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The current state of the UK Railways



InnoTrans 2018
Record number of exhibitors



Lower Saxony
Focus on Port Railways



Pintsch Bamag
Signal Technology in the Course of Time

↑ BREXIT ↑



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Trade Fair Location Europe: Exchanging Information for a Strong Railway Industry!



Dear Readers,

Europe is the cradle of the railway – and the railway industry continues to be a technological leader world-wide. It's no wonder that the continent is home to the world's top railway trade fairs. For instance, the leading international trade fair for railway technology InnoTrans that takes place in Berlin counted nearly 3000 exhibitors and filled approximately 40 halls with technical innovations. A good example of how innovative the railway industry is!

This is exactly why trade fairs are so important: to secure information exchange within the railway industry – for an industry is only as strong as its ability to communicate. And trade fairs are ideal locations to exchange information, inspire others with innovative solutions and establish or strengthen existing contacts. Not only fairs but also congresses play a prominent role in identifying problems and offering technical solutions.

The present issue of European-Rail Markets (ERM) offers an overview of the most prominent fairs and congresses in the area of rail transport. It also introduces the winners of this year's Innovation Prize awarded by the German-speaking journal Privatbahn Magazin, a sister publication of ERM, that was presented to the winners in late May at the transport logistic fair in Munich.

I hope you enjoy this issue!

Christian Wiechel-Kramüller
Editor of European-Rail Markets

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Rail passenger transport has almost doubled in the United Kingdom in the last 20 years.

Railways in the United Kingdom

The current state of the UK Railways

The UK's railways have always been a bit different from its continental neighbours; in spite of having the same track gauge. The smaller loading or structure gauge means smaller trains and, because most railways were built by private entrepreneurs, there was competition for routes and much duplication so that, some 50 years ago, the famous Dr Beeching, then Chairman of British Railways, made a wide range of closures of lines thought to be unprofitable, leaving the remaining network in much the same state as we have today.

That was the age of the car and truck; many people suggested turning closed railways into roads. Then came 'privatisation' of the railways in the 1990's, with the infrastructure manager (Railtrack) being separated from passenger and freight operators. Freight was sold to the private sector and the passenger services let out as franchises for which companies compete, generally for 5 to 10 year periods.

Railtrack was not a success in the private sector; it did not see the need for engineers on its staff and, after several serious accidents caused by poor track, it was effectively taken over by the state as Network Rail.

Now, we have road congestion and serious air pollution caused by road traffic, which has brought some regeneration of the rail sector. Passenger traffic has doubled in the last 20 years; freight has lost copious amounts of coal and steel traffic but the other sectors, such

as intermodal, automotive and construction materials have shown good growth despite intense competition from the road freight sector.

Our rail customers are very particular about trains being on time, and the Office of Rail Regulation supervises a complex but fair performance system which penalises Network Rail or train operators for delays that they cause, and provides a system for compensating passenger for delays. The ORR publishes 'performance tables comparing operators' giving a strong incentive to providing good service. As a result, passenger train performance is generally in the 90 to 95% range on time and freight generally over 80%, although the latter is often affected by customers delaying train departures due to late loading.

So now we have the problem of success and dealing with growth. Some passenger numbers have flattened

out, perhaps due to the overcrowding of commuter trains. Many complain about the costs of passenger tickets; there are cheap ones and highly priced ones on the intercity routes, but commuter fares are high, all reflecting government policy over many years about the amount of subsidy that the railways receive.

Of course, the main expense for the railway is the infrastructure. Both maintenance and enhancements are thought to be very much more expensive than is necessary due to the bureaucracy of Network Rail or our safety regime set by the Office of Rail Regulation. Hundreds of kilometres of electrification of the Great Western route out of London to Bristol and Swansea started off at a cost of £800m and is now forecast to be over £4 bn if it is ever finished. Since the Department for Transport made the extraordinary decision to buy new electric trains for this and other routes, it finds itself with electric trains and not much electrified track. The solution was to ask Hitachi to install diesel motors in these trains and cut some of the electrification work.

So at present, the Government, which owns Network Rail and HS2, and controls all the franchised passenger

operators, has taken back control of all Network Rail expenditure on enhancements, whilst allowing HS2, as a separate government owned company, to waste money on a high performance 'white elephant' of a high speed line which will take you from London to Birmingham 20 minutes faster than the conventional line, with a terminus that is 20 minutes' walk from the centre of Birmingham and the other stations, at a budget that is moving rapidly over £50bn just for this first phase of the project.

More recently, there has been very strong complaints about new passenger timetables failure when franchises start. Train operators, Network Rail and customers all blame each other for the very late publication of timetables, for the lack of drivers with route knowledge, for alternative routes being needed because of delays in electrification but it all comes down to Government, which controls the lot one way or another, trying to micromanage the system without understanding it.

So we see Government owned Network Rail prevented from undertaking any enhancements without Government permission whilst Government owned HS2 spending money in the most profligate of ways on a vanity project!

And we have the additional project of BREXIT. At present, there are Euro-

star passenger trains and a few freight trains using the Channel Tunnel. There should be many more but a combination of high tunnel charges and the unreliability of services and infrastructure in France makes growth challenging. Nevertheless, leaving the European Union could mean recreating the type of frontier that exists at other external EU frontiers, and with drivers and crews having language, licensing and other challenges to face. Passengers may well be subject to more delaying checks at the frontier, restricting the likelihood of ever running a local service between Gatwick and Lille, or from Frankfurt to London without passengers having to leave the train at the frontier and take themselves and their luggage through checks – as happens only on a few services now.

More seriously is the challenge for rail freight; there is hope that checks can be done at inland terminals rather than at Calais or Folkestone, but nothing is yet agreed politically, and the border agencies cannot plan anything in detail with such an agreement.

Equally serious is the situation on standards now finally being led by the European Agency for Rail. There is debate in the UK as to what relationship UK industry and Government should have with the ERA and how necessary it will be in the future for UK railways to comply with ERA standards and procedures. Some parts



Anthony Fitzhardinge Gueterbock, 18th baron Berkeley, Chairman of the UK Rail Freight Group, and a board member of ERFA and Allrail. The opinions expressed are his own.

of the industry seem to want to go their own way and 'cherry pick' what they comply with and what they ignore, and unhelpfully our Secretary of State for Transport does not like European agencies, probably without even understanding the pros and cons of keeping the close relationship between UK railway sector and the ERA.

So, the next years or two will be very rocky and uncertain for the rail sector, be it on equipment, the economy or frontier issues. I hope our continental friends will sympathise with us if BREXIT becomes the longest national political suicide note in history!

Tony Berkeley

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EVENTS

InnoTrans
International trade fair for
transport technology
18.–21. September 2018
Berlin, Germany
www.innotrans.com

Expo Petro Trans 2018
20.–22. September 2018
Kassel, Germany
www.expopetrotrans.de/?lang=en

IAA Commercial vehicles
– **Mobility, Transport, Logistics**
20.–27. September 2018
Hannover, Germany
www.iaa.de/en/

Multimodal Transport Expo
27.–29. September 2018
Zhengzhou, China
www.railwaypro.com/wp/multimodal-expo-2018/

Global Light Rail Awards
3. October 2018
London, United Kingdom
www.eventbrite.co.uk/e/global-light-rail-awards-2018-tickets-42898148517?aff=erelexpmlt

acoustex 2018
10./11. October 2018
Dortmund, Germany
www.acoustex.de

Multimodal Americas
16.–18. October 2018
Toronto, Kanada
www.multimodalamericas.com

Intermodale Europe
6.–8. November 2018
Rotterdam, Germany
www.intermodal-events.com

TRANSLOG Connect Congress
13./14. November 2018
Budapest, Hungary
www.translogconnect.eu

Logitrans
International transport logistics
exhibition
14.–16. November 2018
Istanbul, Turkey
www.english.logitrans.com.tr/

Exporail India 2019
8./9. January 2019
New Delhi, India
www.exporailindia.com/english/

More events:
www.privatbahn-magazin.de
www.zukunftsbranche-bahn.de



Railway trade fairs reflect the innovative strength of the European railway industry.

On the right track!

The innovative strength of the railway industry

The European origins of the railway industry explain why it has such strong roots in Europe. George and Robert Stephenson were not only responsible for developing the Rocket, probably the most famous locomotive, but also literally put the railway on the right track with many technical solutions. These solutions include some standards that still apply today. For example, we owe George Stephenson the determination of the standard gauge for railways of 1435 millimeters.

The high number of successful trade fairs and congresses on rail transport in Europe can be connected to these historic roots. For instance, InnoTrans that takes place every two years has turned into the world's leading trade fair in the railway industry over the past few years. It is divided into the five segments Railway Technology, Railway Infrastructure, Public Transport, Interiors and Tunnel Construction and presents its innovations in a track and outdoor area with a track length of more than 3500 meters. The large number of fair visitors who travelled to Berlin in 2016 from over 119 countries as well as nearly 3000 exhibitors in 41 trade fair halls attest to the international visibility of InnoTrans. InnoTrans will open its gates again from 18 to 21 September 2018 and will once again attract global attention in the industry with current topics and impressive exhibits. Apart from InnoTrans, there are several other trade fairs and congresses

that are highly valued in the railway industry. Without doubt, this includes the international logistics trade fair transport logistic in Munich that reported a new record number of 60.726 visitors in 2017. The international logistics show will take place in Munich from 4 to 7 June 2019.

IT-Trans has also made a name for itself in rail transport over the past few years. From 6 to 8 March 2018, the trade fair will primarily present the latest IT trends and innovations for public transport in addition to IT technologies for modern freight transport – even if freight transport is not its primary focus.

The trade fair "Arbeitsschutz Aktuell" based in Hamburg and Stuttgart is also becoming more and more important to the rail sector, as the topics of occupational safety and accident prevention are always a top priority for rail transport. In 2018, the trade fair will take place in Stuttgart for the first time from 23 to 25 October. The Railway Forum in Berlin has become one of the leading supplier congresses within a short period of time. The next forum that will take place from 1 to 2 October 2019 will feature several interesting events. And finally, let us take a look at Austria, where Rail-Contact has distinguished itself as a leading congress for rail transport technology. The next event will take place on 13 June 2018 in Graz and will focus on the topics of maintenance, innovative manufacturing techniques and obsolescence.



The Smart Rail Track by Vossloh.

Digital technologies are key to maximising track availability and planning forward-looking maintenance. The ability to check the line at any time thanks to networked data capture in real time with innovative products, reliable materials and optimised maintenance concepts for every aspect of rail infrastructure. That's what we mean by "The Smart Rail Track by Vossloh".

Next stop: Berlin, InnoTrans 2018, Hall 26.

A photograph of the InnoTrans 2018 trade show. The scene is a busy aisle between exhibition booths. In the background, a large blue banner with the word "InnoTrans" in white, italicized font spans across the top of a building. Below the banner, there are several exhibition booths. One booth on the left has a sign that says "vossloh". People are walking through the aisle, some looking at the exhibits. The lighting is bright, suggesting an indoor or well-lit outdoor setting.

InnoTrans

InnoTrans 2018

Record number of exhibitors from Berlin-Brandenburg

Joint booths are a fast and direct way for visitors to the trade fair to obtain in-depth information about industry-related offers and capabilities in a compact and comprehensive form. This explains the growing interest among companies and institutions in staging combined presentations, which are also a feature of InnoTrans 2018. From 18 to 21 September the various joint booths at the world's leading trade show for transport technology will provide concentrated insights into the expertise available within the industry at a regional, national and international level.

“The attraction of InnoTrans is also evident in the joint presentation by the capital and surrounding region in the Berlin-Brandenburg display in Hall B of the CityCube Berlin”, according to Jens Ullmann, head of department at the Potsdam Chamber of Industry and Commerce (IHK). “The display occupies over 1,000 square metres and features almost 70 exhibitors – a new record.” Of these companies 17 are joining the Berlin-Brandenburg display for the first time, and there has been so much interest that it was not possible to accommodate all those wishing to take part, the IHK head of department explained. The slogan “The future of mobility” says it all: predictive maintenance, innovative information and communication solutions, energy efficiency, new materials and intelligent safety systems are, as he points out, just some of the highly topical subjects being address-

sed on the booth, which is being organised jointly with Berlin Partner für Wirtschaft und Technologie GmbH.

Five new exhibitors

This year 24 exhibitors are showcasing their innovations at the combined ‘Saxony live’ presentation in hall 7.2b. Among the newcomers are AIS Automation Dresden GmbH, Markenzoo eG, Norafin Industries (Germany) GmbH, Skeleton Technologies GmbH and WBN Waggonbau Niesky. Many international companies such as Bombardier, RailMaint, Goldschmidt Thermit, Hörmann and the NSH Group are active in Saxony, and this also makes InnoTrans “obligatory for companies and research facilities from this industry in Saxony”, according to Markus Brömel, Project Manager Trade Fairs for the business promotion agency Wirtschaftsförderung Sachsen GmbH (WFS). ‘Saxony live’ is being

organised by the WFS on behalf of the Saxony State Ministry for Economic Affairs, Labour and Transport.

Twelve countries Hall 11.2

What are traditionally the largest combined booths can again be found at this year’s InnoTrans, with SWISSRAIL, the Railway Industry Association from the UK and Business France all reserving display spaces in several halls. Business France, for example, is occupying one third of hall 11.2. There are twelve different pavilions here, including Tunisia, Canada, Sweden and Poland. Due to the amount of interest attracted by the combined displays, Brazil, Australia and Portugal will be exhibiting in the adjoining hall 10.2. Many other joint booths are concentrated in other halls, such as hall 9, featuring Russia and the Czech Republic and, in particular, China, which is represented by a number of displays.



At the last event 2,955 exhibitors from 60 countries presented the global rail industry’s innovations to 137,391 trade visitors who came from 119 countries.



Smart camera surveillance and modern incident management: solutions for a new level of security in public transport.

Axis Communications

Solutions for a new level of security

To create a new level of security for public transport, centralised, real-time surveillance and the ability to coordinate response personnel is key to minimising the impact of incidents and increase the perception of security. Network video has a clear role to play in all phases of modern incident management.

Used proactively in real-time, rather than merely recording the footage, camera surveillance is a dimension for security managers to consider when building a security system. The main goal in any incident management system is to not overreact or underestimate any incident and to use the right resources early on to reduce the number of incidents or avoid them entirely.

The incident lifecycle can be characterised in five or six distinct steps: Detection → Prioritisation → Response → Re-prioritisation → Investigation → Follow-up

Detection / Prioritisation

Incidents can be discovered manually for example by a passenger, or it can be done automatically through video analysis by a modern network video camera system. Examples of automatic video analysis could include overcrowding on platforms or entry into a restricted area or onto the rail tracks. Other types of sensors can detect an incident, like fire and smoke alarms,

access controls and radar or other motion sensors.

Next step is to prioritise the nature of the incident and compare it with all other incidents occurring at the same time.

Response

Once the incident is fully understood by the security operators, it can be classified to follow a protocol; a set of operating procedures that have been determined beforehand in order to defuse and minimise the situation. Additionally, the security centre can continually monitor the scene.

Furthermore, as modern network video cameras provide clear HDTV-quality video, operators can also clearly identify the individual(s) involved. It is vital in a real-time situation to give a clear description of a perpetrator or someone in need of help (ie. clothing, height, body shape etc.).

Re-prioritisation

Sometimes an initial response to an incident is made with vague or limited information at hand. Sequences of

events that have happened shortly before detection of the incident need to be reviewed and operators have to create a picture of the situation. Another scenario may happen during an incident, when a suspect leaves the scene before responders have arrived. Furthermore, live and recorded video from other nearby locations can be used to continue the search for people involved and help responders be in the right place.

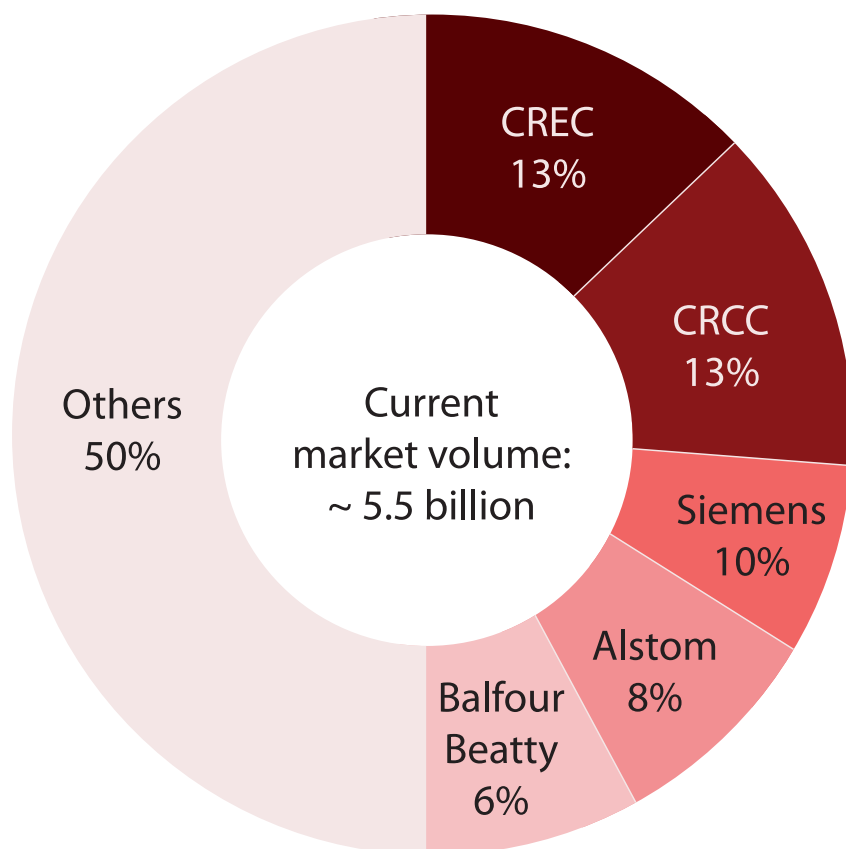
Investigation

After an incident is dealt with, there usually follows a period of investigation where the facts are established and the sequence of actions reported to the authorities. By using modern network cameras, the image quality is the same as the HDTV broadcasts we are accustomed to at home. Positively identifying people where there can be no doubt of who did what and when, is a vital benefit to any investigation process.

Follow-up

The final phase is the step of follow-up and learning.

*Patrik Anderson
Director Business
Development Transportation
Axis Communications*



Worldwide market share suppliers electrification 2013–2017 new development and upgrade.

SCI Verkehr GmbH

World market continues to grow

The current market volume is c. EUR 10 billion, and will grow with a CAGR of 3–4% per year up to 2022. This reflects the trend towards electric mobility in rail transport and the gradual turning away from diesel power.

In particular, this market growth is generated by a large number of metro projects as well as intensified electrification of existing diesel lines with growing operational demands. The European market is once again growing especially dynamically. Momentum for the market development up to 2022 will come from the realisation of projects in France and Spain which have been partially delayed due to the debt crisis as well as from electrification of diesel lines in Eastern European countries and Scandinavia. The Asian market also continues to grow. China is continuing to invest large sums in electric rail lines. A major influence on the market volume for electrification comes from projects to construct new lines or upgrading existing ones. Such changes to the existing network are always subject to political interests and decisions. This makes infrastructure poli-

cy a fundamental driver of the market. Although rail electrification is a niche market within rail infrastructure, it is a growth market with long-term positive prospects, as there are economic and environmental advantages to electrical operation compared to diesel. Of around 1.3 million km of rail lines worldwide, around 344,000 km are electrified, i.e. just over a quarter. In individual market regions, the degree of electrification varies from 1% (North America) to 57% (Western Europe). The degree of electrification in Asia has risen substantially in the last few years. In 2013 it was still 34%, but by 2017 it had reached 47%. Besides China's large investments in both constructing new lines and electrifying diesel lines, India has also been an engine for growth. Historically, various electrical systems have developed in individual countries and regions. Their specific structural

configurations are even more significantly varied than is shown by an overview of the power systems used. In the field of railway electrification, this has led to the establishment of medium-sized national markets with many regional suppliers familiar with the relevant national requirements and standards. The industry structure is very advantageous for niche suppliers.

Among the small number of international suppliers in the field of rail electrification are Siemens, Alstom and Balfour Beatty. While Balfour Beatty sold its rail divisions in many countries as part of a restructuring strategy in 2012–2014, the possible merger of Siemens and Alstom might lead to the emergence of a new world market leader which would be bigger than the two Chinese rail construction groups CREC and CRCC.

These are among the results of the new market study "Railway Electrification – Global Market Development" produced by SCI Verkehr GmbH, the international consultancy firm specialized in railway technology and logistics.



The MRR 600 from Speno international SA.

Speno International SA Preventive milling

See us at InnoTrans in Berlin,
September 18–21 2018,
Hall 26 / Stand 104

Geneva, July 31/2018 – Rail reprofiling and controlling contact fatigue crack growth are today considered as key maintenance issues for modern Railways and Metros across the five continents. Speno is dedicated to these safety-critical tasks and, actually, they are the core business of Speno, where the Company is world leader.

Requirements for rail profiles and reprofiling periodicity from Railways and Metros are becoming more specific, since they take into account more factors like the type of traffic and the local rail conditions. Moreover, the track environment (tunnels, urban areas, type of track on ballast or not) require tailored solutions.

Rail reprofiling can be executed by means of different techniques. Grinding and milling are the most commonly applied.

Even though Speno has so far built almost 300 rail grinding trains, It has become a logical development to add milling to the Speno toolkit. The very first Speno miller, namely the (UIC

gauge) MRR 600, was manufactured in 2017.

A smaller gauge MRR 400 will be available soon. While grinding offers high productivity and ample flexibility in terms of achieving the required metal removal and varying target rail profiles, milling offers other advantages mostly related to a reduced environmental impact.

In the last few years, however, milling was mostly perceived as a corrective maintenance operation for deep cuts into the rail head, to reduce or remove already significant contact fatigue cracks, while it is now generally accepted that rail maintenance has to be done preventively to maximise the

rail life and return on investment.

Infrastructure Managers, more and more aware of the benefits inherent in a preventive maintenance regime, have been looking for a milling tool to be operated for cuts of typically 0.2 to 0.4 mm metal removal.

That is the reason why Speno has developed its MRR family of preventive millers, but which can also be used in multi-pass mode for targeted corrective work.

Another important advantage of the MRR milling technology is the excellent ripple-free rail finish, making any additional finish by grinding unnecessary.

The MRR preventive millers come with the state-of-the-art Speno measurement solutions including:

- Rotating Eddy-current sensor for the detection of head-checks and spalling
- Rail profile optical measurement
- Longitudinal profile measurement
- Metal removal optical measurement
- Continuous track-gauge measurement.

The first MRR 600 is fully integrated into the fleet of machines operated and maintained by experienced Speno staff. A new reliable, safe and innovative reprofiling tool is now available and Speno has committed to dedicate its best resources to support the introduction of the MRR family.





The TCMS application from Pixy AG.

Pixy AG

Complete TCMS application provided

The Rhaetian Railway (RhB) is acquiring 14 new control cars and will install highly efficient Pixy displays in the driver's cab of each. The SIP-100 is the latest generation of HMIs (Human Machine Interface) to be rolled out. In addition, the RhB has also decided to have the complete application developed by Pixy. This has been realized quickly and cost-effectively with the Pixy Application Designer (PAD). In the future, the RhB will benefit from this arrangement in terms of hardware obsolescence and the further development of the application.

The RhB has now installed Pixy's SIP-100 in its 14 control cars. These are used on the UNESCO Albula line, among others.

RhB uses the programming tool PAD (Pixy Application Designer): Although Pixy created the application initially, the RhB will develop it further in the future.

Compared to the previous version, a visually very similar layout was configured to meet the wishes of train drivers and retain the familiar application. This also has crucial advantages: Basically, the implementation of an application can be as customized as needed. In addition there is more space available on the display as well as far better clarity, all the important information can be read quickly and easily. This was very well received by the train drivers.

With this combination of hardware and software, RhB has successfully modernized its train control and monitoring system and can look toward the future with confidence. PAD also ensures self-sufficiency in terms of programming the applications: Over time, changes to optimize the system

can be implemented very easily, as needed. In addition, obsolescence is an issue of the past: Hardware generation changes are replaced by software updates and the RhB no longer has to deal with the time-consuming process of adapting the application to new hardware configurations.

Flexibility was a key factor for the RhB in order to be able to react quickly to changing requirements. Another retrofit project of RhB foresees that 6 shunters will also be equipped with PAD and the 10.4-inch SIP-100, including an auxiliary status display and color, programmable backlit keyboard. RhB will create its own application in this case.

Pixy AG has received a lot of praise from RhB for this project, with its professional and fast support receiving special recognition. Pixy is one of the leading manufacturers of visualization solutions for the railway industry. Today, more than 40,000 Pixy displays are in service globally around the clock wherever the need for mobile visualization and rugged industrial conditions meet.



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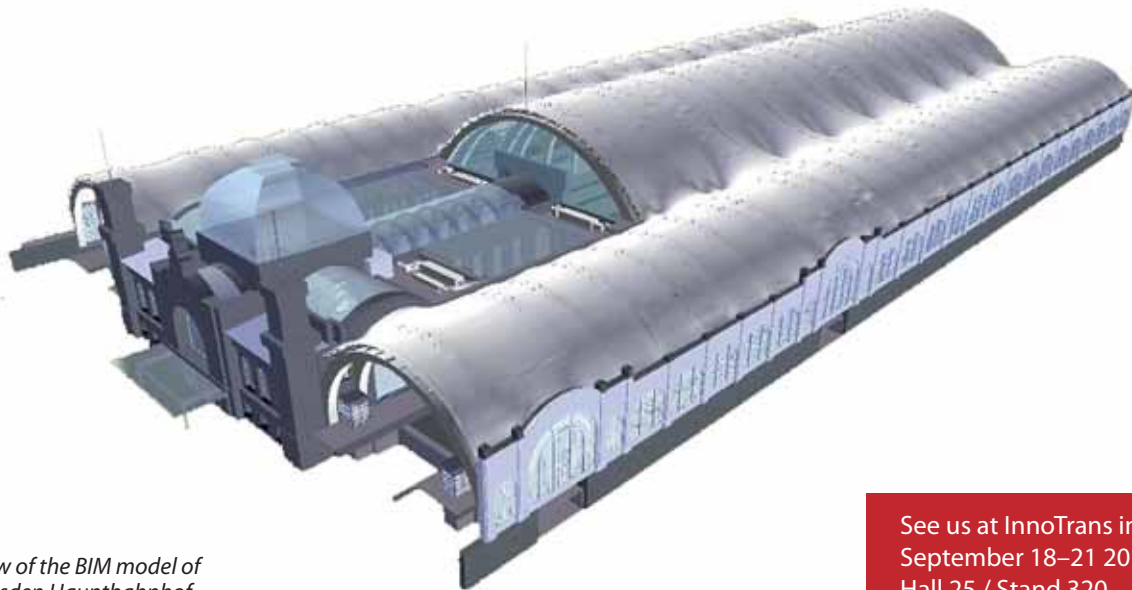
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Hall 6.2, Stand 214

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View of the BIM model of Dresden Hauptbahnhof.

See us at InnoTrans in Berlin, September 18–21 2018, Hall 25 / Stand 320

EPV-GIV mbH

BIM Inventory Modelling

Building Information Modelling (BIM) – this innovative new methodology will be used to make construction projects more on-time, complication-free, transparent and cost-effective in the future. BIM optimises the planning, execution and management of construction projects.

As a result, Deutsche Bahn Station & Service (DB S&S) has set a goal of exclusively using this methodology to carry out projects starting in 2018. That makes DB S&S a pioneer in the area of BIM technology in Germany.

In addition to the digital three-dimensional representation, a BIM model also saves information about all of the components (material, colour, component group, time components, prices, etc.) and allows it to be managed centrally. For the major challenge of the BIM project at Hauptbahnhof Dresden, EPV-GIV mbH will be able to draw on its experiences from multiple successful BIM projects, for instance the platform hall in Görlitz and 5 smaller transit stations.

The planned construction measure behind this project involves replacing the roof membrane of the platform hall; built in 1898, it is 240 meters long and 120 meters wide, and con-

tains 35 trussed rafters as well as 17 tracks and 14 platforms. The hall will be renovated over the next few years.

Measurement using the latest technologies and BIM modelling

Data from the surveying work was primarily recorded using a Leica P40 laser scanner and a DJI Phantom 4 Pro quadcopter, along with a Leica TS15 total station. After that, 350 individual scans were registered, and the photogrammetric images from the surveying flights were used to create an overall point cloud.

This is the basis for the precisely detailed BIM modelling, which will take place using Autodesk Revit software. The digital portfolio model to be created by EPV-GIV will be used for all further planning and construction work. This will require very close contact between the principal

(in this case the DB S&S project management), the other external contractors (the BIM coordinator, object planner, etc.) and the surveyors.

In addition to highly detailed modelling of the platform hall with its roof and support structure, the Dresden Hauptbahnhof project also includes a lower level of detail for the platforms and platform structures, the station building, outdoor areas and shafts.

With building information modelling in Revit, none of the existing standard components can be used because the building is now 120 years old. Special workflows will also need to be developed for certain structural elements. The shape of the membrane roof, for example, with its curved lines, funnels and skylights, is no trivial matter. Smaller NURBS sections will be created from the membrane, which can then be used to model the roof in Revit.

We at EPV-GIV will be able to handle these and other portfolio modelling challenges using the BIM methodology in the future as well.

Anja Kraft, Nico Zeibig



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Economic Ecologic Ergonomic





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MATISA

Pioneering Innovation

MATISA has come a long way since its pioneering debuts in 1945, when they introduced the first mechanical tamping machine. For the first time, this very demanding physical task of tamping the ballast could be executed with a machine, and seated operator.



Modern cabin workplace.

Since then, MATISA has consistently held its place at the cutting edge of the technological progress for on track machines. Bringing innovative features like the elliptical tamping at 42Hz, which is equally suited to line and switch tamping, as well as implementing innovative systems like Total Station and the Palas absolute measuring system on its tamping machines. The most modern of these systems is now NEMO II, based on an optical measuring principle, without mechanical contact. It works on a relative base, ensuring a high precision largely independent of the environmental conditions, such as dust and vibrations.

Milestones in the track renewal mechanisation have also been laid by MATISA with the P811 train, which introduced the continuous and mechanised rail and sleeper replacement. The P811 is the predecessor of the world famous and ubiquitous P95 track renewal train. The P95 features a high versatility and can be adapted to different infrastructure particulari-

ties. It allows for the mechanization of most of the tasks linked to track renewal. In addition, MATISA ballast regulator's range is known for its spacious cabins, allowing for an excellent visibility on tools and track allowing for an efficient and safe operation with a single operator. Their specific robustly designed ploughs adapt to the most demanding ballast profile whilst enabling high output production in both directions. MATISA ballast cleaners are performant, compact machines with very quick and short ramp-in and ramp-out capabilities. The efficient guiding system allows for an excellent work quality, safely using the full working gauge. The size ensures efficient logistic management and stabling possibilities within the worksite vicinity. Available in either pulled or self-propelled versions there are also additional options, such as double screening, or double ballast transfer capabilities. MATISA self-propelled or trailed track inspection vehicles are in operation worldwide, and are available for all track and clearance gauges. They can deliver an efficient and reliable inspection at up to 100km/h, with a wide range of recording parameters. Significant progress is also being ma-

de in the ergonomic and safety domains. MATISA track maintenance machines meet the highest requirements in terms of quality, reliability and safety. An innovative approach to the Human Machine Interface (HMI) includes features such as joystick command for the tamping operator, information exchange through comprehensive and easy to read screens. All features designed to ensure safety and ease of use, thereby also indirectly allowing for a higher quality output, and an increased profitability of the operations.

Safety and sustainability have always been a major focus for MATISA R&D activities, continuously developing and improving the optimal integration of machines in their environment. On track machines frequently

operate in densely populated areas, and mostly during night time. This is the reason design and construction are oriented so as to minimise noise and sustain air quality. The human and economic aspects of track works are also important aspects for MATISA in their search to support the operating staff, by automating the most tedious and repetitive tasks. This has materialised itself by having the complete tamping cycle controlled by computers, with the operator in charge of adjusting the settings and parameters. Automatic sleeper recognition will be the next significant step in this direction.

But MATISA is not resting on its past achievements and is now targeting challenging new objectives. Taking advantage of the new possibilities given by

the latest high-tech applications in the area of connectivity and computing, MATISA is investigating the development of the “smart on track machine”. Such a machine will be strongly connected with its technological and operating environment. That means not only exchanging data for the geometrical drive of the vehicle, but also remote monitoring of the machine’s condition. Thus allowing implementation of efficient predictive maintenance, thereby optimising the organisation and downtime of the machine. The result will allow for even more profitable and reliable operations of MATISA machines.

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IVU Traffic Technologies AG

IT systems for the mobility of tomorrow

The public transport of the future is environmentally friendly, digital and connected. IVU Traffic Technologies will present its solutions for the mobility of tomorrow at InnoTrans 2018. With the current innovations in the standard products IVU.suite and IVU.rail, transport and rail companies are making efficient use of e-buses, bringing ticketing to smartphones and scheduling the maintenance of trains in advance. IVU will be showing all of its highlights and more in hall 2.1 at booth 404.

E-ready with the IVU.suite

The IVU.suite, IVU's standard system for public transport, makes the

efficient deployment of electric buses simple. It knows the properties of the vehicles, the charging options and the

See us at InnoTrans in Berlin,
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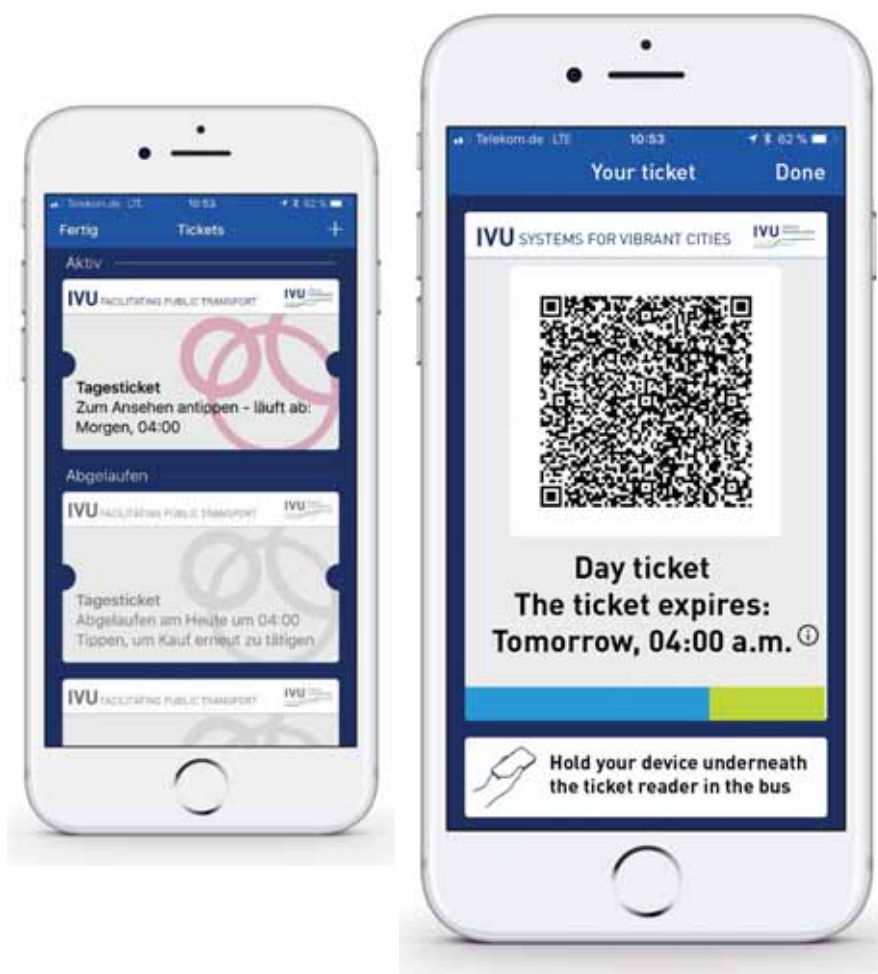
route situations, and assists with suitable suggestions. Thus, there is maximum use of e-buses and optimum deployment of employees. There is a particular focus on integrated management of e-buses and buses with combustion engines: The system combines all vehicles in a single user interface and enables joint planning, dispatch, fleet management and passenger information.

Mobile ticketing

Together with the London-based technology start-up UrbanThings, IVU is providing its customers with the IVU.ticket.app for mobile ticketing. The app uses Bluetooth to track trips and manage payments. This allows the system to provide a simple and cost-effective "be-in/be-out" solution, allowing passengers to board easily without taking out their smartphones. In addition, the settlement software IVU.fare provides extensive evaluation functions.

Condition-based maintenance in IVU.rail

Detect potential damage promptly and schedule maintenance: IVU.rail, IVU's standard system for railways, integrates condition-based maintenance in planning and dispatch. The software analyses data from CBM systems, issues a warning in the event of critical values and automatically determines the optimum maintenance window. Thanks to the seamless connection of workshop systems, IVU.rail also books the right workshop immediately.



At InnoTrans 2018, IVU Traffic Technologies will present the new IVU.ticket.app

See us at InnoTrans!

- Hall 7.1c/104
- Hall B, CityCube/302

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Electrical multiple-unit TRAVERSO for the SOB Voralpen-Express line, Switzerland.

Stadler Rail AG

Presenting seven innovations

Stadler was already one of the largest exhibitors of rail vehicles at InnoTrans 2016. The train manufacturer with production sites in Switzerland, Germany, Spain, Poland, Hungary, Belarus and the USA has even bigger plans for this year's InnoTrans, where it will showcase seven vehicle concepts featuring a variety of new solutions.

Interested professional visitors will be given their first glimpse of Stadler's two new suburban trains, a self-driving metro, two new FLIRT trains, a high-performance bi-modal locomotive and the latest double-decker train for Scandinavia. The seven Stadler vehicles, which will be displayed on over 500 metres of track in the open-air grounds, set new benchmarks in terms of performance, energy efficiency and passenger comfort. The presentation of the new Berlin S-Bahn at the 12th InnoTrans in Berlin is of particular regional importance. The first completed half train can be admired both inside and outside at

InnoTrans. The 73.6 metre-long vehicle seats 184 passengers and has been tailor-made to meet the needs of the German capital.

The regional Swiss transport operator RBS placed an order for 14 suburban trains in June 2016. For the very first time on Switzerland's one-metre gauge market, a train is being fitted with eight instead of six pairs of doors. The fully redundant traction system, including redundant control technology, guarantees high availability and low lifecycle costs.

The trains for the SOB Voralpen-Express line in Switzerland reflect the current development status of the

best-selling FLIRT vehicle line. Large panoramic windows, two bistro areas, a family car and comfortable seats with plug sockets are just some of the features which will make travelling in these trains even more attractive.

In October 2016, Stadler won its largest contract in Great Britain to date, to build and deliver 14 three-car and 24 four-car bi-modal FLIRT trains. The new fleet seeks to make rail travel in East Anglia, faster, more reliable and more comfortable. The bi-modal drive of the FLIRT BMU, shown for the first time at InnoTrans, is considered to be particularly innovative.

The latest generation double-decker train ordered by the Swedish rail vehicle leasing firm AB Transito for Mälardalen has an open, smooth architectural design. The four-car trains can seat

357 passengers and reach a maximum speed of 200 km/h. The trains have been designed to operate at temperatures as low as minus 40 degrees and in snow heights of up to 800 mm.

HVLE from Germany placed an order with Stadler for ten EURODUAL locomotives, including full-service maintenance services, in March 2017. HVLE is the first client to choose this six-axle locomotive with bi-modal drive. The powerful locomotives – which have up to 2,800 kW available for diesel/electric operation and up to 7,000 kW in electric mode – are intended to be used for goods transport in Germany.

For the urban transport Stadler will present its first driverless metro system. They will be equipped for fully-automated, unattended train operations (UTO). The Glasgow subway

system, which dates back to Victorian times, has a narrow track gauge of just 1,219 mm and a tunnel gauge of

3.4 m in diameter, making it the world's smallest underground network.



EURODUAL locomotive for Havelländische Eisenbahn (HVLE) in Stadler Valencia facilities.

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The UITP Global Public Transport Summit Make Stockholm your destination in 2019

The Defining Event in Public Transport.

This is how our sector has come to know the UITP Global Public Transport Summit. With almost 130 years of history behind us, the UITP biennial Summit is a truly global occasion that remains the world's biggest event dedicated to public transport and sustainable mobility.

The 2019 edition will be held in Stockholm, Sweden (9–12 June 2019) under the theme "The Art of Public Transport" and will cover all urban and regional transport modes across the globe.

The Summit will witness a diverse programme full of leading congress sessions, combined with a world-class exhibition displaying the latest and greatest innovations, solutions and products our industry has to offer. Our 2019 local hosts will be SL.

Stockholm has made great achievements in public transport of late, making the Swedish capital an excellent location for the Summit.

The public transport sector will only advance so long as the brightest and

best minds come together to discuss its future. Everyone has a stake in the future of public transport, as moving around our cities with accessibility and fluidity is of interest to us all.

Hosting transport ministers, mayors, operators, authorities, industry CEOs, operations and network managers, public transport entrepreneurs, ITS experts, business developers, urban visionaries, managers involved in marketing, finance and IT and more, the UITP Summit is perfect occasion to ask the questions on the future of public transport and hear the answers.

Stockholm is the perfect location for hosting our Summit under the theme 'The Art of Public Transport'. In all branches of our sector, we are constantly evolving and designing mobility of the future through an art that truly moves you: this is the Art of Public Transport.

Public transport is already a form of art in the capital city of Stockholm. It is believed that there is a genuine craft in using public transport to unite

city districts and the archipelago itself – creating a better environment for all, and dynamic growth along the way. Public transport improves people's quality of life.

With all of this in mind, UITP is well on the way to hosting our biggest ever Summit with with over 70 per cent of the total space of our exhibition already sold and 110 stands already booked.

Exhibitors confirmed so far include GIRO, VDL, Solaris Bus & Coach and Volvo Bus Corporation.

Our Summit exhibition space will cover 40,000m², with over 330 exhibitors expected as around 13000 visitors come through the doors of the Stockholmssävan.

The venue for the 2019 Summit is one of Europe's largest and most experienced congress and exhibition centres. Sustainability is important to UITP and 95% of everything produced throughout the venue is recycled. The UITP Global Public Transport Summit is the only event that covers the challenges of urban mobility worldwide and brings together the in-

ternational public transport community, mobility decision makers and industry suppliers all under one roof. Be part of the industry's biggest event on public transport and urban mobility by visiting the dedicated website www.uitpsummit.org

More about us...

UITP, the International Association of Public Transport, is a passionate champion of sustainable urban mobility and the only worldwide network to bring together all public transport modes. It has 1,500 member companies giving access to 18,000 contacts from 96 countries. The members are public transport operators and authorities, policy decision



makers, research institutes and the public transport supply and service industry.

More about our 2019 local host...

SL, the Public Transport Administration (Trafikförvaltningen) at Stockholm County Council has overall responsibility for transport services in Stockholm County. Over 780,000 people travel by public transport in Stockholm County every day and the number of travellers is increasing every year. The various means of transport –buses, the metro, commuter trains, local rail services and boats—are all coordinated within an ever-growing transport network.

Local host



UITP Global Public Transport Summit: An important date for the railway companies.

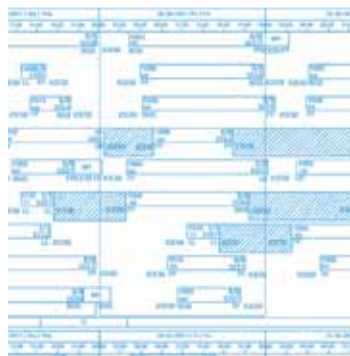
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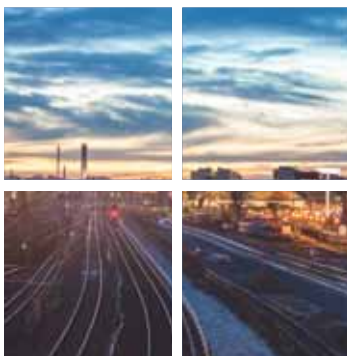
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Interclean Amsterdam: the leading trade fair for cleaning.

Interclean

Interclean Amsterdam and future shows

The 2018 edition of Interclean Amsterdam was the largest, most international exhibition yet. The show attracted a record number of visitors, from more countries than ever before. With a combination of old and new segments, Interclean Amsterdam offered a complete overview of the newest technologies and trends in the professional cleaning market. The robot arena, the InnovationLAB and the new Healthcare Cleaning Forum and LAB were particularly popular.

Aside from the various stages and workshops, visitors were able to enjoy countless activities on exhibitor stands. This included a folklore performance, a basketball court, and virtual reality demonstrations – all of which enhanced the exhibition experience. More visitors than ever spent three days on the show floor, which created a vibrant and lively atmosphere.

“Our statistics do tell you something, but it’s the testimonies that really spoke to me,” said Rob den Hertog, Director Interclean Global Events at RAI Amsterdam. “A great number of people took the time to tell me how much they enjoyed the atmosphere, which I find just as important as, if not more than, the numbers. Interclean was the place to be for our industry

this year, and I’m very pleased with the results!”

The most international show yet

The floor plan was comprised of stands from 892 companies, located across 47 countries. We had a grand total of 33,710 professionals from 143 countries. As many as 77% of the visitors came from outside the Netherlands with some interesting newcomers; Jamaica, Seychelles, Swaziland, Mongolia and Bolivia.

First edition of Healthcare Cleaning Forum

The first ever International Healthcare Cleaning Forum took place alongside Interclean Amsterdam 2018

was. The forum was visited by 300 healthcare professionals from 46 countries, who explored and discussed the biggest challenges and solutions in healthcare cleaning today. The Forum complemented the rest of the exhibition – showcasing the latest innovations in healthcare cleaning, through expert demonstrations and seminars.

What’s next?

Interclean Istanbul is the next event on the list, taking place in the International congress center in Istanbul on 10–12 April, 2019. Despite its increased international character, this regional version of the trade show focusses on Turkey and surrounding countries, particularly those in the Middle East. The Healthcare Cleaning Forum will also claim a spot in the show programme, with seminars by professor Didier Pittet, Hanan Balkhy, who is the chairwoman at King Abdullah International Medical Research Center, and Elias Tannous, Infection Control specialist Cleveland Clinic.



International Railway Summit: A perfect place to meet railway professionals.

7th International Railway Summit

The digital revolution arrives

Digital technologies are transforming the railway sector and will continue to do so for many decades to come. AI, smart sensors, biometric ticketing, automation, the IoT and countless other innovations are improving signalling, easing congestion, boosting safety and security, predicting and resolving maintenance and timetabling issues and promising and often delivering ever more efficient railway systems.

In this new climate, what are rail-sector buyers most interested in learning about? Data collected over the past 5 years by International Railway Summit through its buyer-expert matchmaking portal shows rail operators and rolling stock manufacturers are most interested in learning about improving ‘safety’ (58% of respondents), ‘operational efficiency’ (58%) and ‘the passenger/customer experience’ (55%). It is precisely in these areas where disruptive technologies and digitalisation can be of greatest benefit.

The 7th International Railway Summit in Frankfurt will focus therefore on the many facets of digitalisation with one big question: „How do we achieve an efficient railway system in

the digital era?“. Through a 2-day conference programme, sector leaders and innovators will debate and discuss the benefits and the challenges, seeking the right paths forward for their organisations and for wider society.

The International Railway Summit has a history of presenting new technologies, such as Hyperloop in 2015 when it was still in its infancy, and Deutsche Bahn’s Idea Train earlier this year.

How can digital smooth the journeys of people and goods across borders? Can transport remain at the beating heart of smart cities? Will the ways railways attract investment have to change? How do we maximise the potential of all that data and not be

overwhelmed by it? All these questions will inform the direction of travel of the Frankfurt summit.

Rail operators and rolling stock manufacturers will also learn about the latest technology through a series of one-to-one consultation meetings. Their project requirements will be matched with providers of innovative solutions and an individual meeting timetable will be coordinated by the summit organisers.

The 7th International Railway Summit, organised by the International Union of Railways (UIC) and IRITS Events, takes place from 20–22 February 2019 in Frankfurt, Germany. To find out more about the summit and how you can participate or present solutions, visit irits.org or contact the organisers at anuja.raut@irits.org.

Readers of European Rail Markets can enjoy a special discount of 26% until 19 October. Visit <http://www.irits.org/erm-offer> to receive the discount code.



ACStyria represents around 290 companies.

RAILCONTACT'18

Rail is becoming digital

From 12th to the 13th of June, the ACStyria RAILCONTACT'18, Austria's leading congress of the railway industry with the largest audience, took place in Graz for the fifth time. The topic of this year: the digital shift, which will have great impact on production companies, operators and customers.

Digitalisation will have an effect on all players of railway industry – from production companies to operators and customers. RAILCONTACT'18 dealt with topics such as data that is already being acquired and data that will be necessary in future to sustainably optimise the pre-development process for rail traffic vehicles. High-ranking experts of Deutsche Bahn, Bombardier Transportation, Siemens Mobility, Roland Berger and ÖBB gave an outlook on changes within the railway industry.

Numerous changes

In the past, there have already been many innovations on the customer interface. Smartphone Apps and ID based ticketing are becoming more and more important as distribution, sales and information channels and will continue to supersede such classical channels as vendors. Even now there are numerous driverless subways in the world and this trend will continue not only in new subway project. In the future, driverless locomotives and

railcars will also be used for classical railway systems. In this respect, acceptability among the customers, handling of external malfunctions and registration still are important obstacles. In signalling, electronic signal boxes are being replaced by digital signal boxes.

Digitisation on the next level

High-ranking representatives of voestalpine AG, participated at this year's event. In the context of digital shift, the company group underlined its role as a world market leader for switches and as a top provider of premium rails. The Metal Engineering Division of voestalpine is regarded as being a reliable partner when it comes to implementing demanding rail infrastructure projects worldwide. In the business year 2017/18, the rail sector contributed about eleven per cent to the overall sales volume of the voestalpine Group, which amounts to approx. Euro 13 billion. In the last few years, increasing digitisation has specially led to a rising demand for

innovative diagnostics and monitoring technology made by voestalpine. This technology is based at the voestalpine SIGNALING Group with the Headquarters at Zeltweg, Austria. Thus the sales volume has, in the last ten years, more than tripled, rising to Euro 96 million (business year 2017/18).

RAILWAY ENGINEERING AWARD 2018

In the course of RAILCONTACT, Siemens presented the Railway Engineering Award. The Award is presented every one and a half years and has a volume of € 10,000.-. In cooperation with the Technical Universities and Universities of Applied Sciences in Austria, this Award is presented to authors of trend-setting Diploma / Master Theses in the field of public transport, which focus on the topic of railway/rail. This year, the first and second ranks were taken by Imre Karacsonyi (topic: the strains and stresses to which fibre-reinforced composites used for pneumatic springs are exposed) and Florian Arnold and thus by students of Technical University Graz. Alexander Marent of the University of Applied Sciences Vienna won the third prize.

RAILCONTACT'19

Concepts. Perspectives. Innovations.

Invitation

We would like to invite all interested in the future of railway propulsion and trending topics to participate at our ACStyria RAILCONTACT'19 in Graz, AUSTRIA. In June 2019, the international industry meeting will scrutinise new and old propulsion concepts. You will meet national and international experts, alongside the trade exhibition, from industry, research to operators in order to discuss concepts, perspectives and innovations – and we will venture on having a look at the future of an industry that is changing dynamically, at the moment.

ACstyria Mobility Cluster – together we move

ACstyria represents a network of around 290 companies from the automotive, aerospace and rail systems sectors – with more than 55.000 employees and a total turnover of more than 15 billion €. The main purpose of the cluster – founded in 1995 – is the support of Styrian companies along the entire value-creation chain. It provides a link between business, industry, research and public institutions.

Rail Systems

With large system suppliers, highly qualified niche specialists and the

world's leading research institutes, the Rail Competence Field is one of the most dynamic sectors in the industry. ACStyria supports partner companies in the areas of rolling stock, suspension and signaling.

Cross-Sectoral Topics

Ecologically sustainable technologies, autonomous systems and the optimization of production processes present challenges and opportunities. By tackling these topics, the high potential of innovation of Styrian companies is strengthened in all three areas of competence of the mobility cluster ACStyria.

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Stefan Putzlocher – Daimler – Head of Global Warehouse & Facility Planning

TRANSLOG Connect Congress 2018

Outstanding logistics and supply chain solutions

In four months from now one of the main logistics business summits TRANSLOG Connect Congress with key logistics and supply chain management experts and decision makers from Central Eastern Europe will take place again in Budapest. The professional networking event, taking place annually in November, is growing year by year.

The organizer, TEG The Event Group is delighted to invite all members of the industry to discuss main trends and impacts in logistics and to establish new partnerships to expand professional networks.

Regional and international companies such as Daimler, Jabil, Bosch, Faurecia or Maflow will convey state-of-the-art market insights to guarantee the quality of the agenda which will focus on digitalisation & AI, innovation in road transportation, trend towards 4PL in CEE and how latest automations developments help to overcome staff shortages. Christine Mezger-Behan

the VP Regional Logistics Europe at Robert Bosch will share insights about the fundamental simultaneously transformation and realignment of transport, warehousing, packaging, and foreign trade at Bosch, which was honoured with the “Project of the year“-award by the European Logistics Association (ELA) in 2018.

In addition, TEG is working closely with more than 10 national logistics associations throughout Central Eastern Europe to ensure the regional scope of TRANSLOG Connect. Furthermore delegates will have the opportunity to attend the AUDI facto-

ry in Győr and visit the vehicle production and the press- and body shop, attend case study presentations and pre-schedule one-to-one business meetings with major regional and international solution providers such as Waberer’s International, SSI SCHÄFER, Arviem, Raben Group, Trans.eu, DHL, C.H. Robinson, Transwide, Priority Freight, and many more.

TEG is also proud to announce the 6th Central Eastern European Logistics and Supply Chain Excellence Award established to recognize and promote outstanding projects in the region, while increasing the visibility of the future initiatives and flexible solutions. Manufacturers, retailers and solution providers from all industry sectors can apply with their most innovative projects and methods until the 3rd of October 2018.

Extend your professional network in Central and Eastern Europe!

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UK Light Rail Conference **Networking event**

Now in its 13th year, the UK Light Rail Conference and exhibition is the largest gathering of senior decision-makers dedicated exclusively to the tramway and light rail industries. This congress welcomes 300 decision-makers for two days of open debate on the most important topics issues of urban rail planning, design, operations safety, regulation and new technology. The 2018 event is to be held at the University of Manchester on 17–18 July and welcomes over 50 speakers from across Europe – as well as including over nine hours of dedicated networking sessions.

Themes for 2018 include:

- Alternative light rail traction technologies
- Innovations in designing elegant overhead lines
- Next-generation batteries for OESS systems
- Autonomous technology:
What for? How far it will go?
- Next-generation combined traffic priority systems
- Lessons from digital track mapping initiatives
- Advanced approaches to tramway asset management
- Comparisons of European safety methodologies
- A pragmatic view of sustainability in the LRT industry
- Sensible approaches to managing climate resilience
- Technology to improve the ideal 21st Century depot
- The potential of tramway systems as freight carriers
- Fleet and infrastructure modernisation and renewal
- Sensory design approaches to tram and LRV design

For more information, please contact
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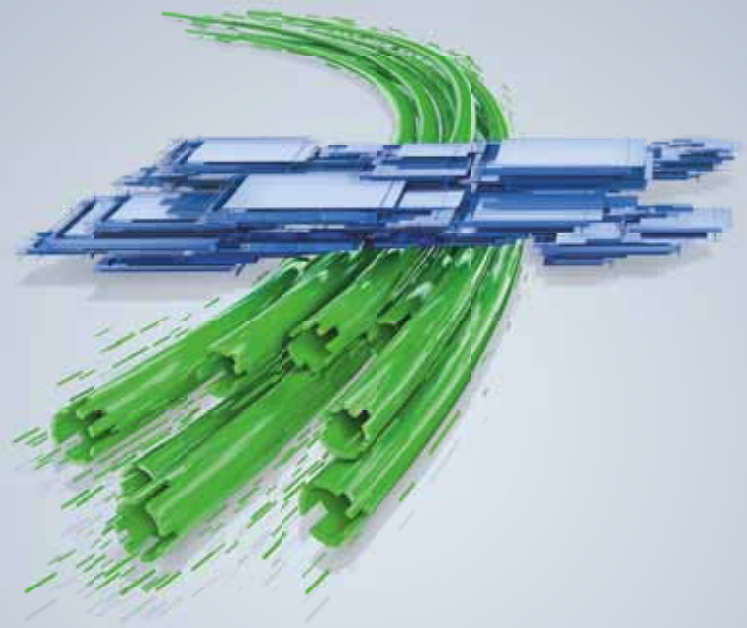


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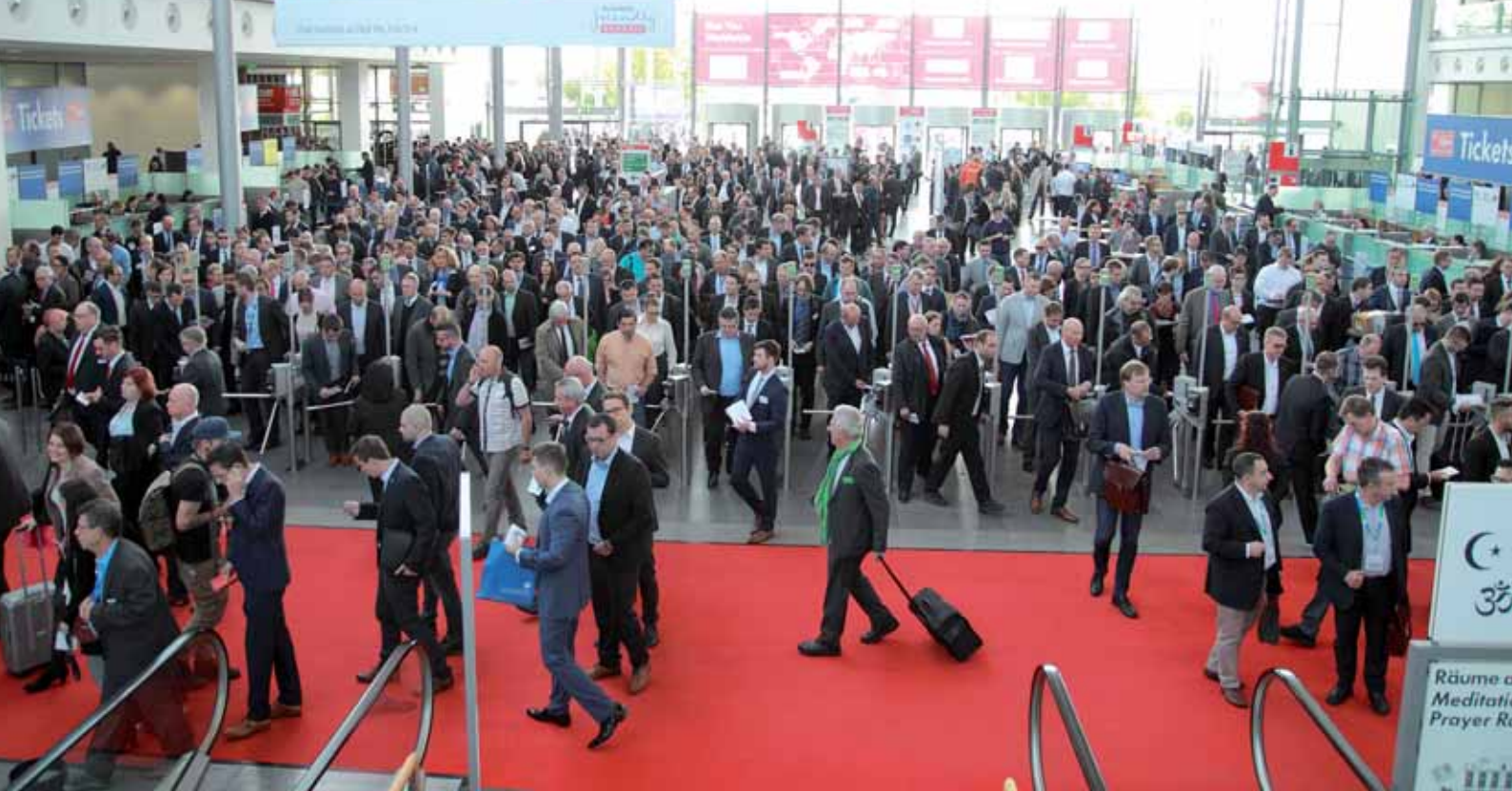
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 Messe Berlin



Large crowds gathered at the main entrances of transport logistic 2017.

6th transport logistic, Munich, May 2017

Railway logistics becomes digital

After InnoTrans in Berlin, transport logistic in Munich has become one of the most important trade fairs for the rail sector worldwide. Every two years, it provides visitors with an overview of trends and innovations in the logistics area, this year again with record participation: 2162 exhibitors from more than 62 countries presented themselves at the world's leading trade fair – an increase of 5,4 percent. The number of visitors increased by 9 percent and amounted to more than 60.000 from 120 countries. To accommodate all exhibitors, the trade fair expanded to 115.000 square meters, the trade fair halls were fully booked. In his opening address, Stefan Rummel, Managing Director of Messe München, stated that there was a lot that needed to be considered for the next trade fair in two years. Maybe building another new hall?

New exhibitors from all over the world were aboard, including China Railway Container Transport, DP World, Heathrow Airport, Kerry Logistics and Maersk. On top of that, 17 national joint stands, from Bahrain to China, from Luxembourg to Slovenia, presented themselves. There were many small firms or startups among the joint stands of German federal states and professional associations.

Aside from Germany, the exhibitor countries that had a large range of products were: the Netherlands, Italy, Belgium, France, Austria, Switzerland, Spain, Great Britain, the Czech Republic, Poland and China.

Dobrindt: More freight transport thanks to Industry 4.0

Digitalization controls everything. It was the central topic of the stands, forums and the publications that were available there. Oftentimes conjured up, sometimes depicted as a threatening “cudgel in the sack”. In Munich, it was clear to everyone that avoiding this topic would significantly damage a company in the foreseeable future. Due to digitalization, “logistics is about to experience the most exciting innovation phase of the last decades – and is thus increasingly gaining importance”, as Alexander Dobrindt, Minister of Transport and Digital In-

frastructure, stressed in his opening address. He mentioned that only a few years ago, there were people in his ministry who believed that “the physical was being replaced by the digital”, that logistics and transport were being pushed into the background. However, “the opposite is the case”. Industry 4.0, e-commerce and networking lead to an increase in freight transport, to more logistics. “Digitalization is not the last nail in the coffin of logistics, logistics is rather the key factor when it comes to making digitalization a success”, according to Dobrindt. Politics should provide the appropriate framework conditions. He added that there are sufficient financial resources for infrastructure, but that planning is too slow. “I am the first Minister of Transport in decades who has more financial resources than projects. It cannot be that projects cannot be realized because of red tape”, as Dobrindt noted. He had little to say on the subject of rail freight transport. To him, the central issue at the moment is the lack of acceptance by the public. However, he said that, not least due to his activity, he would provide

PHOTOS: UH (2), UR (3)

relief in this respect by halving the level of noise by 2020.

Freight Wagon of the Future

Even if the minister didn't talk much about it: Rail logistics occupied a very large part of the halls B2 (IT) and B3 (maritime economy, ports, hinterland traffic in the port area), and especially in halls B4 to B6. And it dominated events in the outdoor area.

Of course, the big players DB Cargo, DB Schenker, Rail Cargo Group, SNCF Logistics and SBB Cargo were obvious. The latter had a large pavilion laid out in the outdoor area. This year, the outdoor area was again fully booked down to the last meter of track so that additional track tiles were necessary.

Among other things, the Swiss pre-



Automatic coupling on the 5L demonstrator train wagon of SBB.

sented their 5L demonstrator train (see also Privatbahn Magazin 2/2017, pages 22 and 23) and the first four converted "freight wagons of the future". The abbreviation "5L" stands

for quiet, lightweight, hard-running, logistically competent and life-cycle cost oriented. The wagons are equipped with a number of innovative components – such as radially adju-

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The tank wagon of the future: Instead of single wagons, BASF opts for the tank container B-TC.

stable wheelsets on the bogies, disc brakes, automatic coupling, telematics, sound absorption measures and sensors. The aim: less noise, low wear and reduced energy consumption. The wagons are quieter, lighter and feature improved running characteristics. A four-year test phase has just started. After the first test results with 150 freight wagons, SBB Cargo plans to convert another 2000 freight wagons by the end of 2018 and run them in test mode.

At a press event, Nicolas Perrin, CEO of SBB Cargo, confirmed that the company is considering to extend its network of owners. He clarified that the Swiss Federal Railways commits itself to ensuring heavy rail freight traffic: SBB Cargo should continue to be majority owned by the SBB and thereby remain part of the integrated railway. For the further development of SBB Cargo, the company aims to open the corporation for a partner who could support the sustained growth of the rail freight company with know-how, business volume or assets. He pointed out that the example of SBB Cargo International shows that such a model can be successful and that it is conceivable that a large logistics company could get “on board”.

Information in Real Time

VTG AG, the largest European wagon owner with more than 80.000 wagons (1000 different wagon types), presented VTG connectors and their incorporation into the existing fleet in the outdoor area.

VTG connectors enable users to access real-time information on each wagon, including the current position of the wagon and a whole range of derived information and applications. “Geofencing” enables users to define geographical areas such as national borders or port areas. As soon as the wagon enters or leaves these areas, a corresponding message is issued, for instance to be able to make operative preparations for loading or unloading or to trigger processes such as invoicing.

On top of that, a series of alarm functions immediately inform about rail occurrences such as jolts and shocks or a longer standstill. The position is determined via GPS, GLO-NASS or Galileo. If there is no satellite signal, the device uses mobile radio masts to approximately determine the position. Currently, only a few hundred wagons are equipped with this feature. By the end of the year, the number is expected to rise to 20.000. VTG plans to equip its entire fleet over the next three years.

A New Type of Tanker

The tank container (B-TC) of BASF attracted much attention. It is no longer firmly fixed to the wagon and can be lifted onto special, autonomously driving vehicles in “last mile” transportation within the site. The Swiss company Wascosa developed the tank under the label „Wascosa Flex Freight System®“. DVL Groep was responsible for managing non-rail-bound mobility. The vehicle has the same length as a normal truck, but it is more agile because it has eight steerable axles. An automatic tank container storage serves as a link between external rail transport and factory logistics.

According to BASF, the delivery of a tank wagon from the factory’s train station to one of more than 150 loading points takes about 22 hours. With autonomously driving transporters, this time could be reduced to one hour.

The company Innofreight also displayed a newly developed “chemitainer” for transporting various corrosive bulk materials. Particularly the first series-produced model of a newly developed wagon for log transport in Sweden attracted a great deal of attention. It was transferred to the Swedish railway undertaking Hector Rail at the trade fair. During this

event, a closer cooperation between Innofreight and VTG AG was announced. In addition, an improved model of the handling system „NiKRASA“ that was jointly developed by bayernhafen Gruppe, TX Logistik, Logistik-Kompetenz-Zentrum Prien and Uhly Maschinentechnik was also presented in the outdoor area. This system makes it possible to implement non-craneable semi-trailers from rail to road and vice versa. The NiKRASA system consists of a driveable terminal platform and a transport platform. The latter travels with the wagon, the terminal platform remains at the terminal.



The further development of the „NiKRASA“ handling system was also presented in the outdoor area.



VTG box that signals situations right on the wagon to the operating personnel.

Ten EURODUAL locomotives

The contract between HVLE and Stadler to produce and deliver ten six-axis EURODUAL locomotives was celebrated at the Stadler stand in hall 5. It had already been signed in March and was explicitly appreciated at the trade fair by Mariano Marti, head of the locomotive builders of the Stadler company. The board members of HVLE, Ludolf Kerkeling and Martin Wischner, praised the exemplary cooperation with Stadler. The high-performance locomotives are to be employed in freight transport in the German network and connect 15 kV AC and 25 kV AC electric

and diesel drive modes. HVLE is the first customer of a new generation of six-axis dual-mode locomotives that Stadler developed for the European market. The deal not only consists of the delivery of the EURODUAL locomotives but also comprises a full service maintenance contract.

We would love to tell you more ... but there is not enough space. The next transport logistic will take place in Munich from 4 to 9 June 2019. Until then, the trade fair organizers will have thought a lot about how to cope with the anticipated crowds of visitors and exhibitors that are expected to be even larger than this year. *ur*

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The international Exhibition for Trach Technology in 2017.

27th iaf Münster Set in Motion

The International Exhibition for Track Technology (iaf) has always had an exceptional position among rail trade fair events. It focuses on railway construction and the maintenance of railway tracks and accessories and only takes place every four years. Two decades ago, this wouldn't have been considered a long time between two trade fairs. Four years were optimal for a quite dense, slowly developing segment. However, just like the rolling material, the tracks and everything underneath them has been set "in motion". The magic word here is digitalization. Innovation, world novelty, new development, unique character – these terms appeared not only at one but at several stands.

The large trade fair halls of the "Messe und Congress Centrum Halle Münsterland" offered a lot of space for presentations, railway construction machines and track maintenance technologies on 15.000 square meters of floor space, with an additional 6000 square meters of open space and a more than 3000 meter long gravel track installation. 200 exhibitors from 20 countries used this opportunity to present their innovations, including global players in the industry such as Plasser & Theurer, Robel, Matisa, Cemafer, Vossloh, Kraiburg Strail, Speno, SRS Rail System, Scheuchzer, Kinshofer, Goldschmidt Thermit, Harsco Rail, Autech and

Liebherr as well as the newcomers BGM, PrefaRails, AFERPI and Zepelin Baumaschinen.

Exchanging Ideas at a High Level

Lectures, seminars and company presentations flanked the trade fair days. The organizer, the Association of German Railway Engineers (VDEI), chose first-class speakers. Gregor Grzonkowski from Rohmann GmbH spoke about surface crack testing with a non-destructive eddy current test procedure, Dr. Florian Auer discussed current requirements and developments in railway construction, his colleague Hannes Steinwen-

cker, both from Plasser & Theurer, gave a talk about innovative electric maintenance machines. Markus Kreisel from Kreisel Electric GmbH outlined his company's new battery technology, Marcel Taubert, Managing Director of Vossloh Rail Services, talked about system solutions for the railway infrastructure and Dr. Dimitre Iliev from the Research and Development department of Vossloh introduced innovative product solutions for the sustainable vibration damping of tracks and turnouts. Though not all speakers can be mentioned here due to lack of space, those mentioned already indicate the broad field these innovations and technologies were presented to. During the opening ceremony, the VDEI prize 2017 that distinguishes an outstanding paper by a student or young engineer was awarded to Timo Strobel for his paper "Construction of a Dual Power Locomotive for Stuttgarter Straßenbahnen AG".

Digital and Electrical

Among other things, Plasser & Theu-

rer presented two technology carriers with E3 drive technology with widely differing characteristics in the outdoor area. One of these was the Unimat 09–4x4/4S E3: E3 stands for Economic, Ecologic and Ergonomic. For the variant Unimat 09–32/4S Dynamic E3, a hybrid turnout tamping machine they exhibited at InnoTrans, Plasser & Theurer received the Innovation Prize 2016/2017 sponsored by Privatbahn Magazin. PriMa editor Prof. Dr. Uwe Höft of the TH Brandenburg handed over the award to Victoria Max-Theurer, Executive Board and shareholder of Plasser & Theurer, and Johann Dumser, Head of Marketing at Plasser & Theurer on 30 May at the iaf.

With the Unimat 09–4x4/4S E3 universal tamping machine, electric energy is supplied to the drive system with nearly no losses. Electric drive motors at the axles of the motor bogies transmit the power to the tracks. The tamping unit was electrified for the electric working principle without changing the decisive tamping parameters. All rotating movements are driven electrically. All linear movements, such as activating the adjustment cylinder, are hydraulic. What has been redesigned: the operating ergonomics in the cabin with the control and assistance systems as well as new input and output interfaces, among other things for a remote diagnostic system.

Another construction equipment feature is the HTW 100 E³: At the construction site, it works with the ne-



View of part of the outdoor area of the iaf 2017. Unimat 09–4x4/4S E3 by Plasser & Theurer.


west electrical battery drive technology developed by Kreisel Electric GmbH. The capacity is designed for two 6-hour shifts and is modularly extendable. The ingenious thermal management in combination with an outdoor air heat pump ensures a consistent performance irrespective of the ambient temperature. The extensive Robel stand in the outdoor area was also bustling with activity. The HSK hybrid rail head profile grinding machine by Robel stores surplus energy during grindstone idling in the Robel Supercap by means of KERS technology (Kinetic Energy Recovery System). The noise emissions were clearly reduced. The grinding is highly efficient due to a weight-optimized and low-maintenance construction – precision in the grinding pattern.

Another example of how the construction scene is changing and being permeated by digitalization is the Intelligent Monitoring System 68.05i IMS: This small device monitors the splice joint around the clock and sends a message to maintenance personnel if irregularities occur.


Innovative Enhancements

Matisa presented enhanced high-performance tamping machines of the tamping series B 66. To be more precise, the Matisa Tamping B 66 UA. Matisa specifically developed the B 35 C for South American, Asian and African markets: an insurging universal tamping machine for conventional lines. Mounted on a carrying axle and a motorized bogie, this machine has two cabins with a driver’s cab and work post as well as a drive



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Work cabin of a universal tamping machine by Plasser & Theurer.

unit. Equipped with four combined tamping units with a total of 16 tamping picks as well as pliers with a hook and rolls arranged in pairs, this tamping machine is perfect for working on turnouts and open tracks.

Among other things, Vossloh presented the HSG-city that is used for rail grinding in local transport (inter alia tram tracks). At the heart of this development is a grinding unit with 24 passively rotating grindstones that

can grind a stretch of 30 kilometers at a work pace of 25 to 60 km/h nonstop. Largely encapsulated, the grinding machine is equipped with a strong suction device for dust and sparks, which makes a subsequent cleaning of tracks and tunnels unnecessary. The HSG-city can be forward or backward-oriented, which is why many types of towing and pushing vehicles are suitable, not least the two-way Unimog. The grinding machine is already being used in Düsseldorf, among other places.

One of the most striking aspects of this year's iaaf was that new players entered the race, in addition to conventional manufacturers of two-way excavators such as Atlas (1404 and 1604) and Liebherr (A 922 Rail Litronic). In the outdoor area, Caterpillar in association with Zeppelin presented the two-way excavator M323F and Kaiser the rail excavator S22 Railroad.

Looking for Future Specialists

As a tradition, the special tour of the trade fair always takes place on the last day of the event. This year, it fo-



Insurgent universal tamping machine B 35 C by MATISA.



The HSG-city by Vossloh.

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cused on the topics of training, supporting and recruiting young talents. During the tour, future school leavers and high school graduates as well as students were addressed and different professions in the rail sector were presented – from railway engineer, developer or planner to marketing manager to product designer. Irrespective of this last day of the trade fair, the iaf Job Exchange Booth and the VDEI Career Point were at the fair on every day of the event. At the VDEI Career Point, engineering students have the opportunity to meet young professionals and executives in the industry who talk about working in track construction, recent experience reports and career opportunities.

The next iaf 2021

The Association of German Railway Engineers (VDEI) has been hosting the iaf since the 1960s and the iaf Congress on Rail Infrastructure Works since 2011.

The trade fair and congress take place alternately every two years, so that there isn't too much time between the branch meetings for the sector. For this reason, the next iaf exhibition will not take place until 2021. Fortunately, this time is shortened due to the 3rd iaf Congress on Rail Infrastructure Works that will take place in Münster from 22 to 23 May 2019 – where thoughts and ideas on rail systems can be exchanged. However: visitors will have to dispense with impressive presentations of large and small equipment for rail construction. Their patience will be rewarded in four years' time

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Lower Saxony's Ports

Focus on Port Railways

The scope of services of the Hafengesellschaft Niedersachsen Ports (NPorts) – Brake, Cuxhaven, Emden and Wilhelmshaven – includes the development, construction and maintenance of infrastructure for a total of 15 seaports in Lower Saxony. These services are carried out in a needs-oriented and proactive manner with regard to efficient logistics processes. Under the initiative hafent+, the responsible use of scarce resources and the reduction of CO2 emissions are given special attention.



Aerial view of the track curve that connects the port of Brake with the hinterland.

Promoting a shift to environmentally friendly modes of transport serves to reach these goals. This is also why the initiative is currently focusing on optimizing and extending the port railway. “A modern port railway with a direct connection between the port and the hinterland enables us to offer climate-friendly transportation”, as Holger Banik, Managing Director of Niedersachsen Ports GmbH & Co. KG and JadeWeserPorts Realisierungs GmbH, explains. Moreover, the current port railway projects secure the competitiveness of the seaports in Lower Saxony.

Efficient Rail Network

NPorts has its own public rail infrastructure with a total length of 75 kilometers in the ports Brake, Cuxhaven, Emden and Wilhelmshaven. The tracks are used by about 130 trains on

a weekly basis. In all ports combined, transport by rail accounts for an average of 30 percent, at some locations even more than 50 percent. In addition, the Hafengesellschaft is taking over the network operation management of the port railway of JadeWeserPorts. It consists of a guide rail section with a length of four kilometers, a 16-track forwarding group as well as a 6-track transshipment terminal with portal bridges of the EUROGATE KV plant Wilhelmshaven GmbH.

In order to optimally use the complex rail infrastructure at all locations, NPorts 2017 will develop a new port rail software. In the future, it will not only be possible to register the trains electronically but also to record information on retracting and advancing times, the number of wagons, the duration of standstills on the track, the movements of the wagons and the use

of special services in this manner. This improves traffic control and at the same time enables electronic invoicing.

Innovative Track Field Lighting

Niedersachsen Ports will also rely on the progress of digitalization for lighting a track field in the port of Emden in the future. In 2017, an innovative and sustainable lighting system will be constructed for the track field at the Eichstraße. NPorts operates six tracks for shunting, storing as well as loading and unloading car trains at this location. As the port of Emden is among the top players in car handling in the country and in Europe, it is necessary to constantly adapt the infrastructure to new challenges.

An innovative, modular control system will be used to adapt the lighting system to various work processes on the track. Future plans also include different lighting scenarios for shunting operations, unloading as well as periods outside of operation hours. Each lamp can be controlled and monitored individually and its lighting design can be changed as well. The lighting of the track field can be operated by means of digital communication via SMS, internet connection or a browser-based app. The light on the track field is controlled in a demand-oriented manner and the light emission in the port is reduced. This way, the system can be operated in an economically viable manner due to reductions of electricity use while at the same time greenhouse gases (CO2) can be reduced as well. Moreover, the LED lamps that are used are low maintenance and ensure low operating costs.

New Track Installation

The NPorts location Wilhelmshaven is one of the largest energy hubs in Europe. Due to the extension of the transshipment site Bulk Terminal Wilhelmshaven

(BTW, also known as Niedersachsenbrücke) and the possibility to dispatch the world's largest coal freighters there, demands on railway systems have increased. The expected increase of coal transshipment in the upcoming years will only contribute to this.

In order to secure its competitiveness, the Hafengesellschaft invested a lot in this area. 2,5 million euros for the new track installation at the Rüstersieler Groden were financed through NPorts, federal funds and the Landesnahverkehrsgesellschaft mbH (LNVG). Immediately after construction began in October 2015, 1530 meters of track and five turnouts were renewed in only ten weeks. In the second construction phase, the tracks were lengthened by 1000 meters by apportioning turnouts and extending tacks. In addition, five electrical locally-set turnouts (EOW) were installed that will greatly facilitate the work of train drivers. Now, they can enter their route via an elevated display board.

The new track installation successfully began operation in mid-September 2016. Now, Wilhelmshaven has modern and sufficient track capacities for setting up, storing and shunting trains.

Future Projects

In the seaport of Brake, a joint construction project of Niedersachsen Ports, the city of Brake and DB Netz AG is currently being implemented. Two level crossings that came into being when the track connection was constructed for the northern extension of the port are being replaced by a



Inauguration of the new track installation at the Rüstersieler Groden on 17 September 2016. Photo (from left to right): Holger Banik (Managing Director of Niedersachsen Ports GmbH & Co. KG and JadeWeserPort Realisierungs GmbH), Holger Ansmann (SPD Member of Parliament), Mathias Lüdicke (Head of the NPorts branch office in Wilhelmshaven), Andreas Wagner (Lord Mayor of the City of Wilhelmshaven) and Olaf Lies (Minister for Economics of Lower Saxony).

bridge. The soft layers of the clay soil that are typical of the Wesermarsch and the sensitive track installations require special stabilizing measures. The new bridge is scheduled to be open to traffic in mid-2018.

Due to the resettlement of the Siemens plant for the manufacture of wind turbines and the increasing transshipment of automobiles, requirements regarding the hinterland connection have also increased in Cuxhaven. At present, three block trains can be set up, which means a maximum working length of about

700 meters. Two of the tracks belong to Deutsche Bahn, track 71 is owned by NPorts. The plan is to generate additional track capacities in the future.

All of these port rail projects illustrate the versatile know-how of Niedersachsen Ports. Needs-oriented development and sustainability are the decisive criteria for extending the port railway. A high-capacity port does not end at the quay wall – but with the connection to the public transport network via waterways, roads or tracks.

Katharina Fischer

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In Sweden, exchanging a turnout only takes eight hours, as Vossloh manufactures turnouts on site that are transported in pre-assembled segments on their own turnout carrier wagons before they are installed on site. Moreover, the Group is in charge of maintenance and servicing over the entire life cycle.

Vossloh AG

Bundled Competence

As one of the world's leading rail technology companies, Vossloh focuses on products and services for rail infrastructure. They form the core business of the company and are provided by three business divisions – Core Components, Customized Modules and Life-cycle Solutions.

Moreover, the bundling of competencies and resources is a key element of the company's strategy. Customers are increasingly requesting integrated solutions because they want to use high-quality product solutions so that they can concentrate on their major infrastructure tasks. Vossloh put three of these central topics on its agenda at InnoTrans in Berlin under the motto „Connecting expertise“:

- Environmental aspects – particularly noise
- Cost management over the entire life cycle of the infrastructure
- and the efficient availability of networks and routes.

Vossloh offers comprehensive solutions for modern rail traffic with know-how from all areas of business. Customized solutions from a single source are the decisive advantage for

customers.

Quality and Prevention

As the costs for the entire life cycle are far more significant than the initial investment, Vossloh sees itself as a value-adding partner whose rail fastening and turnout systems prove to



The W-shape of the elastic tension clamp of the key element provides the necessary safety.

History

The company's business areas are deeply rooted in European economic history. As early as 1883, the blacksmith Eduard Vossloh was first commissioned by the Royal Prussian Railroad to manufacture spring washers for fastening train tracks. Since 1967, Vossloh has been produ-

cing the elastic tension clamp in Werdohl that was developed by Prof. Hermann Meier: From then on, tracks could be laid on almost any surface. As a worldwide reference for all applications in railway operation, the elastic rail fastening systems are just one example of the Group's pioneering spirit.

Top Product from Vossloh: High-Speed Grinding

Since the introduction of the High Speed Grinding (HSG) technology in Germany in 2007, more than 200.000 kilometers of rail and local transport routes have already been ground in many Central and Northern European countries as well as in China.

Network operators appreciate the high working speeds that allow maintenance during regular schedules without route blockages. Moreover, track defects at an early stage can be reduced or eliminated if the technology is used regularly. This has proven to extend the service life of tracks and leads to less noise pollution at the worked sections. Since 2016, DB Netz AG has been using this successful concept for working on turnouts with a movable point frog.



Since October 2016, grinding campaigns have been taking place on a regular basis in the Gotthard Base Tunnel to maintain the infrastructure in the world's longest railway tunnel.

be real high tech products. Each new development runs through a clearly defined innovation process in the company's own state-of-the-art research and development laboratory. This way, operators receive an all-round carefree package: components and technologies that are optimally tuned to one another and can easily be installed or exchanged due to their modular design.

When it comes to economic efficien-

cy, railway companies, network operators and traffic operation want trains to run undisturbed and be on time, that maintenance costs don't go through the roof and that local residents can sleep soundly. As a service provider who focuses on preserving value, Vossloh offers different services for rail maintenance, whereby preventive processing is the aim of all measures to ensure that its products enjoy a prolonged lifespan. However,

on request, Vossloh can also assume responsibility for the availability and efficiency of entire routes.

In addition to preventive measures, Vossloh favors the approach of condition-oriented maintenance. Wear parts are only replaced if necessary. For instance, turnout monitoring systems prevent losing remaining maturities due to fixed intervals.

Ready for Future Challenges

At present, more than 100 companies in 30 countries belong to the Vossloh Group. Vossloh has its own production sites with interdisciplinary teams in key markets.

Moreover, Vossloh cooperates with renowned colleges and universities, and engineers and technicians support supervisory authorities worldwide in developing and perfecting their technical regulations. Numerous patents and references have set and defined standards. Info: www.vossloh.com ■

Present

By 2020, a new lead factory will be erected at the headquarters of the rail technology company. The 40 million euro project is closely linked to the realignment of the entire Group. A focus on core business serves to intensify both technological innovation and the

manufacture of key components. In addition to a faster market maturity of its product developments, Vossloh aims to create optimized production processes and highly automated processes. The declared aim is to sustainably improve the entire value chain.



Level crossing “Schwarzer Weg” at the Oberhausen–Emmerich route. The signal system was designed by PINTSCH BAMAG.

PINTSCH BAMAG Antriebs- und Verkehrstechnik GmbH

Signal Technology in the Course of Time

They’re there – and still, there are people who ignore them: safety devices at level crossings. This can have disastrous consequences. Rail transport required the regulation of road and railway intersections at a fairly early stage. A historical reminiscence with a glance into the future.

The First Level Crossings (1850 onward)

Level crossings have existed in the German rail sector since the first trip of the “Eagle” on 7 December 1835 from Nuremberg to Fürth. At first, level crossings were not specially secured because trains generally ran at a speed of 35 km/h and horses were the fastest mode of road transport with roughly 10 to 20 km/h in the middle of the 19th century. At the Leipzig-Dresdener Eisenbahn-Compagnie, for example, it was initially quite common for train drivers to halt at level crossings to give priority to road traffic.

As traffic increased, signalmen were positioned in short distances along the route to pass on acoustic and later

optical signals – to communicate with each other and with the trains. They were also responsible for surveilling their assigned section of track. For this he was preferably placed at crossroads to prevent accidents between trains and wagons, riders, pedestrians or cattle herds.

With the spread of telegraphy, the function of rail surveillance and communication increasingly lost its importance. The only remaining task was securing level crossings. Thus, the signalman was replaced with a level crossing barrier post. At first, chain barriers, door or gate-like swing barriers and sliding gates were used to secure road and railway intersections. Later, these barriers were replaced by turnpikes before so-called

“remote-controlled barriers” were used towards the end of the 19th century that could be operated with rope hoists from a single position.

Automated Barriers (1920 onward)

Due to gas technology, electric signaling and safety systems were introduced to level crossings. Brighter lanterns with propane and acetylene gas replaced petroleum lamps that were commonly used for advance and main signals until the late 19th century. It was the first time that lanterns with gas-operated flashing light devices were used. This flashing light was also used for lighting rail barriers so that they wouldn’t be mistaken for street lights.

The beginning of the 20th century experienced the mass production of automobiles. Due to an increase of the maximum speed of automobiles, it became necessary to introduce auto-

matic level crossing safety systems. Julius Pintsch AG constructed an “automatic crosswalk warning signal“, a forerunner of today’s level crossing safety systems. It consisted of a cylinder cabinet and an attached gas signal lantern that could be turned on and off with an electromagnetic switching valve. The switching valve, the accumulator battery and three rail contacts formed a control system that automatically switched itself on and off when a train approached. The system switched itself on 500 to 1000 meters before the crosswalk and switched itself off at the crosswalk. To establish the basic position, the opposite switch-on point that was at a distance of 500 to 1000 meters was used. This operating principle has not changed much until today.

Electrotechnical Level Crossings (1925 onward)

In 1930, the Deutsche Reichsbahn was in charge of nearly 76.700 level crossings of which around 35.600 were secured. These level crossings were solely secured with mechanically operated barriers, which lead to high personnel costs. For this reason, Julius Pintsch KG has been working together with the Deutsche Reichsbahn, VES (Vereinigte Eisenbahn-Signalwerke) and Deutsche Werke on components and circuits of a new type of electric warning system since the mid-20s.

VES was founded in 1928 with the participation of the company Siemens & Halske. After a development period of ten years, the Reich Ministry of Transport allowed warning lights and barriers in 1935 to secure level crossings according to the Railway Construction and Operations Act that applied at the time. A control circuit with the designation V293a was developed and approved according to which all warning systems were to be built. The control circuit V293a already consisted of functionally structured circuits such as a basic circuit, lamp circuit, monitoring circuit and a circuit for power supply. As of 1938, only Julius Pintsch KG and VES were


allowed to manufacture electric warning systems.

Level Crossing Technology 1945–1993

After the end of World War II, reconstruction began in both parts of Germany. While in the DDR, only WSSB (VEB Werk für Signal- und Sicherungstechnik Berlin) was assigned with the supply of level crossing systems to the Deutsche Reichsbahn, the three signal manufacturers Siemens, Scheidt & Bachmann and PINTSCH BAMAG established themselves as suppliers of the Deutsche Bundesbahn (German Federal Railway) in the West.

The DDR initially tried to restore the technical facilities that were destroyed during the war by securing level crossings with barrier posts. It was not until 1963 that a guard-operated technology was developed with the electric full barrier eVs 63 and, in the following year, that train-controlled security systems were created with the stop light system HI 64 (only light signals) or the semi-barrier system Hs 64 (light signals and barriers). Until the rail reform in 1993, these were the only systems of the Deutsche Reichsbahn.

In West Germany, the level crossing safety technologies Lo (locomotive driver monitoring) and FÜ (telemoni-



Dirk Kolling
Dirk Kolling is product manager in the Signal Technology unit of PINTSCH BAMAG Antriebs- und Verkehrstechnik GmbH. Before that, he worked as a project engineer in the company's Signal Technology unit. He graduated from the Fachhochschule Niederrhein in electric engineering with a focus on automation technology. His hobbies include studying history.

toring) were developed and manufactured. Both level crossing safety technologies are based on relay technology. Lo systems were designed for single track lines with speeds of up to 120 km/h and were typically used for secondary lines. In Lo technology, rather different functionalities were pooled together in an individual relay group (for example track switching device and light signal). FÜ systems were developed for single or

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Signalwoman at work around 1930.

multi-track main lines up to 160 km/h and already exhibited a higher degree of modularity with a track group, a signal group and an additional group on a rack, in comparison to Lo technology. While Lo technology was still a company-specific development by the companies Pintsch and Siemens, FÜ technology was further developed into a uniform design in 1960.

In the following years, the three signal manufacturers introduced further level crossing technologies to the market with the NFA60 (on-call barrier controlled up close or remote-controlled), the SPM (disable message device), the LZW (operated by light signal guard) and the NE-BÜ70 (level crossing technology for non-federally owned railways model 1970).

The first electronic signal system B6 developed by PINTSCH BAMAG in 1965 is a particularly remarkable development that was named BÜS72-Z after the completion of the development. The BÜS72-Z was a signal-dependent system that was operated, monitored and supplied with energy

via a signal box over distances of up to 6,5 kilometers without needing batteries for an uninterrupted power supply on site. The letter Z stands for central power supply. As this central power supply proved to be quite costly and electronic level crossing technology was not yet being trusted enough, the BÜS72-D technology with a relay-based decentralized power supply was eventually created.

1975 marked the beginning of the development of a uniform technology for securing level crossings that was favored by the Deutsche Bundesbahn. As a joint development of the three signal manufacturers and the Deutsche Bundesbahn, the uniform level crossing technology EBÜT80 ("80" stands for the year it was approved for operation by the German Federal Railways) was created. As a successor technology of the Lo, FÜ and BÜS technologies, it combined the monitoring types ÜS (monitoring signal), FÜ (telemonitoring), HP (main signal), Bed (guard-operated barrier system) and an on-call barrier. A quarter frame technology was used to build the EBÜT80, whereby a

quarter frame was provided for each of the modules light, track, barrier and central functions. A uniform track computer evaluated the incoming data from the tracks.

Current State (1994–2017)

In the mid-1990s, the representatives of Deutsche Bahn AG stated that they wanted to exclusively use all-electronic level crossing safety systems in the future as the successor technology of the EBÜT80 – as had already happened in signal box technology. The development of a uniform technology was no longer important. As a result, the three signal manufacturers brought forth computer-controlled systems that were ready to be licensed, Scheidt & Bachmann with the „BÜS2000“ in 1995, PINTSCH BAMAG with the „RBÜT“ in 1999 and Siemens with the „Simis LC“ in 2003. Of course, the range of uses of the new technologies needed to comply with the functions of the uniform technology EBÜT80.

In the course of time, new, complex functionalities such as the new monitoring type ÜSOE (level crossing

system with optimized activation) or the grouping of level crossing safety systems that are close to each other are integrated in a cluster.

Since 2012, PINTSCH BAMAG has been offering a second generation of computer-controlled level crossing technology with the RBUEP. Another upheaval occurred in the field of components, especially in the field of lighting technology: all photometric signal transmitters (road signal transmitters, track signal transmitters, signal lamps) were converted to LED technology. This way and due to an increasingly complex circuit board technology, the energy demand of level crossing safety systems could be significantly reduced.

Outlook

Product cycles in signal technology

of approximately 20 years are not only considered to be very long in Germany. The suppliers of DB Netz AG committed themselves to remain in a position to deliver for 25 years, even after a product discontinuation has been announced. A comparison with product cycles from consumer electronics quickly leads to the assumption that the industry has little capacity for innovation. This seemingly low level of innovation offers several advantages for operators: a lower variety of products results in a smaller stock of spare parts, less training requirements and a longer life cycle of more mature, stable and safely functioning products. In reality, the individual components and circuit boards of a level crossing safety system are subject to a continuous improvement process.

At present, DB Netz AG is making efforts to integrate all field elements of an electronic signal box along the route such as signals, turnouts and also level crossing safety systems via a serial interface and reliable data protocols into interlocking logics. DB Netz AG is preparing the reference implementation of such a system under the designation "NeuPro" (reorientation product control). The specifications that are scheduled to be released by the end of 2017 form the basis for the development. DB expects that this will lead to an increased performance of the infrastructure. In addition, they aim to improve quality and efficiency with standardized interfaces, reduced cabling effort and intelligent condition monitoring.

Dirk Kolling

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