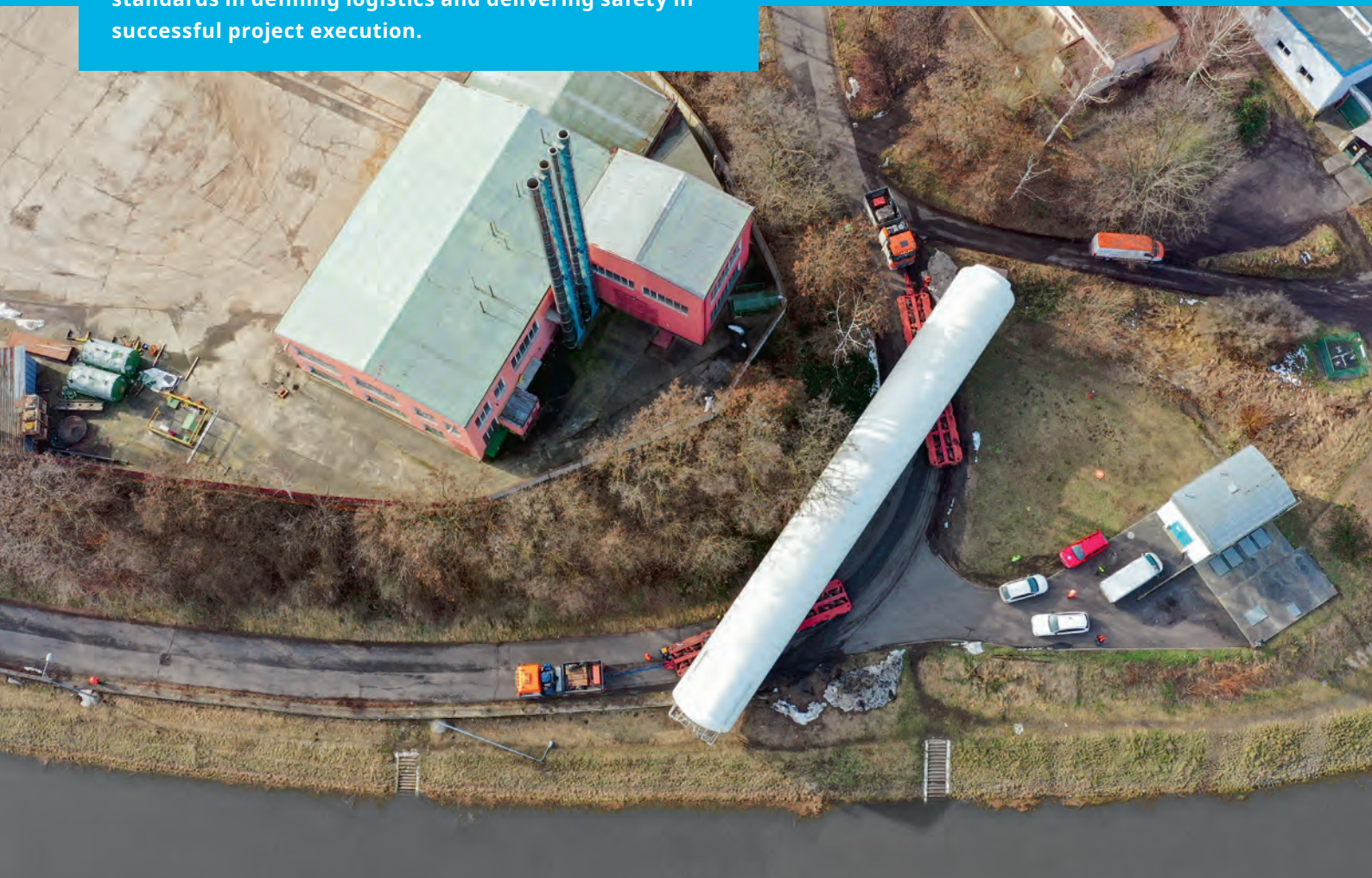
Ready to Make Your Move.

For almost 100 years, deugro has been an industry leader in delivering innovative project freight forwarding solutions to the global energy industry.

From the very beginning, deugro has set the highest standards in defining logistics and delivering safety in successful project execution.

deugro.com

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