

Edition 27 | August 2010

INFORMER

The customer magazine of Knorr-Bremse
Rail Vehicle Systems

Cover-Story

Knorr-Bremse at InnoTrans

Sites

5-day factory opens in Hungary

Aftermarket

Knorr-Bremse original
spare parts kits

Innovations

Driving simulators





CONTENTS

Editorial

Dr. Wolfgang Schlosser,
Member of the Board of Management
of Knorr-Bremse Systeme für
Schienenfahrzeuge GmbH 3

Sites

5-day factory opens in Hungary
Faster, more flexible, more efficient 4

Cover-Story

Knorr-Bremse at InnoTrans 6
Distributor valves –
Hightech behind the facade 10
Bogie equipment –
The linear eddy current brake 14

Quality

Active quality management – Zero defects 16

News

Knorr-Bremse wins Elogistics award 17

Projects

HVAC systems – Solutions you can trust 18
Gautrain – Showcase project in South Africa 20
Diesel locomotives –
Major order from South Africa 21

Aftermarket

Knorr-Bremse original parts kits –
It's all in there! 22

Innovations

Driving simulators – joining forces 19

 **KNORR-BREMSE**

 **IFE**
Innovationen
Für
Einzelregelsysteme

 **merak**

 **Microdetrifica Scientifica**

 **WESTINGHOUSE**
platform screen doors

 **NEW YORK AIR BRAKE**

 **SYDAC**

ZELISKO

raibservices

E-NEWS-0027-EN

This publication may be subject to alteration without prior notice. A printed copy of this document may not be the latest revision. Please contact your local Knorr-Bremse representative or check our website www.knorr-bremse.com for the latest update. The figurative mark "K" and the trademarks KNORR and KNORR-BREMSE are registered in the name of Knorr-Bremse AG. Copyright 2010 © Knorr-Bremse AG – All rights reserved. Including industrial property rights applications. Knorr-Bremse AG retains any power of disposal, such as for copying and transferring.

Imprint:

Publisher:
Knorr-Bremse Systeme für
Schienenfahrzeuge GmbH
August 2010

Information for Knorr-Bremse's worldwide customers and business partners

Central Editorial Office:
Knorr-Bremse Systeme für
Schienenfahrzeuge GmbH
Marketing
Tanja Mohme
Moosacher Strasse 80
80809 München
Germany
Tel. +49 89 35470
Fax. +49 89 3547 2767
www.knorr-bremse.com

Conception, text and design by:
Knorr-Bremse Systeme für
Schienenfahrzeuge GmbH

Text: Torsten Rienth

Realization: KB Media GmbH

Layout, graphics: KB Media GmbH

Printed by: Pera Druck GmbH

EDITORIAL

Let us think back for a moment to the InnoTrans exhibition two years ago, at which a confident rail industry proudly presented its latest innovations. Shortly afterwards it felt the full impact of the economic and financial crisis.

Knorr-Bremse adapted capacity to the changed situation but still maintained its focus on products with the highest safety and quality standards. We also continued to put our faith in innovation, and this Informer introduces some of the results. In Budapest we recently opened a factory based on the "5-day" concept, transferring tried-and-tested logistics systems from the automotive industry to the smaller unit volumes of the rail sector.

Colleagues in the rail industry will soon be meeting again at InnoTrans, and this edition of the Informer focuses on some of the products we will be showcasing in Berlin. Take the latest eddy current brake for example, which Knorr-Bremse will be supplying for the new Siemens high-speed Velaro Deutschland train. You can also read about the Knorr brake distributor valve that still leads the technological field, not only in Europe but worldwide. Or about how we have combined driving simulators and driver information systems to create maximum benefits for the customer.

This edition also contains fascinating reports from other areas. We present a first – highly positive – review of the response to our original spare parts kits, which are now widely used throughout the world. We also take a look at the Gautrain which recently went into operation in South Africa and the 100 diesel locomotives, for which Knorr-Bremse is supplying important components, that American conglomerate GE is also delivering to South Africa. And we show you how we manage to guarantee Knorr-Bremse quality in all our projects.

The InnoTrans 2010 exhibition runs from September 21-24 in Berlin. Come and see us at the world's biggest rail technology trade fair. You will find us in Hall 1.2 at Stand 203. A voucher for a free admission ticket is included with this Informer.

We look forward to seeing you there!

Kind regards

Dr. Wolfgang Schlosser



*Dr. Wolfgang Schlosser,
Member of the Board of
Management of Knorr-Bremse
Systeme für Schienenfahrzeuge GmbH*

5-day factory opens in Hungary

Faster, more flexible, more efficient

The automotive industry has long since set about systematically reducing throughput times, but in the rail vehicle sector this is a relatively new concept, as most business is project-based and unit volumes are relatively low. Nevertheless the 5-day factory opened in July 2010 in Budapest promises to achieve a significant reduction in throughput times.



The objective for the Budapest plant in 2011 is clear: instead of taking 20 days to produce major products like block brakes, from materials procurement to delivery, the new factory aims to do so in a mere five days – reducing throughput times by a factor of four. The new approach will also cut the quantity of stock in circulation by a quarter.



Assembly of a brake panel



New offices



Model of the Hungarian 5-day factory

TRIPLE EFFECT BENEFITS CUSTOMERS

Reducing throughput times increases the plant's flexibility and means customers are able to submit and confirm orders much closer to the required delivery date.

Development of closed value chains within the plant also avoids the need for external transportation and handling of the products – which reduces the risk of damage. Another advantage is that the smaller volume of units passing through the production process makes it easier to react immediately if a defect is discovered. The assembly line can be stopped and problem-solving teams can spring into action, thereby ensuring that no defective components pass into the production chain.

A further advantage is the improved supply capability. All important production steps such as surface treatment or painting have been integrated into the 5-day factory,

which simplifies planning and reduces the risk of unpredicted shortfalls in components that would otherwise be sourced externally.

SOPHISTICATED SYSTEM INTEGRATES PROCESSES

Intelligent integration of the Supply Chain Excellence (SCE) system and the Knorr Production System (KPE) has linked processes within production and tied these in with procurement and delivery processes.

To ensure availability of components for production startup, Knorr-Bremse has allocated all externally sourced parts to a specially developed supply model which goes beyond traditional analyses and takes into account a number of factors in addition to volume. For example the 5-day factory also looks at the logistics competence of the supplier concerned.

In practice the 5-day factory schedules production on the basis of a predetermined throughput timetable. Once the date for assembly has been laid down, the production section is provided with a time window within which it has to pass on the required parts to the next downstream stage – surface treatment. This window is used for optimizing machine times and tooling sequences. The same applies to the individual processes during the next stage – surface treatment.

The final challenge is to set up a delivery process that minimizes time losses. This will be based on an agreed forecast that can vary within a fixed bandwidth according to the nature of the project concerned. Knorr-Bremse is currently developing an electronic network aimed at improving coordination between customer and company.

KNORR-BREMSE AT INNOTRANS





InnoTrans 2010, which will take place from September 21-24, is once again set to draw rail experts and visitors to Berlin from all over the world. With its focus on rail transport technology, the exhibition provides a platform for the national and international passenger and freight rail industries.



At this year's InnoTrans – the world's leading exhibition for rail transport technology – Knorr-Bremse will be showcasing a range of innovative solutions in various product areas, including braking and on-board systems. One main focus of the company's stand will be on complete bogie equipment including the RZKK wheel brake caliper and disc, the WZK axle brake caliper with spring actuator and axle brake disc and also the company's bogie diagnosis system.

The VV180T oil-free compressor will also be on show. VV108T is superior to traditional compressors not just because of its low environmental impact but also in terms of economy and efficiency. Its specially coated components do away with oil and oil filters and the associated disposal costs.

Visitors to the Knorr-Bremse stand will also be able to learn about the MBS modular brake control system, which offers operators reduced maintenance downtimes and dramatically lower life-cycle costs. Its modular design makes it adaptable for cross-border operations anywhere in Europe.

Knorr-Bremse's LEADER driver information system – now also capable of integration into a driving simulator – is a good illustration of how the company can combine its fields of business to maximize customer benefit.

Control valves designed to meet valve standards in all parts of the world will demonstrate the company's global orientation.

A selection of compact systems will also be showcased at the exhibition – for example the HGK compact hydraulic unit with brushless DC motor, the elastically mounted HSE1A active brake caliper the EP2002 Cube and EP Compact.

Improved aftermarket provisions, an eco-friendly HVAC system from Merak and the IFE HGV E3 high-speed train door system will round off Knorr-Bremse's exhibits.



A model of the Knorr-Bremse stand at InnoTrans 2010

We look forward to welcoming you to our InnoTrans stand in Hall 1.2 No. 203

If you do not find a voucher here for a free one-day admission ticket to InnoTrans 2010, please contact us and we will send you one by return.

We will be happy to answer any questions you may have. Please contact us at: InnoTrans@knorr-bremse.com

"Distributor valves – high-tech behind the facade"

Thomas Störzinger, Senior Manager Development at the Brake Control CoC, spoke to Railinformer editorial staff about the distributor valve in Europe.

Europe is often criticized for its insularity. But it was this continent that developed a standard for distributor valves that is now used worldwide. How did this come about?

Störzinger: I must say it does surprise me sometimes. Back in the 19th century when the first standards were being set, Europe was far from being a peaceful continent. But despite this – for example in the case of the UIC standard for distributor valves – people were able to agree on a common denominator. I guess ultimately there were practical reasons for this – everyone realized petty nationalism would merely hinder the success of what was widely regarded as the means of transport of the future: the railway.

What is the difference between the European standard and other standards?

Störzinger: The UIC standard allows for various technological solutions provided they adhere to an overriding specification. To put it simply – it means that a Swedish freight car has

to be capable of running with an Italian one in the same train, a Polish one with a Portuguese one. The American AAR standard is rather different. It doesn't just lay down standards for the coupling between the cars – it calls for complete compatibility of individual components including the distributor valve.

What does that mean for Europe?

Störzinger: It means there is intense competition between systems manufacturers, with each looking for the best solution. Those technologies that have managed to convince people have prevailed – and at the forefront of these is the Knorr-Bremse KE distributor valve.

What is it that makes this valve so special?

Störzinger: It's extremely robust, it can be used in a wide range of temperatures and it requires minimal maintenance. What is interesting is that there have been no changes to the

basic principle of the valve since the 1950s. But behind the facade it is very high-tech – the individual components and materials are state-of-the-art.

Is it still being developed?

Störzinger: Yes and no. In technological terms we have reached a point where improvements are really only possible in theory or at a price that would be out of proportion to any benefits. But Knorr-Bremse is still taking this technology forward. We are not just looking at the distributor valve from a purely technological point of view but also from the customer's perspective. We are currently involved in intensive discussions with vehicle manufacturers, leasing companies, operators and logistics experts on how to adapt systems and valves even better to market requirements.



Thomas Störzinger is responsible, amongst other things, for distributor valves at Knorr-Bremse. After studying engineering and working as an academic assistant in the field of precision instruments at Munich Technical University, he joined the company in 1972. He started his career at Knorr-Bremse in the testing department and subsequently headed up development departments for brake control, hydraulics and automatic train couplings. Since 2002 he has been responsible for component development at various different sites within the Brake Control Center of Competence.



Distributor valves

Valves for the world

There are few rail vehicles for which Knorr-Bremse cannot deliver the correct standard of distributor valve. But serving the market also means adapting products to specific requirements – for example they have to function just as reliably in desert heat and sand as in temperatures of -60°C in the Russian winter.

DELIVERING TO THE WORLD

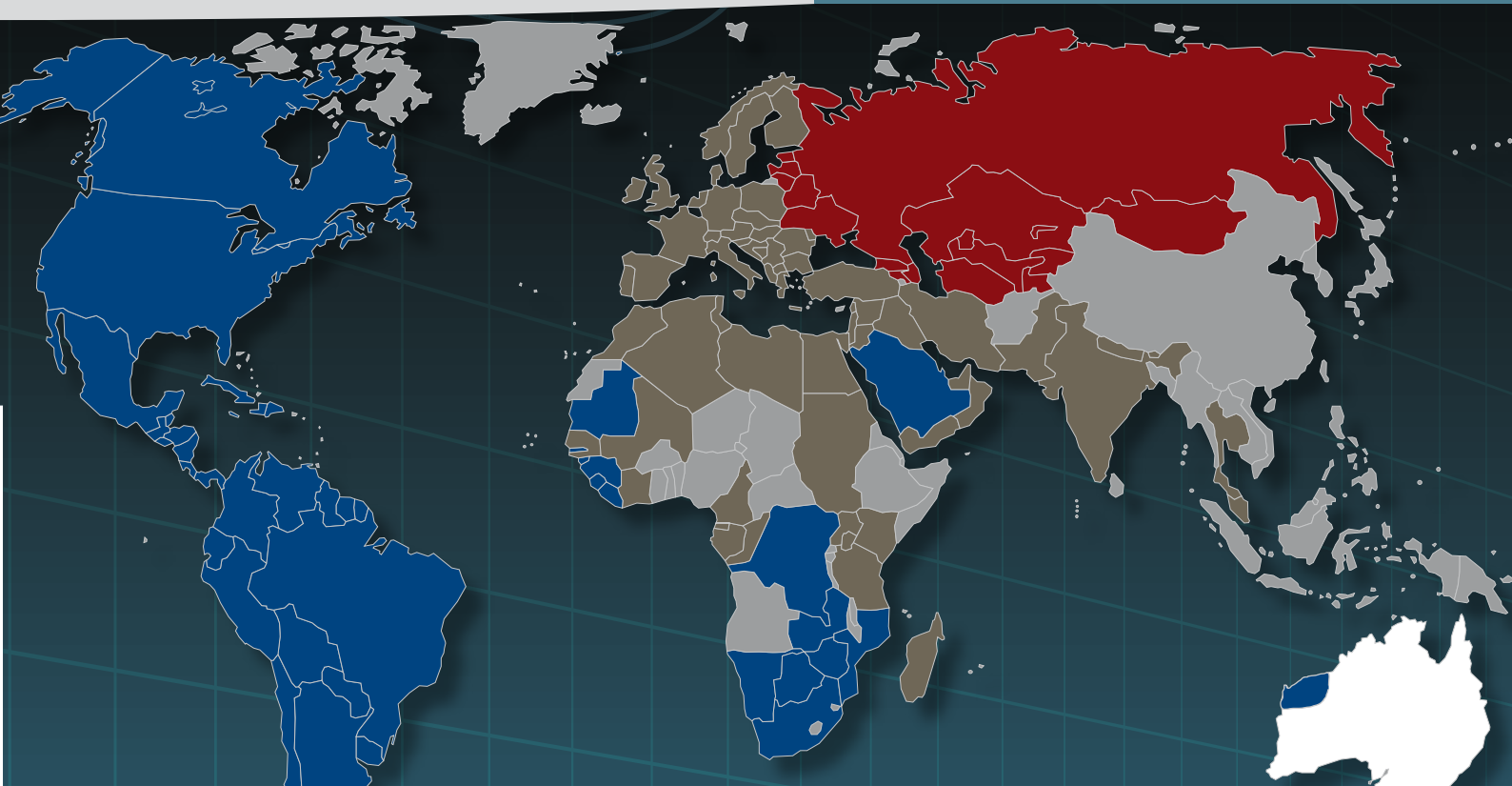
Decades of experience, state-of-the-art technology and low maintenance requirements have helped establish the Knorr-Bremse KE distributor valve in the core European UIC market. And, having proved itself a million times over, the valve has become synonymous with absolute reliability. Much of its success is due to an ongoing process of further development and improvement carried out mainly at the company's UIC test rig in Munich –

where braking using Knorr-Bremse's W-series valves can be simulated on trains up to 1,500 meters in length.

Acquisition of New York Air Brake and production of the Knorr DB60 distributor valve for the AAR market enabled Knorr-Bremse to continue its global expansion. In addition to the American market, the company was also able to access the South African market, which is similarly based on the AAR standard. Australia uses the AAR system for heavy ore transportation as well as the Austra-

lian Railways system, which operates with Knorr-Bremse W-series valves.

The experience gathered by Knorr-Bremse in adapting to AAR standards is now helping the company in its drive to access the Russian market. Working closely with the Russian State railway company, Knorr-Bremse is developing valves for use on 1,520 mm gauge tracks. Specially designed to fit the Russian vehicles, the units are compatible with older valve types and offer clear advantages for the operator.



Pneumatic brakes are a special development – and at their heart is the distributor valve. Modern valves are sophisticated pieces of technology providing load-related braking for various specific brake types.

Millions of these valves are currently in use all over the world. But it is not a question of “one size fits all” – the various regions have different standards that were established over the years and are not compatible with one another.

“For this project it has been crucial to have experienced Russian rail specialists working with us, because they know what is important for their region,” explains Thomas Störzinger, responsible for the development of distributor valves at Knorr-Bremse. Despite the company’s years of experience, the challenge that this project represents should not be underestimated: while valves are designed to operate down to minus 40°C in Europe and North America, temperatures in Russia can fall to as low as –60°C. Störzinger does not hide the fact that this is a considerable challenge for the engineers: “We can manage those extra 20 degrees – but it’s far from easy.”

The systems, components and materials for the project are currently undergoing testing in Munich as part of an extensive program that includes compatibility testing and will later be rounded off with field and operational tests.

- AAR system
- UIC system
- GOST system
- ARA system
- Other

Bogie equipment

The linear eddy current brake

Deutsche Bahn recently ordered 15 of the latest VELARO high-speed multiple units from Siemens. Amongst other things, Knorr-Bremse is equipping this German VELARO with state-of-the-art eddy current brakes. The company will be exhibiting this upgraded version of the electromagnetic braking system at this year's InnoTrans.





The VELARO D has been specially designed for international operations in Europe, particularly between Germany and France, where the train is expected to reach maximum speeds of 320 km/h. The eddy current brake is an ideal supplement to traditional brake components: the braking force is independent of any contact between wheels and track, it can be used at high speeds and works without friction. The brake can be applied progressively and acts virtually without delay. The advantages for operators are obvious – there is no wear and tear, no noise and no smell. The application of constant braking force over a wide range of speeds means it can be used as a service brake. Judicious blending of electrodynamic and eddy current brakes means the use of friction brakes can be confined to very low speeds, significantly extending the life of the brake pads.

TWO MAJOR IMPROVEMENTS

Compared with its predecessor, the ICE3, the traction voltage on the Velaro D is considerably higher. The coils of the eddy current brake therefore had to have better insulation – but without any increase in the available installation space. The development engineers also improved the brake's characteristics in terms of signal transfer technology.

This involved the company in a number of interdisciplinary activities that included the development of certain new manufacturing fields. Time was of the essence, as the new eddy current brake had to be ready for delivery within a year.

GOAL: ZERO DEFECTS

Parallel to this development, the company also had to build up a reliable delivery chain and stable manufacturing processes. Amongst other things this involved countless audits and FMEAs (failure modes and effects analyses). And of course customers and suppliers were also involved in the process.

Knorr-Bremse worked hard on reducing the defect rate to zero by optimizing production processes. Amongst other things this involved setting up a new mixing and casting facility for the electrical coils. The project leader for eddy current brake development, Dr. Henry Lehmann, confirms that this involved drawing on resources and expertise from all parts of the Group.

EIGHT BRAKES PER MONTH

In May of last year, a mere seven months after project launch, the various electrical, thermal and mechanical tests began, and by the end of the year Knorr-Bremse was able to deliver four braking systems to Siemens for testing. By January 2010 sample testing had been completed and series production could begin. By mid-2011 output is scheduled to reach eight brakes per month.

Active quality management

Zero defects

Two words sum up the philosophy underlying Knorr-Bremse's approach to quality management: "zero defects". Even at the product planning stage the company lays the foundation for defect-free products, using methods throughout the development process that prevent defects from arising in the first place.

There are some companies for whom quality is less important than design or the number of units produced, but Knorr-Bremse is not among them – for good reasons. Its Q-First campaign brings together a wide range of measures designed to ensure top quality for every single component.

ACTING RATHER THAN REACTING

An important element in our quality management philosophy is the principle of prevention rather than remediation. Potential defects have to be identified and eliminated before they become a problem. That is why enormous emphasis is put on integrating safety-relevant requirements into development processes at an early stage, with teams of experts analyzing weak points and drawing up improvement measures.

Failure modes and effects analysis (FMEA) is carried out on a daily basis in the product development departments, as are product conformity tests during production processes. Every single step is examined, with quality-critical elements being defined and categorized according to seriousness. Potential problems can thus be dealt with by introducing improvements to the development process well before full-scale production begins. Comprehensive tests are also carried out during the development process to validate the quality requirements of the newly developed products. And pro-active supply management ensures that components of the right quality are sourced from suppliers.

COMBINATION OF TESTS

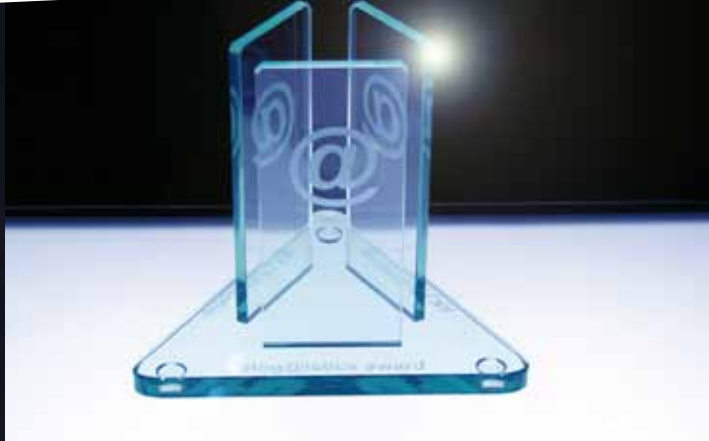
Throughout the production process, spot checks are made on outsourced components as they are delivered to KB.

During production itself, avoidance of errors is the main focus of quality management. One of the methods used by Knorr-Bremse to achieve this is the poka yoke system, which identifies errors and provides the necessary feedback.

The intensity of contact between the production equipment and a product can, for example, signal a defect. Similarly a check on the right number or sequence of manufacturing processes can also identify problems.

When several components have to be joined during a manufacturing process, the different parts are first put together in kits. At the end of the process, if the number counted does not match the standard number prescribed, then an error must have occurred and the system sounds the alarm. Conversely, if any components are left over at the end of the assembly process, an error is also automatically signaled. At the end every component is also subjected to a thorough examination to check that it meets the required standards.

Ultimately all these elements combine to create a combination of poka yoke solutions and production testing aimed at the same goal – improved quality and greater safety.



Thomas Endres, Roland Becker, Dr. Albrecht Köhler and Dr. Christoph Hartmann at the award ceremony

Knorr-Bremse wins 2010 Elogistics Award

In another major success for Knorr-Bremse, the Munich-based brake specialist has won an Elogistics Award from the AKJ Group. AKJ brings together experts and top managers from the German automotive industry and offers a platform for exchanging experience amongst OE manufacturers, suppliers and service providers in the automotive value-added chain.

Knorr-Bremse received the award for its solution to the problem of “uniform disposition responsibilities in a complex plant structure,” which is based on a sophisticated combination of logistics and information technology.

RESPONDING EFFICIENTLY TO CUSTOMER REQUIREMENTS

An integrated disposition system with only one person responsible for each category of goods enables customer requirements to be dealt

with much more efficiently, even on a cross-plant basis. In collaboration with Appia Consult GmbH an individual solution was developed in an SAP environment that significantly reduces reaction times and also avoids friction and information losses between plants.

IN EXCELLENT COMPANY

During an evening gala event Dr. Albrecht Köhler, Managing Director Knorr-Bremse Rail Vehicle Systems, Thomas Endres (Appia Consult

GmbH) and Roland Becker, Head of Supply Chain Management at Knorr-Bremse Rail Vehicle Systems were presented with the award by Dr. Christoph Hartmann, Minister for Economic Affairs in the Saarland. Knorr-Bremse found itself in excellent company at the event – the other award winners were Volkswagen AG and MAN Trucks.

HVAC systems

Solutions you can trust

Knorr-Bremse's subsidiary Merak designs and manufactures heating, ventilation and air-conditioning (HVAC) systems for all types of railway vehicles. With more than 45 years of experience in the field, the Spain-based company ensures pleasant on-board temperatures under a wide range of climatic conditions.

More than 45,000 HVAC-units with over 200 different designs are currently in service around the globe. In order to meet customers' requirements anywhere in the world, Merak operates manufacturing sites on three continents and service agents in all major markets. Whatever the climatic conditions – Merak's systems offer flexible operation where air conditioning, ventilation or heating is needed: from high speed trains speeding through Russia's coldest regions, to urban trains operating in dusty conditions in the Middle East or in regions with extremely high humidity such as South-east Asia.

Merak's success is based on a number of factors: state of the art R&D and testing technology is used to assure efficient design and layout solutions that meet customers' requirements. For example, the company uses modern climatic chambers to test the capacity of the HVAC units and simulate various operational conditions. This enables the equipment to be tested at temperatures ranging from -50 to +60 degrees

Celsius and even in extreme conditions like snow, sand or varying levels of humidity.

Merak benefits from its multinational organization while at the same time maintaining an individual company identity. Employees are proud to be more than just a brand, but at the same time are able to take advantage of the Knorr-Bremse Group's structure. And Merak keeps on pushing the edge: an important part of its turnover is re-invested in research and development.

We would be delighted if you were able to drop in during the Innotrans exhibition and have a chat with us about the latest state-of-the-art developments and more eco-friendly solutions for our products.



Driving simulators

Joining forces

Last year, Knorr-Bremse acquired Sydac, one of the world's leading manufacturers of driving simulators. Both companies have much in common and fit well together – bringing many benefits for customers.

The area is not entirely new to Knorr-Bremse – the company's subsidiary New York Air Brake is already highly successful in the North American market with simulators for heavy freight trains. And Knorr-Bremse itself makes internal use of simulation programs on computers and test rigs. Now the expertise of both companies can be combined. The braking system is the strongest single influence on train dynamics, and Knorr-Bremse has more than 100 years' experience in the field. What Sydac can supply is high-end technology for visualization of these dynamics.

THE SAME LANGUAGE

As with braking systems, the key to successful development of driving simulators is close collaboration between the manufacturer and the customer. Co-operation is the name of the game: Knorr-Bremse has been speaking the language of railroad specialists for more than a hundred years and has a thorough knowledge of train operations – giving the company a better understanding of operators' wishes and requirements and how to put them into practice. Now it can do exactly the same for driving simulators.

EARLY AVAILABILITY

As a manufacturer of braking systems, Knorr-Bremse is involved in the planning process for new projects from the very outset. This means data that is also of potential use for simulators is available early on, enabling the company to deliver the driving simulators usually months before the new trains are ready for service – which means driver training can start well before the vehicles actually go into operation. Such early simulator availability can also generate valuable feedback for the development stage.

INTEGRATION OF LEADER

There are also synergies between simulators and Knorr-Bremse's LEADER driver information system: both use similar physical models and rely on comparable vehicle and operating data. Whereas simulators are used for driver training, LEADER enables locomotive engineers to develop the most efficient and fuel-saving driving style by providing recommendations based on the actual operating situation. As well as significantly reducing wear and tear, the system can also offer savings of up to 15 per cent of fuel costs. As the two systems are linked, journeys using LEADER can be simulated for driver training purposes.



Gautrain

Showcase project in South Africa

Gautrain's first track section between Johannesburg International Airport and the northern part of the city was opened in time for the 2010 Soccer World Cup. Knorr-Bremse is supplying the Electrostar trains manufactured by the Bombela Consortium with braking and door systems.

The 80-kilometer express link is a showcase project when it comes to expansion of South Africa's public transportation network. The Gautrain usually runs at speeds up to 160 kilometers per hour, making it one of the fastest trains based on the Bombardier Electrostar platform: Passengers travelling from the airport to Sandton can make the trip in just 14 minutes. Completion of the entire Gautrain system is planned for 2011, when it will link Johannesburg with the national capital of Pretoria in a mere 42 minutes.

KNORR-BREMSE ON BOARD

The trains are equipped with the Knorr-Bremse EP98 brake control system, an air supply system that includes the Knorr-Bremse oil-free compressor, and a sanding system. And IFE, the world's leading manufacturer of automatic door systems for rail vehicles, is supplying each Gautrain with 16 access systems and four cab doors. The doors have a clear-cut design and distinctive construction and are mounted within the portal width.

The door wings are blocked on each of the portal's angles, which means the locking mechanism is unaffected in the case of portal deformation and ensures a tight fit. The aluminum doors themselves have a honeycomb sandwich design offering high levels of sound insulation. Many years of practical experience have flowed into the design of these extremely robust and reliable systems.



Diesel locomotives

Major order from South Africa

South African rail operator Transnet has ordered 100 new diesel locomotives from US conglomerate General Electric for use by Transnet subsidiary Transnet Freight Rail. Knorr-Bremse products will be on board – the Group is developing and supplying the CCBBII microprocessor-controlled braking system, the vacuum brake control and the block brakes.



The order placed with GE by Transnet is a double first: it is the first time in the last 20 years that the manufacturer has sold diesel locomotives to a sub-Saharan country; and Knorr-Bremse has never before equipped GE locomotives for delivery to South Africa.

REGIONALIZATION WITH A GOOD PRICE-PERFORMANCE RATIO

One of the reasons Knorr-Bremse has secured the order is the attractive price-performance ratio offered by the products. But another factor is the company's ability to supply – at very short notice – products that are perfectly adapted to the South African market. For Knorr-Bremse it is mainly an organizational challenge, with sites in Germany, Hungary and

China involved in the development and manufacturing processes. The first field tests of the locomotives are scheduled to start as early as fall of this year.

Assembly operations will start before the end of the year, and GE will deliver the first 100 locomotives in 2011. Transnet aims to use them immediately for their freight fleet in order to reduce lifecycle costs and emissions and improve operational efficiency.



Knorr-Bremse original spare parts kits are more than just the sum of their parts – they offers a whole range of potential savings. The standardized content of every kit means there is no need to check them prior to use and cuts the cost of disposition, ordering and delivery monitoring. At the same time, auditing, warehousing and inventory can be carried out more simply and more quickly. Kits containing all the necessary original parts are currently available for some 4,000 different brake components. Their use can save up to 70% of procurement and warehousing costs.

Knorr-Bremse original parts kits

It's all in there!

Rail vehicles have to operate day-in day-out, and downtimes for maintenance and repair can have a crucial influence on their economic viability. That is why, almost three years ago, Knorr-Bremse launched its original parts kits on the market. The response from customers has been extremely positive.

SATISFIED CUSTOMERS WORLDWIDE

It is not surprising that the verdict of customers after almost 3 years of using the kits is so positive. As Johann Eichinger of Austrian Railways' technical services workshop in St Pölten, where SL20 screw compressors are overhauled, confirms: "Apart from anything else the kits have helped improve quality and reduce costs. Colleagues find them easy to handle and can see the sense in using them. They would be happy to see the system introduced for other equipment as well."

At the Deutsche Bahn workshops in Fulda the kits are used for very practical reasons: "They reduce the number of procurement operations required for overhaul work – in other words we see the main advantage as being a logistical one," explains Frank Hasenauer of DB Fahrzeuginstandhaltung GmbH. His company uses the kits when large volumes of equipment have to be overhauled – for example weighing valves, load brake valves or brake calipers. "The other advantage is that all the parts we need are immediately available – which helps guarantee good quality work."

That is a point that Walter Jansen of the Dutch operator Ned-Train Fleet Services also makes: "The kits enable the technicians to make sure they're really using all the parts." Will his company use original parts kits for other equipment in future? "Certainly – for new projects involving a lot of overhaul work."



There has also been a positive reaction from the other side of the globe, for example from Knorr-Bremse's own service center in Australia. "The great advantage is their user-friendliness," says Ilja Dorsch of the service facility. "Colleagues find that helpful for their day-to-day work." And introduction of the kits went smoothly: "There was no need for any major changes in the workshops."





QUALITY THAT
CONVINCES.

**InnoTrans
2010**

**Visit us
at Hall 1.2,
Stand 203**

All over the world, Knorr-Bremse products are used to move people and goods safely. In all types of rail vehicles, carrying passengers and freight – and on platforms. That is why quality is so important for us. Our Quality First Initiative helps us create products that will function reliably throughout a long working life. Our goal of Zero Defects starts with the initial development stage and culminates in carefully designed manufacturing processes with regular quality control procedures. That way, everyone stays on the right track – our customers and our customers' customers. | www.knorr-bremse.com |

KNORR-BREMSE

