

InnoTrans 2024 Report



B2B-Magazine for the Railway Industry

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IN FOCUS

TUNNEL CONSTRUCTION

Meeting environmental and safety aspects

Underground structures must fulfil increasingly stringent requirements in line with the new age of mobility.



on real-time data.

Longer service life of railway systems

A digital platform to support decision-making based



fully automated U5 underground railway line.

Flagship project in Hamburg

To reduce greenhouse gas emissions, new standards apply to planning, building and operating the



rail freight transport.

Paving the way for new processes

The introduction of the digital automatic coupling will boost

Record-breaking structure gains speed



Construction lot "H61 Mauls 2-3": Emergency stop Trens

Photo: Brenner Basistunnel BBT SE

Including the Innsbruck bypass, the Brenner Base Tunnel will be the longest underground rail link in the world, with a total length of 64 kilometres. Scheduled to become operational in 2032, the project's objective is to shift as much freight traffic as possible from road to rail.

The Brenner Pass is not only the most important border crossing between Italy and Austria, but due to its low altitude of 1,370 metres above sea level, it is also the lowest Alpine crossing which can be used all year round. This makes it one of the most important north-south links in Europe.

The tunnel between Italy and Austria is the centrepiece of the new Munich-Verona railway corridor. This 435-kilometre route in the heart of Europe aims above all to increase freight transport capacity, to allow

for longer and heavier trains thanks to the lower gradient of the line and to reduce CO₂ emissions and noise pollution caused by heavy goods traffic. The new railway line will make it possible to run up to 740-metre long trains instead of the current limit of 450 metres. One locomotive will then be able to pull up to 2,000 tonnes of goods, whereas currently two locomotives are required to transport 1,400 tonnes.

The Brenner Base Tunnel is an important section of the Scandinavian-

Mediterranean corridor in the trans-European transport network (TEN-T).

Significant project progress

2023 was a particularly successful year for the Brenner Base Tunnel project. Two of the project's most technically challenging construction sites were completed, the "Eisack undercrossing" and "Hochstegen".

In order to be able to leave the Eisack in its original riverbed, the

environmentally friendly method of ground freezing was used at the "Eisack undercrossing" construction site in the Italian project area. This technique made it possible to overcome the natural challenges of the construction site, such as the excavation of some tunnel sections under the Eisack. At the same time, flora and fauna could be protected.

Complex requirements

The tender for the engineering services for the railway equipment is currently running parallel to the structural work. These relate to the planning services for the railway equipment.

The cross-border project with its high level of technical complexity represents a major challenge for the planning of these railway engineering systems. It is not only necessary to comply with the already very high technical standards of the Italian and Austrian railway networks, but also – due to the cross-border nature of the Brenner Base Tunnel – with the European standards for interoperability.

Once the shell has been completed, the slab track, the traction power supply, the telecommunications and radio systems, the interlocking and train control systems, modern control technology as well as the ventilation and safety equipment will turn the tunnel structure into a pioneering railway infrastructure which can make a significant contribution to a sustainable shift of cross-border passenger and freight traffic from road to rail.

Read the full article on the [InnoTrans Blog](#).

Brenner Basistunnel BBT SE | Hall 5.2 | 620

COMMENT

Germany is lagging behind with the BBT

Prof Dr Roland Leucker, Managing Director, STUVA e. V.



Photo: DVV Media

Packing up the Beetle and then leaving for Italy. Since mass motorisation began in the 1960s, this has been an iconic holiday experience for many Germans. Even the journey through the Inn Valley was a source of utmost anticipated pleasure. Only if it weren't for the Brenner Pass! Many a boiling radiator has brought holidays to an abrupt end here. Technical progress means that crossing the Alps is no longer a challenge these days, and that is the real problem. The Brenner region is suffocating under the weight of private transport. The Inntal motorways are just as much at their limits as the sensitive environment of the Stubai and Zillertal Alps. Well over 50,000,000 tonnes of freight are now transported over the Brenner every year, only a quarter of which is transported by rail, as the railway line, built in 1867, with its tight curves and gradients of 25 per mille, is not suitable for modern freight logistics. At least there is hope in sight: the Brenner Base Tunnel (BBT), built jointly by Austria and Italy, is scheduled to go into operation in 2032. As a core element of the Scandinavian-Mediterranean corridor from Finland to Malta, it will then become the longest railway tunnel in the world. Construction is

CONTINUED ON PAGE 2

Mein Hai hat Heuschnupfen.

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CONTINUED COMMENT

currently underway at full speed everywhere – especially on the access routes, on whose performance the success of the BBT depends to a large extent. In summer 2023, Austrian infrastructure manager ÖBB-Infrastruktur AG started building a new, more than 20 kilometres long four-track line, which will reach the German border in ten years' time. But from there, for the time being, high speed will come to an end, as Germany is still working on the planning of its line alignment. The Inn Valley communities are up in arms against the planned line upgrade, which would take up a lot of land and destroy the landscape, and are calling for tunnels to be foreseen for future rail traffic. However, those responsible for planning are obviously not in favour of this much more costly solution. It is true that tunnels are more expensive than open lines; however, as numerous old tunnels have shown, they have a service life of well over 100 years and are therefore extremely sustainable. And so time passes. As with the access route to the Swiss Gotthard or Ceneri Base Tunnels, Germany is lagging behind in the planning of the European railway network. However, as long as no solution is found for a high-speed route worthy of the name, 2.5 million lorries will continue to travel over the Brenner every year instead of using the railway under the Brenner. This is not good at all for the environment. In Germany, we need to endeavour to implement forward-looking projects more quickly.

STUVA Hall 5.2 | 931

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At InnoTrans, international decision-makers from the worlds of business, politics and transport come together to exchange ideas. The opening ceremony, the InnoTrans Convention and the International Press Circle will shed light on the future topics of the entire mobility industry. A special highlight will be the premiere of the Railfluencer Festival.

■ One day before the official opening of InnoTrans, the now traditional **International Press Circle** will take place on Monday, 23 September 2024. A "sneak peek" for media representatives and representatives of associations from Germany and abroad. Participants will include the InnoTrans partner associations: the German Railway Industry Association (VDB), the Association of the European Rail Transport Industry (UNIFE), the Association of German Transport Companies (VDV), the German Electro and Digital Industry Association (ZVEI) and the German Transport Forum (DVF). Representatives from abroad include the railway industry associations from Spain (MAFEX), Portugal (PPF), Brazil (ABIFER), Latin America (ALAF), the International Monorail Association and the International Rail Catering Group. On the World Innovation Press Tour, media representatives can learn about the exhibition's innovations in advance.

Opening of InnoTrans: focus on artificial intelligence in the mobility sector

On Tuesday, 24 September 2024, Adina Valean (TBC), EU Commissioner for Transport, the German Federal Minister of Transport and Digital Infrastructure, Dr Volker Wissing, and Dirk Hoffman, COO of Messe Berlin, will open InnoTrans at a ceremony with over 1,000 guests from politics, business and

the media at palais.Berlin. The motto of this year's opening is "From Hype to Reality – AI in the Mobility Sector". The topic will be discussed on the podium by Dr Volker Wissing, German Federal Minister for Transport and Digital, Dr Richard Lutz, Chairman of the Executive Board Deutsche Bahn AG, Mohamed Rabie Khlie, CEO Moroccan National Railways Office (ONCF), Henri Poupart-Lafarge, President Alstom Transport S.A., Michael Peter, CEO Siemens Mobility GmbH, and Javier Martínez Ojinaga, CEO CAF S.A. After the opening event, an official opening tour will take place.

InnoTrans Convention from ERTMS to catering

The InnoTrans Convention will continue the professional dialogue with its lectures and round table discussions. At the heart of the event will be the daily **Dialog Forums** under the auspices of VDB, DVE, UNIFE, ZVEI and VDV. The topics are diverse – from the digitalisation of rail freight transport and ERTMS to the recruitment of skilled workers and young professionals.

On Tuesday, 24 September 2024, the **Rail Leaders' Summit** will be the international top-level meeting of transport ministers and directors-general of transport companies dedicated to the topic of "For people and the planet. Railways for the world of tomorrow." Deutsche Bahn, the German Federal Ministry for Digital and Transport together with Messe

Berlin invite visitors to this exclusive event to discuss current developments, challenges and opportunities in the industry.

The **International Design Forum** on Wednesday, 25 September 2024 will focus on "Designing attractive passenger experiences: innovative interiors for the public transport of today and tomorrow". The International Design Centre Berlin is in charge of the content of the event.

On Thursday, 26 September 2024, the **DB Innovation Forum** will take place with the title "Next station: rail success. Digital, connected, automated and climate resilient. How are we leading railways into a prosperous future?".

The **International Tunnel Forum** will be accompanying the Tunnel Construction segment at InnoTrans. On 25 and 26 September 2024, the Research Association for Tunnels and Transportation Facilities (STUVA e.V.) will host discussion panels on sustainability and challenges in tunnel construction.

Trade visitors should not miss the exhibition in the Summer Garden – the Bus Display. This is where exhibitors will be presenting buses in action. In line with this, the German Transport Forum will focus on the "Roadmap Future for public transport: strategy, benchmark and rollout" as part of the **International Bus Forum** on 26 September 2024.

The **Public Transport Forum** has been well attended in recent years. At InnoTrans 2024 on 26 September 2024, everything will revolve around "Funding

– Networking – Personnel: Indispensable for the public transport of the future". The organiser is ETC Solutions GmbH.

"Spotlight on Talent: Attracting skilled workers, maximising potential, shaping rail transportation": The main focus of the Dialogue Forum jointly organised by VDB and VDV is on recruiting young talent and skilled workers on Friday, 27 September 2024.

Premiere of the Railfluencer Festival

The premiere of the first international Railfluencer Festival at InnoTrans is all about networking, getting to know each other and new opportunities for cooperation. On Friday, 27 September 2024, influencers, bloggers and YouTubers – in short, the social media stars of the mobility industry – will meet industry, transport companies, media and associations in a festival-like atmosphere in the Marshall House. The Railfluencer Award will honour railfluencers and selected InnoTrans exhibitors in three different categories.

More information on the [supporting programme](#)

Don't miss anything:

The live streams will also be available after the events on the **InnoTrans website** and on [InnoTransPlus](#).



Tunnelling at the NEC

Construction of the Frederick Douglass Tunnel in Baltimore will include two high-capacity tunnel tubes to be used primarily by electric passenger trains

Graphic: Amtrak

Now that the construction of the Hudson Tunnel - as an addition to the North River Tunnel between New York and New Jersey - has started, the Baltimore & Potomac Tunnel, which connects Baltimore and Washington DC, is also set to be decongested.

Both new tunnels are part of the Northeast Corridor (NEC) which is the busiest railway line in the USA, stretching from Boston via New Haven, New York, Philadelphia and Baltimore to Washington DC. It urgently

needs to be rehabilitated. In October 2012, the North River Tunnel was flooded with millions of litres of salt water during Superstorm Sandy. Corrosive chemicals were left behind, affecting the tunnel's concrete lining, its

retaining walls and other systems that are vital for train operations.

Stephen Sigmund, director of public relations for the Gateway Development Commission, project owner of the Hudson Tunnel project, says: "Con-

struction has begun on the Hudson Tunnel, the most urgent infrastructure project in the United States. The new tunnel will finally eliminate the danger posed by a single weak link and make rail travel easier, faster and more reliable for the hundreds of thousands of passengers who travel under the Hudson River and throughout our megaregion every day." The new Hudson Tunnel will relieve pressure on the North River Tunnel during its refurbishment and create additional capacity in the future. Seven years have been estimated for the new construction and a further three years for the subsequent refurbishment.

In February of this year, the railway company Amtrak, the main owner of the NEC railway line and operator of the two tunnels, announced that it had been awarded the contract for the construction of the new Frederick Douglass Tunnel in Baltimore. It will replace the approximately 150-year-old Baltimore & Potomac Tunnel - the oldest tunnel along the NEC - the structure of which is very poor due to its age and which also lacks modern fire protection and safety systems. Construction of the tunnel is scheduled to begin in 2026.

The Infrastructure Investment & Jobs Act, which was signed into law in 2021 "to address the climate crisis and revitalise the US economy after the COVID-19 pandemic", has played an important role in financing both projects.

NEWS

New Director General of UNIFE appointed



Enno Wiebe will become the new Director General of UNIFE in June

Photo: CER

In March 2024, the Executive Committee of the European railway supply industry association "Union des Industries Ferroviaires Européennes" (UNIFE) appointed Enno Wiebe as the association's new Director General. Wiebe will take up his post on 1 June. He succeeds Philippe Citroën, who has been Director General since 2011. Prior to his appointment, Enno Wiebe served for over 13 years as Technical Director of the Community of European Railway and Infrastructure Companies (CER).

There he oversaw the work of the technical department and managed the association's role as a representative body in dealings with the European Commission and the European Union Agency for Railways. From 2007 to 2012, he was in charge of research programmes and projects at the International Union of Railways (Union Internationale des Chemins de fer, UIC). He began his career as a civil engineer at Deutsche Bahn AG.

"I am very grateful to have been entrusted with the management of UNIFE and its incredibly important work for the European railway supply industry. It is an honour to continue the good work that has been done so far and an encouragement to build on it to further improve the world's railway systems," said Wiebe on the occasion of his appointment. For him, 2024 is a crucial year for the future of the industry to drive its agenda ahead. In this context, he refers to the upcoming EU elections and the new dialogue partners.

Michael Peter, Chairman of the UNIFE Presidency and CEO of Siemens Mobility, is confident that Enno Wiebe and UNIFE "will continue to strengthen and connect the entire ecosystem of our railway community".

UNIFE | Hall 27 | 630



Conversion to driverless operation

Passengers on Prague metro lines C and D will in future be transported automatically

Photo: Depositphotos

The city of Prague is investing in the automation of two metro lines and calling for tenders to equip existing vehicles, purchase new metro trains and maintain the trains and technical systems for driverless operation.

In Prague, metro line C will be equipped for driverless operation (ATO GoA 4) as well as line D, which is currently being built. The Prague

City Council decided these projects in January 2024. The investment for the common automation project, including new vehicles, is estimated at

around 3.45 billion euros (86 billion Czech crowns). Line C is the line with the highest passenger demand; the automation is intended to reduce the

train headway from the current 115 seconds to 90 seconds. Line D between Náměstí Míru and Depo Písnice will provide a faster connection between the southern outskirts of the city and the centre of Prague. The section between Pankrác, the interchange point for line C, and Olbrachtova is under construction. A total of 69 new metro trains will be required for the two lines: 53 trains for Line C and 16 trains for Line D when fully operational. The stations are to be equipped with platform screen doors.

Prague's public transport operator DBB also intends to outsource the maintenance of the trains and the technical systems of the ATO operation for 35 years. DDP conducted a market consultation on the project in 2020/21. It expects the competitive dialogue in the now planned award procedure to take around two years. The first vehicles and converted sections of the line are due to be completed in 2027/28. DDP expects annual operating cost savings of around 31 million euros (770 million Czech crowns) on Line C. After the conversion of Line C, the Siemens/Adtranz metro trains built between 2000 and 2003 are to be transferred from Line C to Lines A and B.

5G and cybersecurity solutions for the railway sector

eSIM

XDR

IA

5G

Wi-Fi 6

H5 RAIL

CELER RAIL



Teldat's new communication and cybersecurity solutions

Photo: Teldat

In productive sectors such as rail technology, artificial intelligence (AI) has become a key topic for the transformation of processes and the optimisation of company resources, so that they become more agile and efficient. This path to modernisation not only involves a revolution in 5G communication and cybersecurity, but in user interaction as well. This also results in 5G and embedded security solutions which support the devices and solutions in the European Teldat Group's new product line.

For various reasons, transport operators value a high level of reliability and communication performance as well as cybersecurity measures. They enable them for instance to continu-

ously improve their processes to remotely configure and visualise their IT infrastructure and to optimise their network services and security. They can furthermore benefit from the new

AI mechanisms for data analysis and security.

Teldat solves the most important use cases with H5 RAIL, the latest generation of routers for high-demand

and high-availability scenarios. This multi-service device is characterised by its high capacity to support high bandwidth requirements. It features up to four 5G modules with active/

stand-by dual SIM. This improves the coverage of operators and enables the simultaneous use of various operators as well as connectivity, quality of service and connection stability during roaming. It also includes eSIM for dynamic operator configuration.

Made in Europe

H5 Rail also features WLAN 6, which can operate in client or access point mode to provide a service to passengers and solve the challenging cases of train-to-ground communication. This includes an advanced system for detecting unauthorised access to a network to issue alerts or Intrusion Detection System (IDS) logs. An SSD extension is available if more storage space is required.

New product generations such as Celer Rail and H5 Rail show that AI in combination with 5G connectivity is a fundamental tool for creating a secure environment. In this context, the integration of Coral technology, the detection of undesired objects, predictive analytics and self-healing (Extended Detection and Response) XDR cyber techniques are some of the most common use cases in this sector.

As a result of its efforts to innovate, Teldat has been awarded the "Cybersecurity made in Europe" seal by the European Digital SME Alliance, a network alliance of European information and communication technology companies. Teldat complies with strict data protection and cybersecurity standards.

Teldat Group | Hall 4.1. | 840

Making decisions on the basis of real-time data



Maintenance instead of repair: Vossloh connect focusses on rail infrastructure.

Photo: Vossloh AG

Rail infrastructure managers increasingly require solutions to optimise track availability, and this has given rise to a large number of digital solution platforms. With its Vossloh connect platform, Vossloh AG has developed a comprehensive range of solutions which is specially tailored to the differentiated needs of the rail industry.

Obtaining real-time data on the condition of rail networks constitutes a challenge for the railway industry. By providing access to information which was previously unavailable, the Vossloh connect digital platform transforms such "black boxes" into "open books".

At its core, Vossloh connect utilises predictive maintenance capabilities to identify maintenance needs before they lead to costly repairs or operational downtimes. This plays a crucial role for the extension of the service life of railway assets and ensures that investments in railway infrastructure create long-term value. Vossloh therefore describes its digital platform not just as a tool, but as a "strategic partner for achieving maximum track availability and efficiency".

Easy and intuitive operation

The data-driven analyses of Vossloh connect are facilitating precise planning and resource allocation and increasing the accuracy and effectiveness of maintenance plans.

The platform is easy to use. Its intuitive user interface is suitable for users with both technical and non-technical backgrounds. In addition, the platform is scalable and can be adapted to different sizes of rail networks.

Digital rail network management

Vossloh connect ensures that maintenance work is carried out in a timely and efficient manner to minimise disruption and optimise performance in all areas. This is achieved by streamlining processes through data collection and analysis. The advanced monitoring tools also provide a clear picture of the condition of the assets and enable proactive maintenance activities. They also minimise accidents and increase the overall safety of rail operations.

The Vossloh connect platform is based on a global approach, its network of experts and Vossloh's 140 years of experience in the rail infrastructure sector.

Vossloh AG | Hall 26 | 975

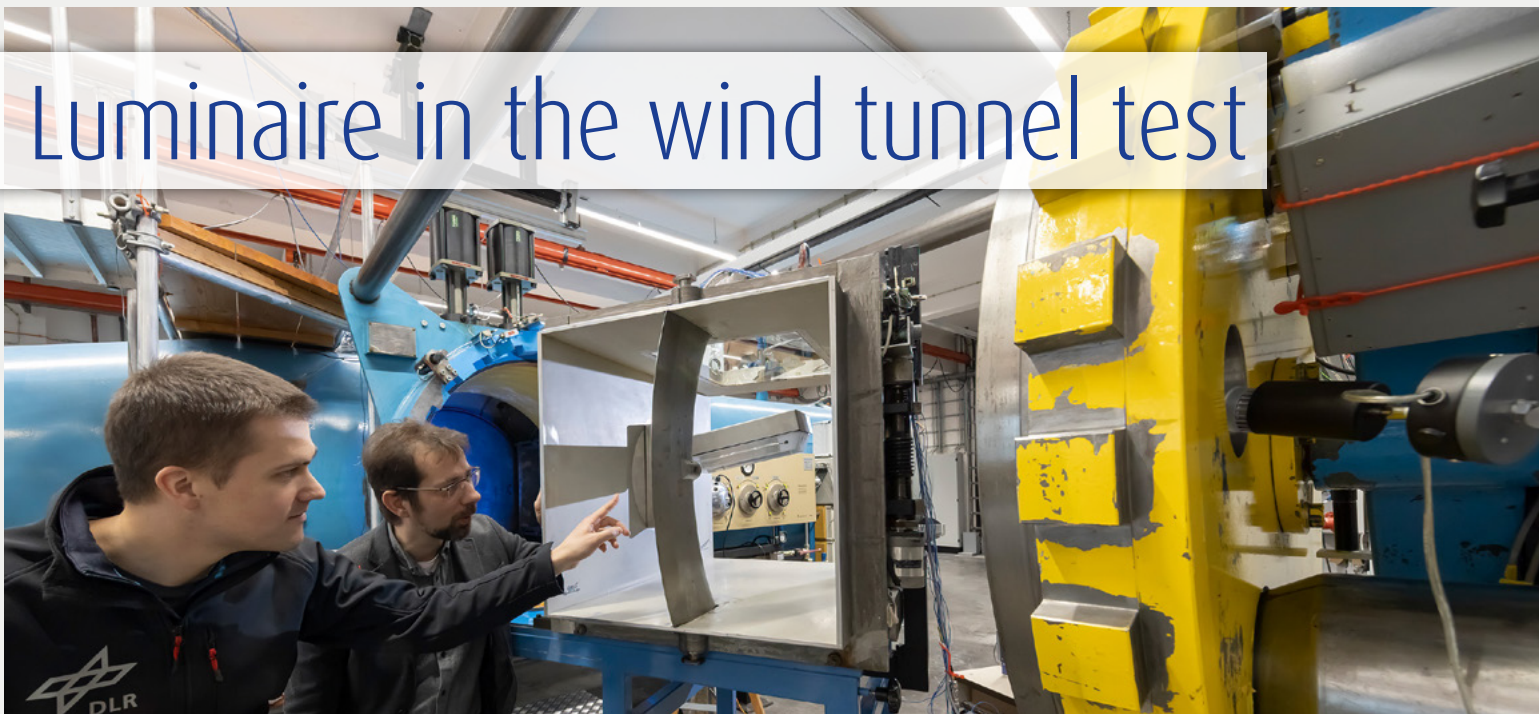
IN FOCUS

■ TUNNEL
CONSTRUCTION

An eye on safety and environment

Faster, more reliable and with shorter intervals. The new age of mobility is increasing the requirements which passenger and freight transport has to satisfy, and this also applies to underground connections. Tunnels have to smooth the way – in the truest sense of the word – and ensure trouble-free operations. And even during their construction, increased environmental regulations must be respected and greenhouse gas emissions reduced.

Luminaire in the wind tunnel test



The SPANDAU LED easily withstands the compressive load of 5,790 pascals - and even considerably more.

Photo: NORKA/Frieder Blickle

The German luminaire manufacturer NORKA Norddeutsche Kunststoff- und Elektro-Gesellschaft Stäcker mbH & Co. KG has been specialising in providing good light even under extreme environmental conditions for 75 years. Sometimes the products have to pass tough tests in order to qualify for the intended use - true to the motto "safety first". The SPANDAU LED luminaire is no exception.

■ With the dynamic pressure test in the wind tunnel, the LED luminaire from NORKA SPANDAU proves its safe use in high-speed tunnels. The reason is obvious: high-speed trains generate enormous pressure waves in the air of a tunnel, and the lighting must perma-

nently withstand these loads. What is interesting about the test are the details of its implementation. The Göttingen high-pressure wind tunnel of the German Aerospace Center (DLR) utilises the fact that the same physical effects are achieved under increased

pressure as would occur at higher speeds. This allows high wind speeds to be simulated – for example, the 350 kilometres per hour (97 metres per second) required in the test through the combination of 15 bar pressure and 28 metres per second speed. The

system at the Institute of Aeroelasticity can generate a maximum pressure of 100 bar and a speed of 35 metres per second. When measuring the luminaire, the engineers used 14 acceleration sensors to measure how great the load on the housing and mounting

was and what level of vibration they were subjected to. The SPANDAU LED easily withstands the compressive load of 5,790 pascals – which corresponds to the dynamic pressure at a wind speed of 350 kilometres per hour. But it can withstand even more. The test was stopped when 6,970 pascals were reached, a much higher value than required for tunnel conditions.

Strict regulations for the area close to the track

The luminaire was specially developed for lighting tunnels, corridors and underpasses. Its extremely wide-beam "Batwing" light distribution allows generous luminaire spacing of up to 17 metres. This reduces the number of light points and so also reduces investment, operating and maintenance costs. Its stainless steel wall bracket, synthetic housing and polycarbonate luminaire cover make the lighting appliance extremely robust – a fact which was impressively underscored by the pressure test. Strict regulations apply to suppliers of lighting for trackside areas. In addition to the specifications and regulations of the EN 60598 and EN 12464 standards, they also have to comply with the company's own electrical and lighting guidelines and planning specifications for the safety of employees and customers.

NORKA Norddeutsche Kunststoff- und Elektro-Gesellschaft Stäcker mbH & Co. KG
Hall 5.2 | 800

Fire-resistant
electrical
cabinet

In the event of fire, the IOP90 electrical cabinet protects the surrounding area (escape routes) against electrical hazards for 90 minutes.

Photo: Swibox AG



■ Until now, electrical cabinets which had to withstand a fire were mainly made of panels based on gypsum. These materials are characterised by their high fire resistance and low thermal conductivity. Gypsum also contains chemically bound water of crystallisation, which vaporises in the event of a fire and thus enables an intrinsic cooling effect. However, the vapour atmosphere which develops inside an electrical cabinet during a fire has disadvantages as well. The condensation can affect electrical components and lead to short circuits which cause breakdowns of functions. For this reason, the solutions available on the market cannot be certified as electrical cabinets, instead they can only be approved as rooms in which moisture is permitted. In addition, cabinets made of gypsum board are susceptible to fungal infestation, especially

when they are not completely encased in a waterproof material.

Resistant to freezing,
water and weathering

The aim of the Swibox project was to develop a fire protection cabinet which eliminates all the disadvantages that have been mentioned and also fulfils the following conditions at the same time. It had to be resistant to freezing, water and weathering while also being lighter than previous cabinet solutions. In the event of fire and in normal operation without fire, it should have the same humidity level in its interior and it should be suitable for use in tunnelling and building construction.

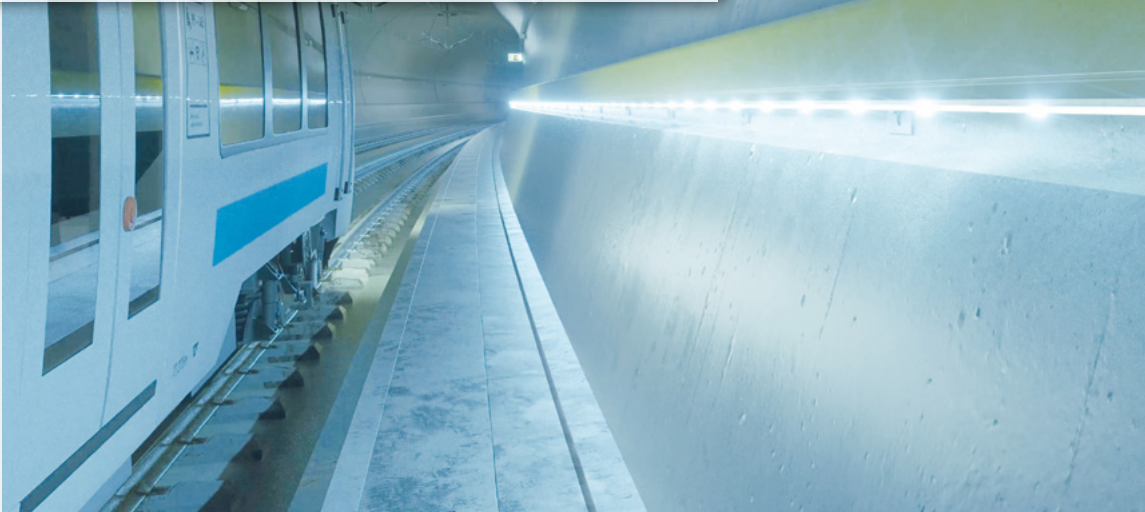
The result is an IOP90 (Inside-Outside Protection) cabinet, which features the same housing to withstand external

and internal fires. This provides for reliability in planning as well as shorter delivery times and lower costs, due to the fact that it can be used in damp environments without the need for stainless steel panelling. The fire protection panels made of a single material are sustainable and non-flammable (A1). The housing is resistant to freezing, water and weathering, the materials used are resistant to high-pressure cleaners and have a high abrasion resistance. Thanks to the glass fibre-reinforced lightweight concrete panels, the finished construction is at least 30 percent lighter than the existing solution. The density of the raw material is around 965 kilograms per cubic metre. It is also easy to produce in customer-specific sizes. With this, it fulfils the requirements for tunnel construction.

Swibox AG Hall 5.2 | 912

Technical equipment has to continue operating reliably even when a fire breaks out. The control cabinet from the Swiss company Swibox AG withstands fire without producing water vapour in its interior.

Quickly connected, safely installed



LED-illuminated handrail system HRS made of glass fibre reinforced plastic

Photo: Niedax Group

In the age of ongoing digitalisation, major transport infrastructure projects place high demands on electrical installations. The CEVA railway line, which connects the Swiss city of Geneva with the French town of Annemasse, is no exception. The Niedax Group, a manufacturer of cable laying systems, offers special solutions for such types of challenging construction projects, so that a reliable power supply can be guaranteed at all times.

■ The impact of global climate change calls for the development of sustainable mobility concepts. Innovative and efficient technologies are in demand. With its solutions, the Niedax Group supports the move of many operators of infrastructure connections into a new age of mobility - from consulting and planning to the design and installation of customised cable laying systems.

Niedax products can be found in many areas of railway infrastructure, including the CEVA railway line. The name CEVA stands for the station names Cornavin in Geneva, Eaux-Vives and Annemasse along the route. With a total length of 16 kilometres, 14 of which are on Swiss territory, it connects Geneva with Annemasse. As a link between two lakeshores and two countries, this major project is a response to the constant growth of the canton of Geneva and is a sustainable complement to the existing transport services.

Temperature and dimensional stability thanks to fibreglass

As a large part of the route runs underground, the project placed high demands on the electrical installations to ensure a safe power supply to the tunnel systems even in the event of a fire. The Niedax Group has developed

comprehensive intelligent systems which have been tested for functional continuity and ensure safety and trouble-free operation in railway tunnels.

One special feature is the LED-illuminated HRS handrail system, which is also installed in tunnels on the CEVA line, among others. A total of almost 17,000 metres of HRS made of glass fibre-reinforced plastic have been supplied. This synthetic material offers a high level of resistance to temperature and deformation as well as being robust. Due to the fact that HRS is made of flame-retardant, self-extinguishing and halogen-free synthetic material, no toxic gases are released in the event of a fire. The solutions used ensure that in an emergency the electrical systems remain functional and allow passengers to be evacuated safely to the emergency exits.

Giuseppe Lovaglio, Niedax EBO's Swiss branch office manager, explains, "As all system components are coordinated and can be connected quickly, our illuminated HRS handrail system can be installed on a customised basis. With the ETWS single support trough system, cables can also be easily laid in the narrow space between the tunnel wall and the railway vehicle. The rounded edges serve to protect the cables, while high side walls enable safe cable routing."

NIEDAX GMBH & CO. KG

■ Hall 5.2 | 810



Modern fire protection under the Suez Canal

Acceptance test with spray test during commissioning

Photo: FOGTEC

In order to integrate the Sinai Peninsula as an economic zone, the Egyptian government has launched several infrastructure projects within the framework of an infrastructure programme. One of these was the construction of several tunnels under the Suez Canal. FOGTEC Brandschutz GmbH was in charge of the water mist firefighting system (FFFS).

■ The Ismailia Tunnel is the longest connection under the Suez Canal. It consists of two tubes, each about five kilometres long, and runs at a depth of 40 metres below the canal. Depending on traffic, the tunnel, which is located at a distance of 130 kilometres east of Cairo, can be reached in around two

hours by car from the Egyptian capital.

The tunnel was built by a consortium consisting of two large and experienced Egyptian construction companies. Internationally renowned planning offices were involved in its planning, and numerous specialised companies from abroad were contracted.

Water mist FFFS for the Ismailia Tunnel

The safety concept for the tunnel, which is located under water, includes a water mist firefighting system which has been developed by ARCADIS in the Netherlands. It was successfully tested

to withstand a heat release fire load of 200 megawatts.

The tunnel is designed for use by all types of vehicles, including large lorries with high fire loads. The water mist FFFS ensures a high degree of availability, protects people in the event of a fire and improves access for emergency services.

FOGTEC Brandschutz GmbH from Cologne was appointed to plan the system in detail, supply and install it. This was realised in a very short time and under difficult conditions. Thanks to the support of specialists from Cologne and Egypt, the installation team was able to work in 24-hour shifts.

Two pump stations with redundant high-pressure pumps were installed to supply water and pressure for the activation of water mist sections. The

main pipes are made of highly corrosion-resistant duplex steel. Patented valves make it possible to carry out an automated remote maintenance without the need to feed water into the sections. The high-pressure water mist technology has been successfully tested in real fire tests and is effective against solid and liquid fires. The design of the system is based on large-scale fire tests and fulfils international standards.

Commissioning went smoothly and the system was successfully handed over. The first water mist FFFS in an African tunnel protects an important part of the Egyptian infrastructure and is the result of international teams working together under challenging conditions.

FOGTEC Brandschutz GmbH

■ Hall 5.2 | 735



Preparation of the pipework in Germany for quick on-site installation

Photo: FOGTEC

NEWS

■ **Dramix® steel fibres for Grand Paris Express**

Grand Paris Express Lot 16.1

Photo: Eiffage Génie Civil

Line 16 of the Grand Paris Express provides a connection between the suburban stations in the Département de la Seine-Saint-Denis which lie in the north and east of Paris in order to avoid unnecessary journeys to the centre of Paris and back again. The new line runs fully underground in a 19.3 kilometre tunnel. Due to the size of the tunnel, which measures 8.7 metres in diameter on the inside and 9.5 metres on the outside, and also due to the urban

location of the project, the time factor played a particularly important role during its construction. In addition to speedy delivery, the customer Société du Grand Paris (SGP) emphasised modern and sustainable construction processes. The precast segments supplied by Bonna Sabla were therefore reinforced with Dramix® high-performance steel fibres developed by Bekaert. The use of a steel fibre reinforcement made it possible to deliver the required quality at the desired

speed. The concrete segments are made of C540/50 concrete and are reinforced with 40 kilograms per cubic metre of Dramix® high-performance steel fibre. The decision not to use reinforcing steel, which has a much higher specific weight of 85 kilograms per cubic metre, resulted in material savings of more than 50 percent. In parallel, the CO2 emissions associated with transport were reduced. "Dramix® high-performance steel fibres also ensure an increased durability. By

using them, the thickness of the concrete segments could be reduced by two to three centimetres," explains Benoit de Rivaz, owner of Bekaert. Up to 5,200 tonnes of Dramix® steel fibres were required for the entire project. This makes it one of Bekaert's largest projects in Paris. Every year, Bekaert supplies Dramix® steel fibres to reinforce some ten million cubic metres of concrete. All Bekaert steel fibre production sites have been ISO 14001 certified since 2010.

Bekaert ■ Hall 5.2 | 930

Stuttgart: Rail transport revolution



Digitalisation of the Stuttgart S-Bahn at the Hennigsdorf site in Germany

Photo: Alstom

The conversion of Stuttgart's rail transport system (digital node) is a decisive step towards increasing transport capacity without new tracks and reducing dependence on road transport. Alstom is equipping 333 regional and S-Bahn trains with the latest ETCS signalling technology. It enables sustainability, shorter journey times, dense train sequences and smoother overall operations, for the benefit of passengers and railway systems.

■ While the automation of rail transport is already underway in many countries, the conversion of Stuttgart's rail transport system, the major project known as the "Digital Node", is a showcase example of how automatic train operation (ATO) can revolutionise rail transport in Germany. This project, which is based on the first fully integrated implementation of ETCS (European Train Control System) hardware for commercial operation in regional transport in Germany, is being carried out by Alstom. The company is equipping 333 regional and S-Bahn trains with state-of-the-art signalling technology.

These trains will be put into operation by 2025. A key component of the initiative is Alstom's fully digital third generation on-board platform, which offers increased capacity for ETCS and

ATO, cyber security and state-of-the-art maintenance functions. It is also ready to support future developments such as the Future Railway Mobile Communication System (FRMCS).

97 percent fewer trackside control centres in Belgium

Digital interlockings are another crucial element of digitalised railways. They control rail traffic by connecting trackside elements such as point machines and signals to central computer units. This simplifies cabling, speeds up response times and increases control distances so that railway traffic can be centrally controlled. Alstom has helped Belgium to reduce the number of line control centres by 97 percent thanks to the introduction of digital interlockings.

Cross-border connections become safer through the use of digital interlockings and radio block control centres, since commands can be transmitted by radio from the operations control centre to the vehicles. Modern sensor technology detects track signals or anomalies, whereby it becomes possible to reduce the number of different train control systems and to improve the standardisation of cross-border connections.

The interplay of all components ensures greater sustainability, shorter journey times, tighter train intervals and a higher level of stability for the overall system. Passengers will be delighted with more frequent and reliable connections, as rail transport will run even more smoothly.

Alstom ■ Hall 3.2 | 450 and outdoor display

Bundled expertise for the future of mobility



Germany's first driverless underground railway of VAG Nuremberg was developed in the Cluster BahnTechnik Bayern.

Photo: VAG/Claus Felix

The BahnTechnik Bayern cluster is the central platform for innovation and cooperation in the Bavarian railway industry. As a competence centre for all players in the rail technology sector, it accelerates the networking and innovation process in the industry. It also provided the impetus for Germany's first fully automated underground railway in Nuremberg.

■ Within the framework of the Bavarian Cluster Offensive, CNA e.V., a think tank for mobility, transport and logistics, has been coordinating the Bavarian Railway Technology Cluster since 2006 on behalf of the Bavarian State Ministry of Economic Affairs, Regional Development and Energy. It promotes the development and implementation of future-oriented rail technologies by engaging in a dialogue between industry, operators, research and policy makers. Its more than 200 members benefit from the organisation's networking services, knowledge transfer, support in initiating projects and access to a broad network of experts.

Events such as the Forum Bahn+BahnTechnik Bayern, the leading industry congress in Bavaria, as well as the Innovation Circles, which take place on an ongoing basis, play a central role in this process. They serve as platforms for dialogue and knowledge transfer, identifying current challenges, analysing trends and making new technologies available for use by the railways. They are therefore much more than just meeting points for experts from the industry; they are also showcases for the latest technologies

and research results in railway technology.

Initiating and marketing innovation projects

This dialogue often leads to the initiation of innovation projects - such as Germany's first fully automated underground railway in Nuremberg - or to the development of groundbreaking guidelines - such as an IT security architecture model for rail vehicles. Successful projects are also honoured each year with the CNA InnovationsPreis (Innovation Award) and thus marketed across all sectors.

The work of the BahnTechnik Bayern cluster is guided by the desire to improve the efficiency, safety and sustainability of rail transport. By focusing on key topics such as digital transformation, new traction technologies, IT security of rail vehicles and sustainable mobility concepts, the cluster contributes to strengthening the competitiveness and innovative power of its members and of Bavaria as a business and mobility location.

Cluster BahnTechnik Bayern | CNA e.V.
■ Hall A, City Cube | 240

GUEST CONTRIBUTION

**DIPL.-ING.
FRANK PLÖGER**

Head of Sustainability Unit,
HOCHBAHN U5 Projekt GmbH



Photo: HOCHBAHN

U5 poised to be the outstanding flagship project for climate-friendly construction



270,000 daily passengers will use the new underground line.

Photo: HOCHBAHN

Hamburg's first fully automated underground railway line, the U5, is becoming a reality. As a core element of the mobility turnaround in the city, passengers will in future enjoy the highest level of comfort in mobility. Its automatic operation will ensure a particularly high performance. Furthermore, it offers flexible train lengths and a frequency of as little as 90 seconds. The underground line, which runs on 100 per cent green electricity, will be fully operational in 2040. 270,000 passengers, including 180,000 Hamburg residents, will use the new line every day.

Pioneering work: the first fully comprehensive sustainability strategy

The U5 will also set new standards in construction. Hamburger Hochbahn AG (HOCHBAHN) and its subsidiary HOCHBAHN U5 Projekt GmbH (U5 GmbH) have committed to placing climate responsibility at the centre of their planning. To this end, the emissions caused by the construction of the new underground line are to be minimised through the use of all available technology. For the first time in such an infrastructure project, not only the greenhouse gas (GHG) emissions generated on site, but also the entire supply chain

are to be taken into account. However, the strategic focus includes more than just realising the reduction potential available today. Future technical advances in the field of climate-friendly construction should also be utilised. In order to initiate and accelerate this process, HOCHBAHN and U5 GmbH are in close dialogue with companies and associations in the steel, concrete and cement industries. As a result, 70 per cent of the CO₂ emissions that would be produced by today's standard construction methods can be saved by the reduction strategy. Two independent expertises from the University of Innsbruck and the Research Association for Tunnels and Transportation Facilities

– STUVA – e. V. have confirmed the results and assessed them as "rather defensive".

Definition of objectives, strategy in planning and construction as well as monitoring and evaluation

The reduction strategy pursues the goal of achieving as many greenhouse gas savings as possible while fully guaranteeing the functionality of structures (stability, robustness, service life).

Its implementation includes the development of a GHG roadmap as a definition of objectives, the development and implementation of strategies

with corresponding measures to reduce GHG emissions and the development of a quality assurance strategy for monitoring and evaluation.

With the help of the GHG roadmap, the first step is to assess the current construction methods used in Hamburg in order to diagnose GHG hotspots. By applying suitable strategies, construction methods can be created in order to reduce GHG emissions. This will be defined as the target scenario. There are three basic principles which the construction measures will follow in the course of planning and implementation: sufficiency (optimised material quantities while maintaining the same functionality), efficiency (use of GHG-efficient building materials) and consistency (use of GHG-efficient construction processes).

The integration of GHG-efficient materials is based on current and future developments by material manufacturers. To this end, the dialogue with the industry is crucial. An independent sustainability consultancy accompanies the planning and implementation processes, takes on accounting tasks and helps shape the industry dialogue.

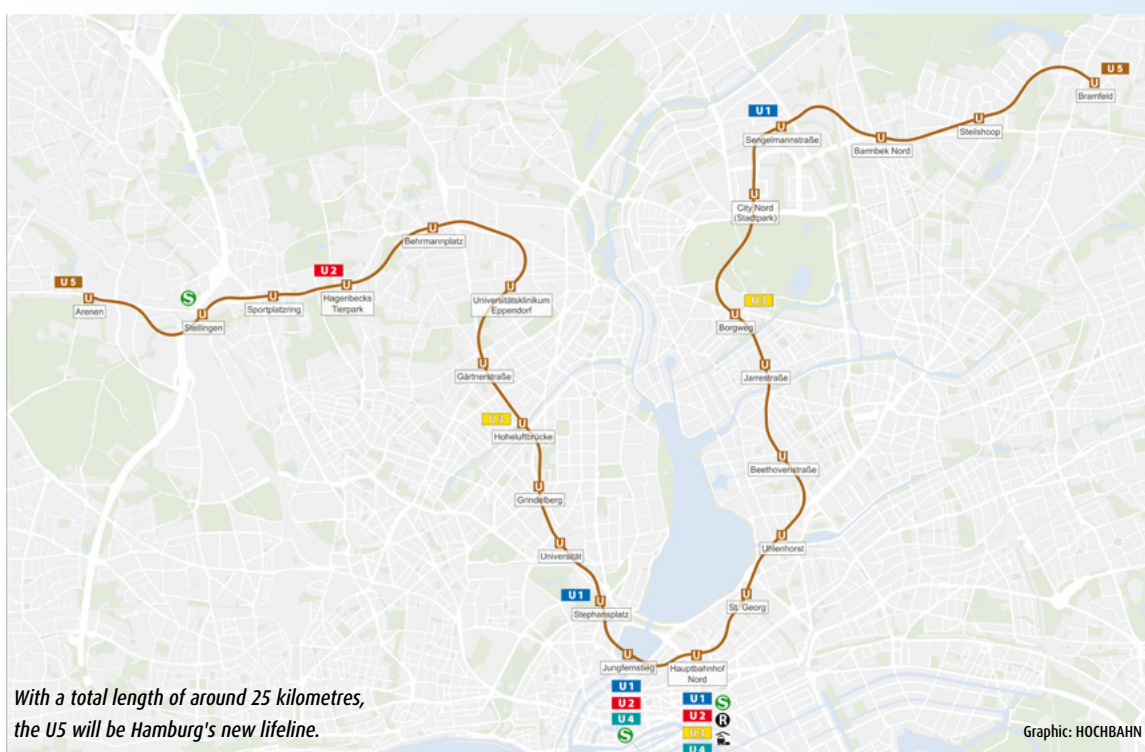
Forecasting future developments

The use of eco-power and low-clinker cements as well as a sustainable soil management system are already being taken into account during construction. As part of the contract award for Lot 2 of the first construction phase, the exclusive use of CO₂-reduced reinforcing steel was furthermore specified

for the first time. For future targets, the GHG roadmap takes into account, for example, the availability of cements with proportionate CO₂ capture in the manufacturing process from 2028 and with 100 per cent CO₂ capture from 2035, as well as steel profiles which use green hydrogen. The balance sheet for the U5 therefore forecasts a potential reduction of around 70 per cent – from 2.7 million tonnes CO₂ in the baseline scenario to 850,000 tonnes CO₂ in the target scenario. To ensure an effective control system and a high level of transparency, the real CO₂ emissions of the construction will be closely monitored over the entire construction period.

Lighthouse project for climate-friendly underground railway construction

As Germany's largest inner-city infrastructure project, this strategy will also create a relevant market for climate-friendly building materials. The new underground railway will not only set new standards with its modern and climate-friendly operation, but also with a construction method which utilises all possibilities for reducing CO₂ today and in the future. In June 2023, the International Construction Project Management Association (ICPMA) recognised U5 GmbH as a pioneer for climate-friendly construction at an international level.



With a total length of around 25 kilometres, the U5 will be Hamburg's new lifeline.

Graphic: HOCHBAHN

A new boost for abandoned railway lines



The NGT-TAXI is ready for use around the clock.

Photo: DLR/Robert Hahn

The German Aerospace Centre (DLR) is developing NGT-TAXI, a small, lightweight and efficient rail vehicle. It will primarily operate in automatic mode on secondary lines and thus provide fast and flexible 24/7 connections even in rural areas.

■ Rail transport is one of the most promising pillars of the mobility revolution. Its goals include the doubling of passenger transport capacity by 2030, the integration of innovative drives and the digitisation of both vehicles and fixed assets. As a perspective, disused sections will be put back into operation so that the rail network will be expanded. This is where the NGT-TAXI from DLR railway research comes in. The abbreviation NGT stands for Next Generation Train and summarises all the concepts and technologies for rail transport of the future.

Flexible and demand-orientated operating concept

The NGT-TAXI focusses on branch lines, isolated lines and stand-alone networks which are physically disconnected from other lines. DLR is developing various operating concepts

for such infrastructures, for example either fixed-interval operation during some hours of the day or on-demand operation at other times. Automated operation means that the vehicle is ready for use around the clock. It runs when it is needed and, depending on the number of passengers, in the appropriate size and in virtually coupled clusters. Empty journeys can thus be avoided, operating and maintenance costs reduced, the service life of components extended and resources conserved.

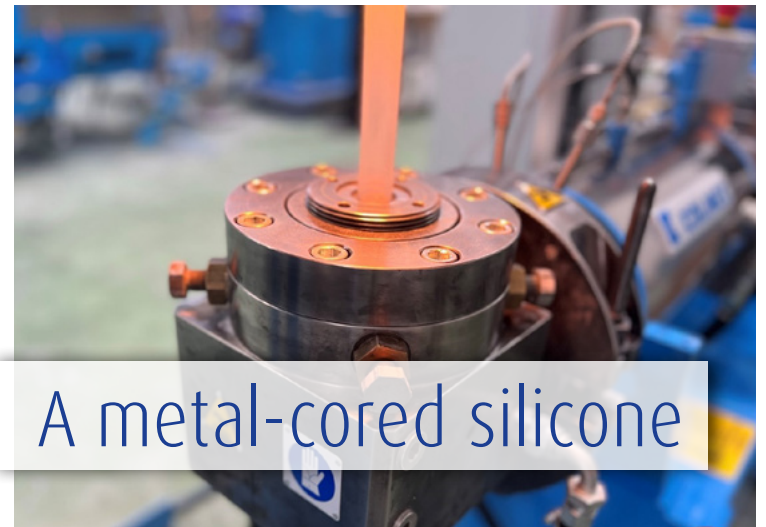
Modular vehicle and traction concept

The vehicle structure and drive concept of the NGT-TAXI can be flexibly adapted to the conditions of the routes and the volume of passengers. The shortest version is just under ten metres long and has twelve seats. The longest measures 17.5 metres and

has 54 seats. This is made possible by the combination of different carriage modules. The futuristic rail bus is powered by climate-friendly batteries or fuel cells. Up to a range of around 100 kilometres, batteries are sufficient. To cover longer distances, DLR is relying on fuel cells in combination with smaller batteries. The drive concept has standardised power packs depending on vehicle size, route profile and range.

Standard control and safety technology is used for mixed operation on main lines. A simplified safe technology is used for isolated routes. As the NGT-TAXI is very agile, the DLR uses approaches and components from the automotive and tram sectors. Virtual coupling of the vehicles is also possible. This also allows the capacity to be quickly adapted to demand at any time.

German Aerospace Centre (DLR)
Hall 2.2 | 440



Vertical silicone rubber extrusion line

Photo: MEREFSA S.L.U.

A metal-cored silicone

The co-extrusion of silicone with a metal core developed by Spanish manufacturer MEREFSA S.L.U. allows the advantages of compact silicone and sponge silicone to be combined.

■ In the dynamic world of the railway industry, it is crucial to innovate in order to safeguard the safety, efficiency and quality of the components used in these transport systems. MEREFSA, a Spanish manufacturer of silicone rubber, has developed the process of co-extruding silicone with a metal core. This technology combines the simultaneous extrusion of compact High Consistency Rubber (HCR) and sponge HCR extrusion and can also include metal inserts. Everything complies with the EN45545-2 standard and is customised for this industry.

The combination of compact and sponge silicone in co-extrusion allows the benefits of both materials to be utilised. Compact silicone offers exceptional mechanical strength at high and low temperatures as well as electrical insulation. This makes it ideal for protection against adverse environmental conditions and ensures long durability. Meanwhile, sponge silicone provides an effective seal, lightweight properties and a perfect fit. The inclusion of metal inserts allows for greater dimen-

sional and structural stability, better mechanical attachment and reduced maintenance.

By introducing this new vertical silicone rubber extrusion line, MEREFSA can increase production capacity, efficiency and product quality. This process is particularly suitable for the manufacture of elements which play a crucial role in the protection and safety of railway rolling stock and machinery. In the event of fire, they have a high degree of flame resistance, low smoke and toxic gas emissions and are highly resistant to ignition. They also have the ability to self-extinguish and stop the spread of fire. In the event of short circuits and electric shocks, they provide excellent electrical insulation. This property prevents flashovers and helps to protect both electrical components and people. The technology enables MEREFSA to produce profiles with complex geometries. The company also emphasises that it will also continue to maintain its commitment to innovation and excellence in the production of silicone rubber.

MEREFSA S.L.U. Hall 8.1 | 110

Sustainable painting processes



Surfaces of railway vehicles have to withstand many chemical and mechanical stresses.

Photo: Deutsche Bahn AG / Oliver Lang

■ Painting processes play a key role in the sustainable and economical production of rail vehicles. With its "SnapCure" paint technology, the global paint manufacturer Mankiewicz is introducing a product to the market which significantly shortens the process time and makes energy-intensive oven drying obsolete.

The drying times of paints in particular currently pose some time-related challenges for rolling stock manufacturers and their suppliers. Clear coats in particular have a comparatively long drying time. Compared to the usual drying time of eight to twelve hours on the market, the ALEXIT® SnapCure Clearcoat dries in just two hours at room temperature. This eliminates the need for costly and

energy-intensive oven drying, which makes a valuable contribution to the ecological footprint of manufacturers. There is another point in terms of sustainability: the coating system has a high solids content, so that fewer solvents are emitted. Furthermore, it is free from diisocyanates, which helps to protect employees.

Thanks to the patented paint formulation, the technology also allows the independent adjustment of processing parameters such as pot life and drying time for the requirements of the railway industry. This ensures reliable and efficient application in line with the specific process conditions in the rail sector.

The service life of railway vehicles often exceeds 15 years. Accordingly,

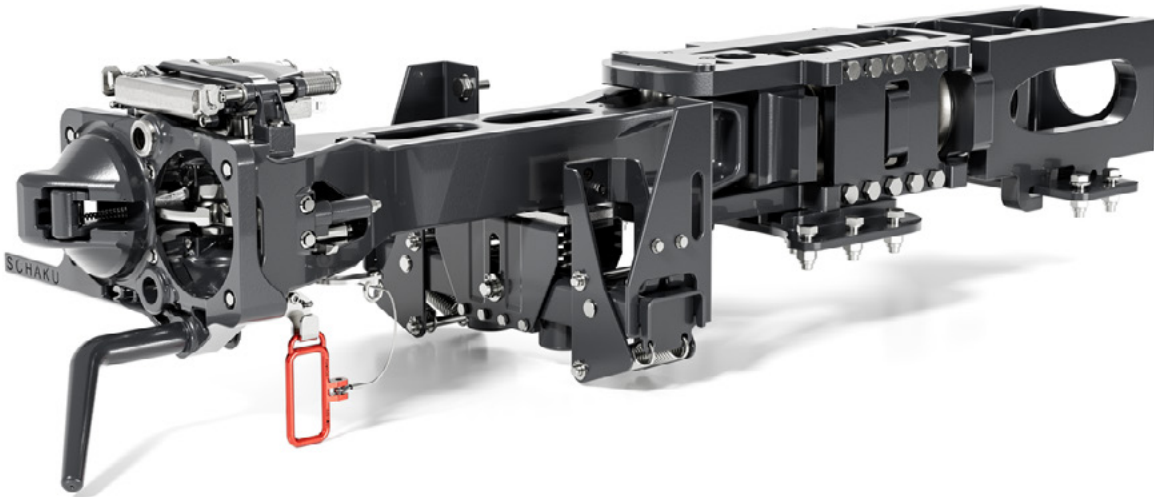
materials in the interior or exterior must be able to withstand numerous influences. The outer skin of trains in particular is subjected to high stresses such as weather influences, stone chipping or chemical components. Paint not only plays a central role as an essential surface protection, but also ensures the feel-good factor for passengers by maintaining the value of the coating.

ALEXIT® SnapCure is extremely resistant to chemicals and UV radiation. Overall, the coating system therefore fulfils all the requirements of the rail industry and brings considerable efficiency to the painting process of rail vehicles.

Mankiewicz Gebr. & Co. (GmbH & Co.KG)
Hall 8.2 | 225

With its "SnapCure" technology, paint manufacturer Mankiewicz Gebr. & Co. significantly accelerates the painting process for rail vehicles.

The digital automatic coupler: a key building block of the European Green Deal



The CargoFlex reliably connects and disconnects freight wagons even under extreme weather conditions

Photo: Voith

According to the European Green Deal, from 2030 at least 30 percent of goods should be transported by rail. This requires improved utilisation of the rail network. The first step towards this goal is the comprehensive introduction of a digital automatic coupler (DAC). The Voith Group has already developed its CargoFlex DAC for the specifications of the future.

■ Up to 3,500 freight wagons a day are handled at peak times at Europe's largest marshalling yard in Maschen, just outside Hamburg, on a site equivalent to almost 400 football pitches. The coupling and uncoupling of the individual wagons is still mainly carried out in a manual process. There are two screw couplings on each wagon, which an employee has to separate or connect by hand in the dangerous space between the wagons. The whole train preparation process alone, including shunting, brake testing and wagon inspection, may even take up to a full shift. These processes have changed only marginally over the past 100 years.

Digital automatic coupling will pave the way for the change in processes. The new unified automatic coupling system for around 450,000 freight wagons and around 23,000 locomotives in Europe can also be used to digitalise rail freight transport. To this end, the committee for the Europe-wide delivery of the DAC (EDDP Board) recently defined the basic functions which the freight coupler must fulfil. In addition to the automatic coupling function which includes air, data and power line connections, the brake test should be automated and recognition of the wagon sequence and train completeness as well as automatic uncoupling of the wagons should become standard features in future. With CargoFlex,

Voith is currently able to offer most of these functions already.

Proven technology further developed

Voith's CargoFlex is based on the proven technology of Scharfenberg couplers. Switzerland's SBB-Cargo, one of the world's most demanding rail operators in rail freight transport, has been successfully using the CargoFlex in regular daily commercial operations since May 2019.

System solution for the transition phase

During a transition phase, manual and automatic couplers will co-exist. However, Voith has developed the CargoFlex Hybrid to integrate the entire rolling stock of railway operators into the process of increasing productivity. It enables coupling either with a towing hook or with an automatic coupler, as the head position can be changed between automatic and manual as required.

Converting the entire fleet to DAC is a major challenge for wagon owners. To ensure a smooth migration process, Voith therefore also offers comprehensive support from fleet preparation to installation.

Both the CargoFlex and the CargoFlex Hybrid are designed to meet the specifications of the future.

Voith Group | Hall 1.2 | 130

Transport operators to achieve savings with OnTrack Monitoring



Predictive maintenance and higher availability of vehicle fleets and infrastructure through OnTrack Monitoring

Photo: Schunk Group

Transport operators may be faced with typical costly troubles such as damaged overhead lines and pantographs. Schunk OnTrack Monitoring offers potential to reduce costs thanks to a sensor-based monitoring system to upgrade the pantographs of Schunk Transit Systems GmbH and to make them intelligent.

■ The monitoring system can be retrofitted. It continuously collects data on the condition of the pantograph and the overhead line during operation.

Operators can benefit from Schunk's expertise in analysing the data and, for instance, detect irregularities in the overhead contact line before they

lead to serious damage. The data is processed in a clearly organised manner for transport companies and infrastructure managers and forms the

basis for predictive maintenance and increased availability of vehicle fleets and fixed assets.

If nevertheless there is damage, the collected data enables an objective root cause analysis and a targeted repair. Last but not least, unscheduled maintenance – such as the repair of damaged vehicles or overhead lines thanks to OnTrack Monitoring – can also be carried out more easily, quickly and therefore more economically.

Autonomous, resistant and lightweight

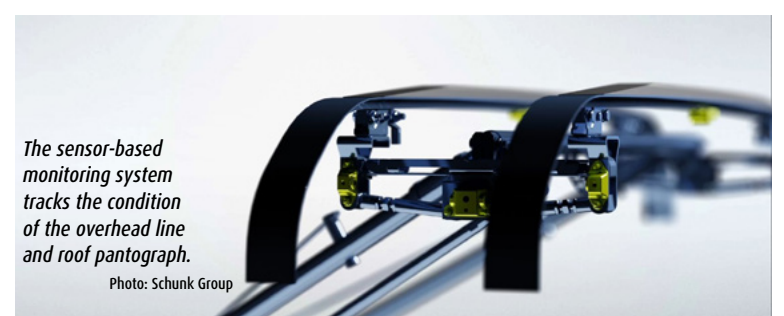
With the autonomous system, both existing old and new pantographs can be digitally upgraded with various components in the collector head and in the base frame area. An autonomous power supply, high resistance to environmental influences typical of the ap-

plication and a low dead weight create a functional and reliable solution.

The associated software transforms the complex data into clearly presented events which are either related to the vehicle or to the infrastructure. Each event is enhanced with detailed information which allows fast and direct validation and technical assessment of fault patterns in a web application. A map visualisation allows relevant events to be sent directly to the maintenance centre in collected exports. The software is not only a tool, but also a streamlined workspace in which multiple users can collaborate and improve intelligent evaluation with each technical assessment of events.

In this way, OnTrack Monitoring makes it possible to meet the requirements of the modern railway industry, optimise operating processes and extend service lives.

Schunk Transit Systems GmbH | Hall 9 | 345



The sensor-based monitoring system tracks the condition of the overhead line and roof pantograph.

Photo: Schunk Group

A clean dosage



Automatic dispenser for soaps and sanitisers controlled by a timer relay

Photo: RCS

The perfectly harmonised and reliable components from LÜTZE Transportation GmbH ensure safe operation of automatic soap and disinfectant dispensers.

■ Mireo from Siemens Mobility is a platform solution with many features which offer high added value. LÜTZE is involved in the Mireo Lausitz trains with components installed by the supplier RCS (Rail Components and Systems).

RCS works for various railway manufacturers and produces components such as driver's cabs, front masks and interior panelling. It also develops the associated electronic and electrical systems, including complete sanitary modules, for which RCS is a system supplier.

A time relay controls how long soap or disinfectant flows out, using a DC/DC converter which supplies 12 volts to the dosing pump. As there is only a small load, the aim was to create a compact and railway-compatible low-power product for top-hat rail mounting. "We chose the LÜTZE Transportation timing relays

because we were looking for a flexible and programmable solution," reports Mathias Wacke, Product Manager for driver's desks and WC cabins at RCS. As the ideal output times were not yet precisely known at the start of the project, they had to be variable. "One reason for this was that different railway companies may use thicker or thinner substances during operation," explains Wacke. "The operator can then update the parameter set himself using a free software and programming cable." RCS developed the system together with its customer Siemens Mobility. It first went into operation on DB Regio AG's Mireo network in Lausitz.

EMC 06 tested

The subsequent integration of relays and converters into an existing platform is akin to modernisation.

"This required an EMC 06 electromagnetic compatibility test, which LÜTZE obtained as requested. In general, we have a long-standing partnership," says Wacke. RCS already installs LÜTZE DC voltage converters in driver's desks and the USB charging stations and sound generators in some projects.

Siemens required a self-sufficient solution, otherwise, the toilet control system could no longer be used as a common part across all projects. For hand washing, some railway operators want manual, some automatic dispensers, some with and some without dryers. Toilet control should remain unaffected by this.

RCS opted for the programmable timer relays because they wanted to avoid a small control unit. On the one hand because these three components are less expensive and on the other because of the software effort involved.

Lütze Transportation GmbH | Hall 27 | 650

Personalised on-board catering

For many travellers, it is of decisive importance to be able to enjoy high-quality on-board catering. The new generation of trolleys from Cairate Sviluppi Industriali Srl. (CSI) offers configurations which are flexible enough to fulfil passenger requirements.

■ The internal modularity of the CSI trolley line makes it possible to flexibly adapt the layout of the interior to the different needs of railway catering – from serving hot drinks to frozen food. Access at the front can be either through a hinged side door or through drawers for direct access. A lightweight structure and the "dead man's" brake system make the trolley manoeuvrable so that on-board staff can easily oper-

ate it individually, handle it easily and steer it safely.

There are not only options for customising the interior, but also for the external dimensions, and furthermore additional functions can be installed on the top. This ranges from the espresso machine and service of cold products to displays for product presentations. The trolley can be adapted to the specific space conditions of the respective

train and allows an attractive presentation of the products on board.

Two Italian companies have worked together on the new catering trolley line, the recently founded company CSI and the long-established company Dante Bertoni, which can look back on over 100 years of experience in the manufacture of material handling equipment.

Cairate Sviluppi Industriali Srl. | Hall 1.1 | 174



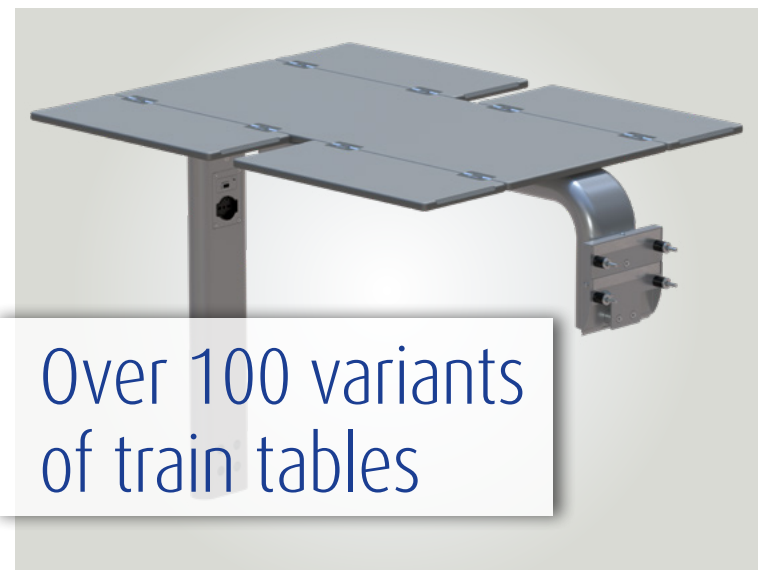
Catering trolley from CSI for regional trains

Trolley designed for the high-speed train

Cocktail bar trolley from CSI

Photos: Cairate Sviluppi Industriali Srl.

Over 100 variants of train tables



The new modular train table from Lippert

Photo: Lippert

When developing the new tables for the railway market, the Lippert Technical Excellence Centre (Lippert TEC) in Rignano sull'Arno in Tuscany put people first. The Italian manufacturer's aim was to improve passenger comfort while making them easier to maintain for railway operators.

■ Lippert is convinced that new ideas for ergonomics, functionality and accessories for train interiors are best developed when the users are involved in the process. For the development of a standard product which is adapted to the various requirements, the company consulted stakeholders such as train manufacturers, operators and designers about the ideas which had emerged.

The modular design of the train tables, which consist of independent sub-assemblies such as the structural frame, table top and accessories, allows more than 100 variants to be configured. This modularity makes it easier to customise the tables and simplifies maintenance and upgrades throughout the product's life cycle. Key features of Lippert's new train table include cantilevered

structures which optimise ergonomics, a fold-out table top for efficient use of space and integrated tech-friendly amenities such as wireless charging ports and USB sockets.

The virtual product configurator allows users to explore and test different configuration options in a simulated train environment. With the help of the Lippert TEC team, customers can tailor the table to their specific requirements, whether this is a single prototype or a fleet-wide deployment.

The first-class version of the modular Lippert train table is already in use in Italy. The market launch of a second model with a two- and four-person version is planned for 2024 to further increase the reach and impact of this solution.

Lippert | Hall 1.1 | 610

AI Tours: expertise in artificial intelligence



Photo: Messe Berlin GmbH

New tours to provide visitors with an overview of AI solutions.

AI technologies perform important support functions in transport technology, for example in the autonomous monitoring of tracks or the optimisation of workflows and processes. InnoTrans 2024 offers four different tours focussing on AI to match interested parties with exhibitors. They will take place daily during the trade fair and complement the existing range of guided World Innovation Tours on Railway Technology, Public Transport/Interiors, Tunnel Construction/Infrastructure as well as Outdoor/Bus Display.

Starting from the AI Mobility Lab

The "AI Tour" will start daily from the AI Mobility Lab. The AI Mobility Lab is a new exhibition area in the Public Transport segment in Hall 7.1a of the trade fair. In the forum, companies will present their innovations from the fields of AI, robotics, data protection and cybersecurity. The AI Mobility Lab offers specialist lectures and discussion panels.

More information about the tours on the [InnoTrans website](https://www.innotrans.de).

AI Mobility Lab in Hall 7.1a

IDF 2024: Call for Speakers

The International Design Forum (IDF) at InnoTrans 2024 will once again focus on the aspects of design and mobility. The forum is part of the InnoTrans Convention in the Public Transport and Interiors (PTI) segment. IDF will present innovative interior concepts for public transport. The International Design Centre Berlin (IDZ) invites experts in these fields to submit contributions from the areas CITY (urban mobility) and REGION (regional mobility).

They are invited to submit 15-minute case studies on CITY/urban mobility: innovative PTI solutions for urban mobility and REGION/regional mobility and commuter transport: innovative PTI solutions for regional mobility. The final programme will be curated by IDZ. More information on "Call for Speakers" at www.idz.de.

Your direct route to us: the online ticket shop

Day/permanent and student tickets for InnoTrans 2024 are available in the [ticket shop](https://www.innotrans.de/ticket-shop). The tickets are available on mobile devices and allow contactless

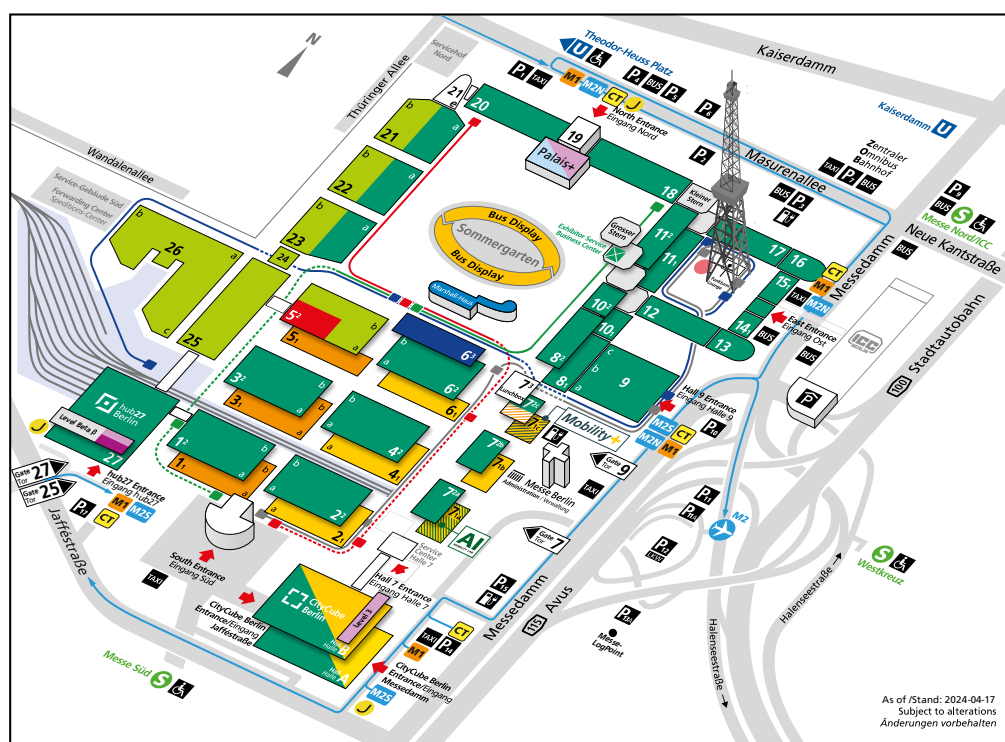
access. They will also entitle the holder to use Berlin's public transport system (ABC) free of charge for the period of validity.

Trade visitor pass Online (9:00 am - 6:00 pm)

Day ticket	60 euros
Day ticket Friday (9:00 - 16:00 hours)	50 euros
Permanent ticket	90 euros
Day ticket for students	14 euros
Permanent ticket for students	30 euros



Ticket sales and voucher redemption will take place exclusively online. There will be no ticket office at the event.



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- M1 Olympischer Platz P+R
- M2N BER – Expo North · Expo Nord
- M2S BER – Expo South · Expo Süd
- CT City Transfer

Fairground Shuttle · Geländeshuttle

- Fast Shuttle
- South Entrance – Hall 18
Eingang Süd – Halle 18
- South Entrance – Hall 20
Eingang Süd – Halle 20
- South Entrance – East Entrance
Eingang Süd – Eingang Ost
- East Entrance – Outdoor Display
Eingang Ost – Gleis- und Freigelände

Exhibition grounds InnoTrans 2024



- Railway Technology
- Interiors incl. Travel Catering & Comfort Services
- Railway Infrastructure
- Tunnel Construction
- Public Transport incl. Mobility+
- AI Mobility Lab
- Outdoor Display · Gleis- und Freigelände
- Bus Display
- Opening Ceremony · Eröffnungsveranstaltung
- InnoTrans Convention
- Speakers' Corner
- InnoTrans Campus
- Business Lounge (Marshall-Haus)
- Press Center · Pressezentrum
- FoodCourt · Restaurant
- J Jelbi hub shared mobility Pickup & Drop-off for rental two-wheeled vehicles
Mobilitätsflächen für Miet-Zweiräder

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