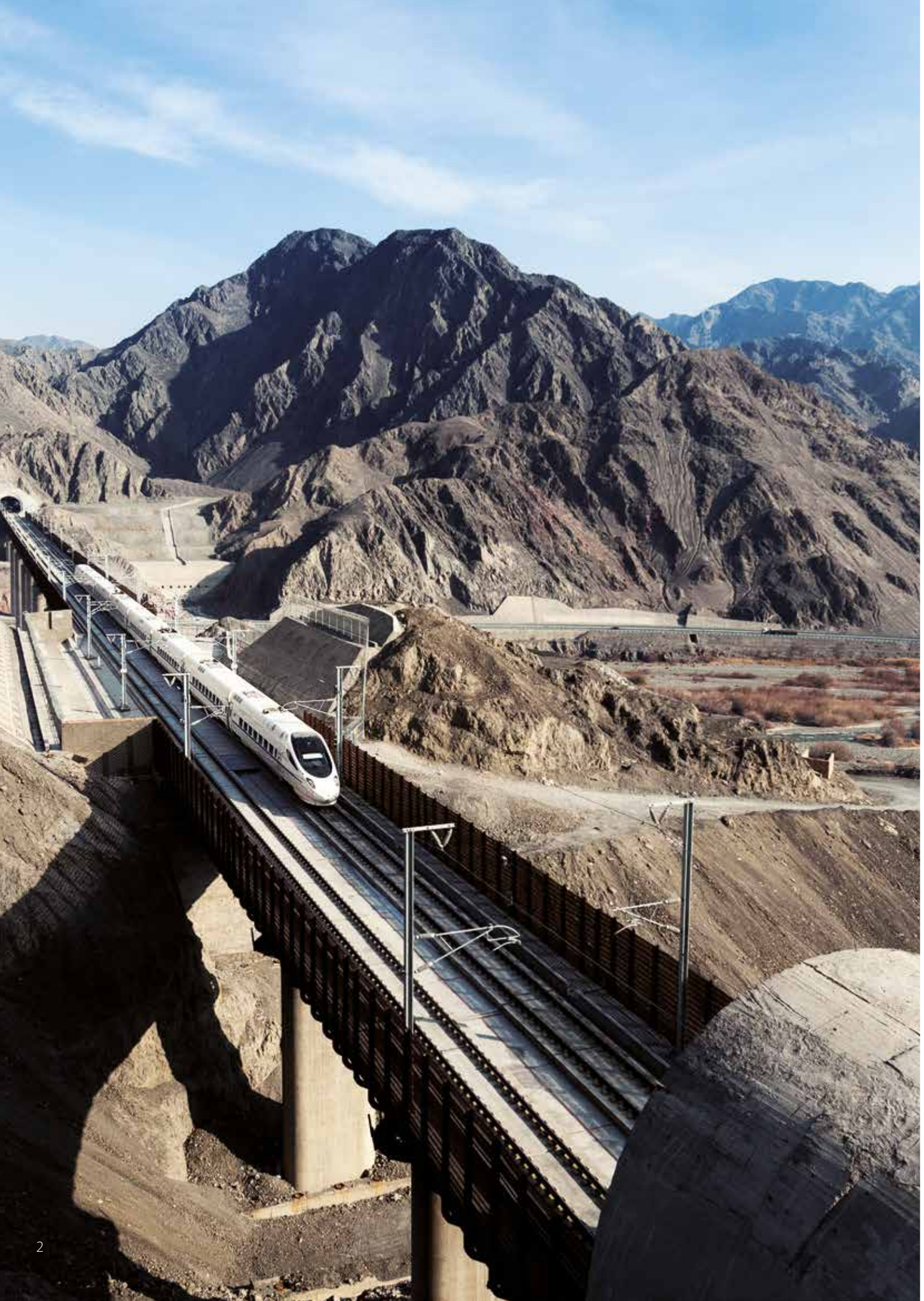
KNORR-BREMSE
RAIL VEHICLE SYSTEMS

For safe mobility worldwide.

KNORR-BREMSE



DURING AN EMERGENCY STOP,
THE BRAKES OF A HIGH-SPEED TRAIN REACH TEMPERATURES OF
MORE THAN **600°** CELSIUS.

LAST YEAR, KNORR-BREMSE USED SOME
7,000,000 SINTERED METAL ELEMENTS
FOR ITS FRICTION PRODUCTS.

KNORR-BREMSE HAS PRODUCED SOME **1,100,000** KE
VALVES SINCE THEY WERE FIRST MARKETED.

THE KAB60 CONTROL VALVE CAN FUNCTION FULLY AT
TEMPERATURES AS LOW AS **-60°** CELSIUS.

EVERY DAY, ALL OVER THE WORLD, OUR IFE ENTRANCE SYSTEMS
OPEN AND CLOSE MORE THAN **50,000,000** TIMES.

MORE THAN **100,000** KNORR-BREMSE HVAC SYSTEMS
ENSURE AIR QUALITY AND PASSENGER COMFORT IN TRAINS ALL
OVER THE WORLD.

"Under the motto of 'Local Thinking. Worldwide' Knorr-Bremse ventured into international markets early on. It has been a real success story."

Peter Karius, Director International Sales, Knorr-Bremse Rail Vehicle Systems

KNORR-BREMSE: FOR SAFE MOBILITY WORLDWIDE

The development of the Knorr-Bremse Group from the Company's early days in 1905 to its current position as a world leader is a fascinating and gripping story. But from the very outset, the Company was – and still is – driven by an absolute commitment to safety on road and rail. After initially focusing on manufacturing, selling and servicing braking systems, it eventually developed into a global group offering complete systems for rail and commercial vehicles. At Knorr-Bremse we see ourselves as the service partner of choice for customers all over the world – which is why we focus on developing innovative solutions for road and rail vehicles' entire life cycle.

System solutions for greater safety. This is what has made us so successful and has driven our global growth. With 28,000 highly motivated employees at our headquarters and in a further 100 or more facilities in 30 different countries, we now enjoy the trust of customers all over the world.

Products for partners. Metros, high-speed trains, trucks or buses: In every segment we understand how customers' technological requirements vary according to the local environment in which they operate. Over the years, joint development of customized products has created close partnerships that have proved invaluable – to the benefit of customers and road and rail travelers all over the world.

Actively facing the future. Maximizing operational and functional safety is a priority for Knorr-Bremse's research and development engineers. Since 2016, the new Development Center in Munich has combined the rail and commercial vehicle divisions under one roof, enabling the Company to benefit from the resulting synergies. Joining forces enables us to overcome tomorrow's challenges: globalization, urbanization, the need for energy efficiency – and greater safety. Knorr-Bremse is ideally positioned to react flexibly to the challenges: developing new braking systems to meet ever stricter regulations or creating more energy-efficient products in response to an increasing scarcity of resources.

Assuming responsibility. In improving our products we are also responding to calls for greater sustainability. Our Corporate Responsibility policy embraces environmental issues, HR development and our social commitment through our charitable organization Knorr-Bremse Global Care.

KNORR-BREMSE:
FOR SAFE MOBILITY WORLDWIDE

Every day, countless people use rail vehicles equipped with Knorr-Bremse products. Manufacturers and fleet operators choose to work with Knorr-Bremse because they value our systems expertise and want to offer their customers top levels of safety, reliability and comfort.

Global presence. With more than 14,000 employees and over 80 production, sales and service sites around the world, Knorr-Bremse Rail Vehicle Systems maintains a strong local presence, enabling it to provide on-the-spot aftersales service over the entire product life cycle. The result: rapid delivery combined with ongoing support.

State-of-the-art products. Rail is an environmentally friendly mode of transport, and the brakes, entrance systems, air conditioning and power supply solutions supplied by Knorr-Bremse have a reputation for maximum operational and functional reliability. They are designed to form complete, networked systems that are unique in the market. Customers benefit from reliable, efficient rail vehicles, energy savings and reduced life-cycle costs.

Quality is the key. As a developer and manufacturer of safety-critical products, Knorr-Bremse is uncompromising in its commitment to quality from the very start of the development process. The globally standardized Knorr-Bremse Production System (KPS) provides the basis for best-in-class production based on a zero-defects culture – from procurement to delivery and beyond.

Solutions across the entire life cycle. High-quality systems are crucial for the safe operation of a train. Knorr-Bremse is also very much aware that from the point of view of the operator, maximum availability of the necessary spare parts in OEM quality is essential – combined with competent, reliable inspection and maintenance of rail vehicles throughout their entire life cycle by expert technicians. Customers can count on Knorr- Bremse RailServices to provide all this.

Optimum networking. The more closely the sub-systems in a rail vehicle are networked, the greater the benefits for vehicle builders and operators. Cross-system diagnostics avoid the need for individual service tools for each sub-system. And properly matched, pre-tested hardware and software interfaces simplify the task of planning the system architecture. State-of-the-art control technology based on integrated system tools from Selectron Systems AG provides the perfect basis for this.

"Our customers expect absolute safety and reliability. We achieve this through our comprehensive systems competence, our technological lead and our local service."

Masahiko Horiuchi, Managing Director, Knorr-Bremse Rail Systems Japan

STRONG PARTNERSHIPS: OUR TECHNOLOGY EVOLVES IN STEP WITH OUR CUSTOMERS

Mile-long freight trains in the Australian outback, modern metros on the Arabian Peninsula, or high-speed trains in Japan – every vehicle builder and operator has specific requirements. That is why Knorr-Bremse develops customized solutions for each application based on tried-and-tested, innovative technologies. Whether the trains will be operating in earthquake zones, in extreme cold or in dusty desert conditions – in all cases Knorr-Bremse is a single-source provider of perfectly matched braking and on-board systems offering vehicle builders and operators genuine added value. Thanks to their intelligent networking with the overall train system, the result is uncompromising safety, top reliability and efficient operation, coupled with low life-cycle costs.

KNORR-BREMSE

Brakes
Braking and on-board systems for rail vehicles: Knorr-Bremse

IFE Innovations For Entrance Systems

Door systems
Entrance systems for rail vehicles: IFE

WESTINGHOUSE platform screen doors

Door systems
Platform screen doors for rail vehicles: Westinghouse

merak

HVAC
Heating, ventilation and air conditioning systems: Merak

KIEPE ELECTRIC

Electrical systems for rail vehicles
Traction, power supply, HVAC equipment, TCMS: Kiepe Electric

Selectron

Train control & monitoring systems (TCMS)
Control, network and communications technology, automation systems for rail vehicles: Selectron

Microelettrica Scientifica

Energy control systems
Electro-mechanical and electronic control elements: Microelettrica Scientifica

POWERTECH

Power supply
Power supply solutions for rail vehicles: PowerTech

ZELISKO

Signaling and traffic management systems
Signaling and traffic management systems, current and voltage transformers: Zelisko

NEW YORK AIR BRAKE

Brake control systems
Innovative control systems for rail vehicles: New York Air Brake

RAILSERVICES always on track

Maintenance and service
Maintenance, modernization and repair services for brakes and on-board systems: RailServices

"Brakes do not impose limits. On the contrary, with good brakes a train can travel faster and reach its destination sooner."

Eric Wright, Chief Engineer, New York Air Brake

KNORR-BREMSE: GREEN LIGHT FOR PROGRESS

The travelers waiting on the platform watch as the train enters the station and glides to a precise halt in front of them. Countless times every day, precisely controlled braking systems stop trains with reassuring reliability. And it is Knorr-Bremse that bears responsibility for the entire system, with a perfect combination of electronic, pneumatic, mechanical and hydraulic components.

Total systems competence. Knorr-Bremse is a manufacturer of proven braking technologies for all types of rail vehicle. Over the years the Company's highly integrated systems for the intelligent control and regulation of dynamic braking forces have been installed in thousands of trains. Hydraulic products are combined with air supply, brake control and brake mechanics to create efficient overall solutions. The Company's systems meet global standards such as UIC, AAR, ARA and GOST.

Every component tried and tested. This step in the manufacturing process is so important that we do not leave it up to third parties. Electronic brake control systems and pneumatic and hydraulic components for all types of rail vehicle from freight to high-speed trains are designed to cope with extreme operating conditions such as unusually high or low temperatures. And all products are carefully matched and designed for long maintenance intervals.

Maximum operational and functional reliability. Examples of products resulting from our ongoing development of braking technology are an oil-free compressor for heavy-duty locomotives, an air dryer with optimized regeneration requirements, a wheel slide protection system for improved braking distances, track brakes and the ESRA electronic platform.

Energy efficiency and sustainability. In addition to innovative technologies, one of Knorr-Bremse's core competences is energy efficiency. This is demonstrated by our extremely durable braking force management system, with modular brake control and special control valves. HVAC systems from Knorr-Bremse use heat from the ambient air and recuperate energy from the brakes. Energy is also saved by lightweight cast aluminum brake discs – which also reduce brake pad wear. And passengers and the surrounding environment benefit from a reduction in noise emissions from moving trains by the use of sound-insulated compressors combined with special brake shoes and pads.

SAFE STEP:
ACCESS SOLUTIONS

Every train journey – be it in a high-speed train, regional train, metro or LRV – starts with safe, comfortable access. Few passengers stop to think about the complexity of the train entrance system, but the driver knows how important it is for the technology to function smoothly. Reliable opening and closing are essential for a safe and efficient journey.

Top quality, state-of-the-art technology. Companies in the Knorr-Bremse Group are market leaders when it comes to door systems for rail travel. They realize how important it is for trains to be easily accessible, and for entrance systems for passengers to meet statutory requirements. IFE is responsible for all aspects of electric train door systems, and Westinghouse Platform Screen Doors offers a full range of products and services related to platform doors.

Reliable entrance systems from IFE. The latest generation of IFE entrance systems has significantly improved train and station safety. They meet customers' needs for low installation costs, good heat and noise insulation and low life-cycle costs, thanks to reduced maintenance requirements.

Tried-and-tested, convenient, economical. Train operators and builders put great emphasis on safe entry systems – understandably, because the efficient boarding and disembarkation of large numbers of passengers strongly impacts on the punctuality, reliability and economy of mass transit systems. Prior to installation, every door is subjected to exhaustive testing in IFE's own validation center in order to ensure perfect operation.

Safe, efficient platform screen door systems from WPSD. The global market for platform screen door systems continues to grow. The doors separate the platform from track and train, delivering a cleaner and safer environment for system users. They create consistent boarding zones, effectively guiding passengers and speeding boarding and disembarkation. The use of full-height platform screen doors also facilitates the economical air conditioning of platforms and enhances the platform environment.

"We sell more than just doors –
we sell safe and reliable entry."

Hans Gold, Business Unit Director, Knorr-Bremse IFE Entrance Systems

"An optimum HVAC system achieves a good balance between passenger comfort and energy efficiency."

Michael Powell, Group Technical Director, Knorr-Bremse Merak HVAC Systems

FRESH AIR IN ALL CLIMATIC CONDITIONS WITH KNORR-BREMSE

Rail is one of the most environmentally friendly modes of transport, and Knorr-Bremse contributes to keeping it that way. State-of-the-art HVAC systems for rail vehicles adjust the flow of fresh air according to the number of passengers on board, thereby reducing energy consumption and helping to combat climate change, while still ensuring fresh air and an agreeable temperature for the passengers.

Worldwide quality. Knorr-Bremse has capitalized on global synergies to become a world leader in the development and manufacture of HVAC systems, and will continue to drive growth in the rail vehicle sector. Systems tailored to customer requirements integrate service-proven modules, meet the highest quality standards and operate equally well in desert conditions with temperatures up to +55 °C and winter conditions with temperatures as low as -45 °C. Global production and service facilities mean we are always close to the customer.

Innovation strengthens market position. As a technology leader, we are continually improving our products by adding innovative solutions. One example of this approach is our development of a state-of-the-art HVAC filter system capable of operating in all kinds of climatic conditions that ensures clean air and at the same time requires minimal maintenance.

Sustainable HVAC technology. Climate protection and passenger comfort go hand in hand. Our HVAC systems are both climate-friendly and energy-efficient. This is achieved partly through recycling braking energy to produce heat and partly also through varying the rate of air exchange according to the number of passengers. The design of the latest HVAC systems also contributes to reducing their environmental impact, with their low weight, optimum coolant content, fresh air and partial load operation and improved filter life and performance. The danger of coolant loss is minimized by their robust design and construction, coolant leak detection systems and the identification and use of alternative coolants.

OPTIMUM POWER: DEMAND-BASED POWER SUPPLY AND ELECTRONIC CONTROL FROM KNORR-BREMSE

Knorr-Bremse is driving the energy revolution in trains. As the growing requirements on comfort and safety also increase on-board energy demand, an efficient power supply for the auxiliary systems becomes more and more important. PowerTech delivers this for various systems, including the air conditioning, the on-board restaurant and the digital infotainment system – as well as safety-critical systems such as brakes. And reliable switching for these circuits is ensured by control components from Microelettrica Scientifica.

Tried-and-tested quality and reliability. On-board power converters from PowerTech ensure an effective and energy-efficient power supply for auxiliary systems in rail vehicles. The company's many years of experience make for high-quality, compact products offering top reliability. Knorr-Bremse subsidiary Microelettrica Scientifica is a leading supplier of electronic and electro-mechanical control components for rail vehicle applications.

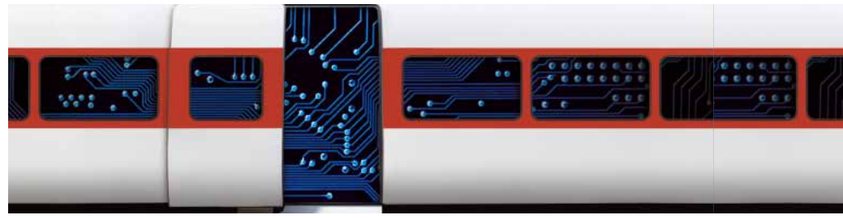
Value-added products from PowerTech. On-board power converters supplied by PowerTech for all train types and performance categories are flexibly adapted to customers' precise requirements. By constantly subjecting its product portfolio to ongoing technological development – for example using the latest silicon carbide semiconductors – PowerTech sets new standards for converters in terms of compact design, overall efficiency and minimal life-cycle costs (LCC).

Value-added products from Microelettrica Scientifica. The control components produced by Microelettrica Scientifica also optimize the performance of rail vehicle applications and reduce their life-cycle costs. The all-embracing ECO system measures energy consumption, evaluates the results and relays the information to the train control management system.

Integration into other systems. On-board systems such as air conditioning or components such as air compressors can, if required, be equipped with their own power supply from PowerTech. This increases overall system efficiency and the availability of individual consumers. Perfectly balanced on-board product solutions also offer greater constructional flexibility and easier installation. Similar advantages are offered by integrated functional units (FUI) from Microelettrica Scientifica. Contactors and circuit breakers are supplied as complete units, so that the customer can install them in the vehicle with a minimum of effort.

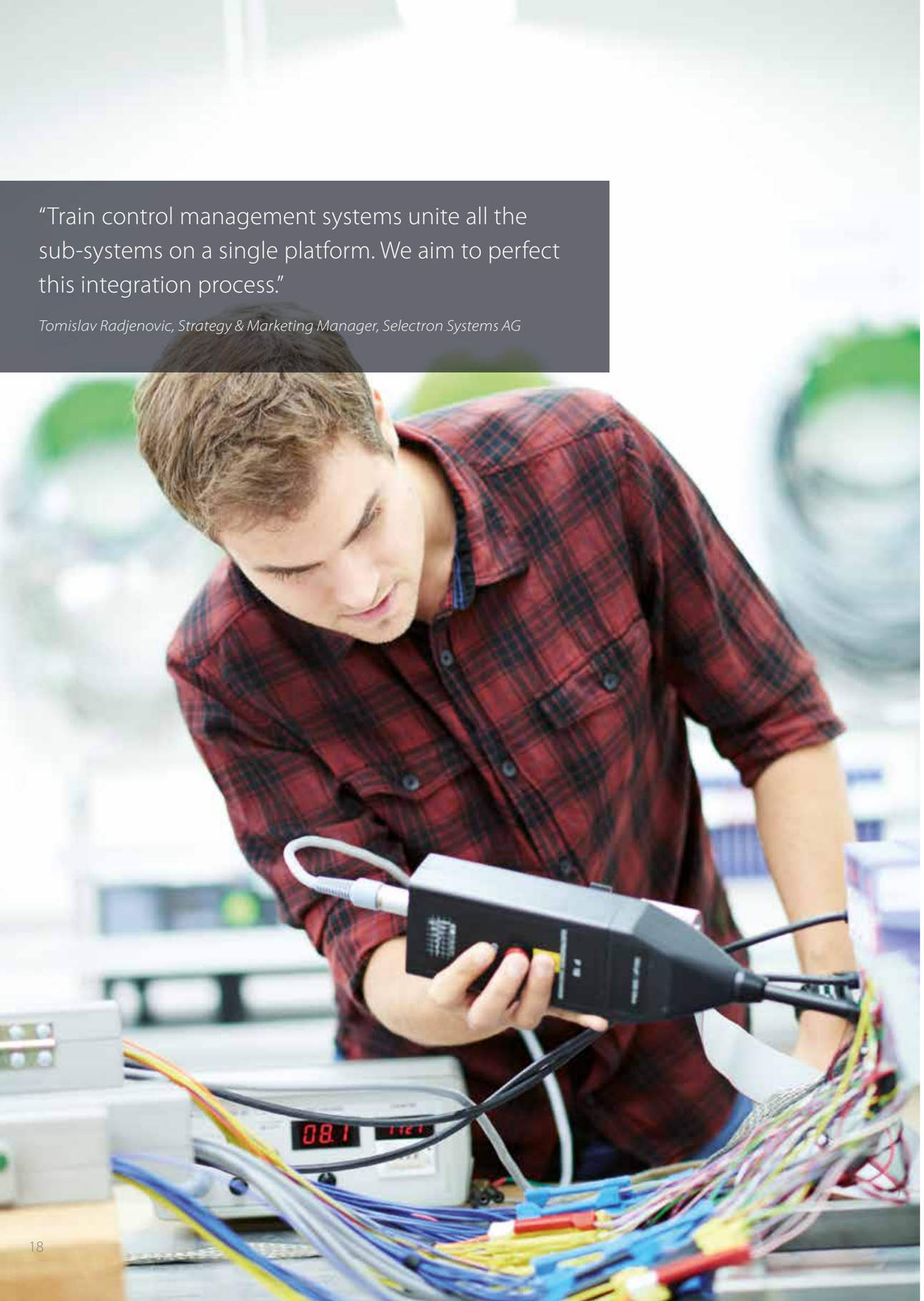
"Growing requirements on comfort and safety increase the energy demand in trains. We supply the power efficiently and according to need."

Jure Mikolčić, Managing Director, Knorr-Bremse PowerTech



"Train control management systems unite all the sub-systems on a single platform. We aim to perfect this integration process."

Tomislav Radjenovic, Strategy & Marketing Manager, Selectron Systems AG



EFFICIENT OPERATION: CONNECTIVITY SOLUTIONS FROM KNORR-BREMSE

As a systems supplier, Knorr-Bremse helps to make rail transportation more energy-efficient and reliable. Selectron offers modern platform technology and networking solutions for train management, as well as simulation equipment for high-quality personnel training. And Zelisko trackside signaling systems ensure the safety of rail operations.

Networking solutions from Selectron: Vehicle control systems and networking solutions form a rail vehicle's central nervous system, with information from the individual vehicle components flowing to the control management system. This includes data on the braking, door and HVAC systems, the power supply, the vehicle diagnostics and the passenger information system. An efficient exchange of data supports high safety standards and accelerates the approval process. Large volumes of data are processed using high bandwidth routers and switches from Selectron. Wireless data transmission by modem (WLAN, GSM, LTE, GPS) ensures passenger comfort (WiFi) and an exchange of diagnostic information for various kinds of evaluation.

Software tools from Selectron. Under the name of 'Symphony,' Selectron offers an entire family of carefully matched software tools with efficient features such as programming, engineering, commissioning support, configuration, train setup, network management, diagnostics etc. Tools for safety-relevant applications simplify the vehicle approval process.

Market-leading simulation technology from Selectron. Engineers, electricians and graphic designers develop and produce software for customized driver training simulators. By ensuring high-quality training with simulation products ranging from the high-end 'full cab simulator' down to simple training documentation, the company contributes towards improving safety on the world's railroads.

Strong signals from Zelisko. Zelisko signaling systems ensure the safe operation of level crossings on many important railroad routes. The high visibility and top levels of safety offered by LED trackside signals ensure the smooth running of railroad networks in many countries. But Zelisko is equally important for local public transport systems, with its state-of-the-art ticketing systems. And in a third area the company also ensures a reliable power supply with its high-grade current and voltage transformers for indoor and outdoor application, as well as sensors for intelligent transformer substations.

KEEPING YOUR TRAINS ON THE RAILS

Any railroad company wishing to remain competitive has to offer two things: absolute safety and reliability. Passengers expect to feel safe on trains, and to ensure this, Knorr-Bremse looks after rail vehicles throughout their entire life cycle. Reliability is important in two respects – it keeps operating costs down and makes train travel more attractive for passengers.

Global presence. More than 30 service centers all over the world offer customers a comprehensive range of maintenance processes and services that transfer the Company's global technological competence into high-quality local service solutions. Knorr-Bremse RailServices makes it possible for repair and maintenance to be carried out rapidly in a single location close to the customer. The high-quality working environments at the majority of our service centers have already achieved certification according to European Regulation (EU) No. 445/2011 – a standard that Knorr-Bremse aims to roll out at all its European sites.

Product expertise. Knorr-Bremse RailServices is familiar with individual types of rail vehicle and develops products and services irrespective of the manufacturer or operator. As a long-term systems partner the company puts together service packages that are tailored to customers' specific requirements. Such ongoing collaboration not only increases vehicle availability but also encourages innovative solutions and cuts life-cycle costs. As part of its close cooperation with its customers, RailServices passes on to them a deeper understanding of its products and constantly works to improve product quality.

Service throughout the entire life cycle. You can choose the particular services you require from our flexible aftermarket program – whether this involves trouble-shooting, kitting or a complete overhaul. To ensure completely smooth running, regular maintenance, overhaul and repair are essential. RailServices helps you meet this challenge by offering active service management that includes a comprehensive needs analysis, spare parts supply, punctual delivery, proactive wear management and a dedicated contact person. Via its global 'Advanced & Project Engineering' network, RailServices offers integrated, customer-specific modernization programs to prepare rail vehicles for the approval process.

"We are driven by a determination to be the service partner of choice for our railroad partners worldwide, offering innovative and competitive solutions across the entire product life cycle."

Kathrin Moder, Head of Sales Strategy and Technical Solutions, Knorr-Bremse RailServices

KNORR-BREMSE RAILSERVICES OFFERS YOU MORE THAN JUST ORIGINAL SPARE PARTS.

As competition between transport modes increases, and passengers demand ever greater levels of comfort, train manufacturers and operators are subjected to growing price pressure. This makes it all the more important to ensure operational reliability, short downtimes and minimal repair costs. RailServices offers through-life support to its customers, with tailored service packages and original spare parts, full maintenance, direct service, technology upgrades and highly trained technicians. This enables it to keep brakes and on-board systems functioning reliably and extend vehicles' lives through modernization programs.

Original parts. Purchase original spare parts from Knorr-Bremse and you receive quality products designed for a long and reliable life. All the components are carefully matched and approved for use in the railroad sector. Efficient parts management by RailServices minimizes customers' inventory requirements, offers first-class maintenance and reduces administrative costs.

Vehicle maintenance. Preventive maintenance and regular overhaul keeps your vehicles in operation and reduces life-cycle costs. Consistency is ensured by the sheer quality of Knorr-Bremse remanufactured parts, which are tested to the same level as new products.

Local service. RailServices offers a rapid, flexible service at local level. In addition to over 30 service centers around the world, customers can rely on a wide range of highly trained local field service technicians. Another service is the transfer of knowledge through training measures.

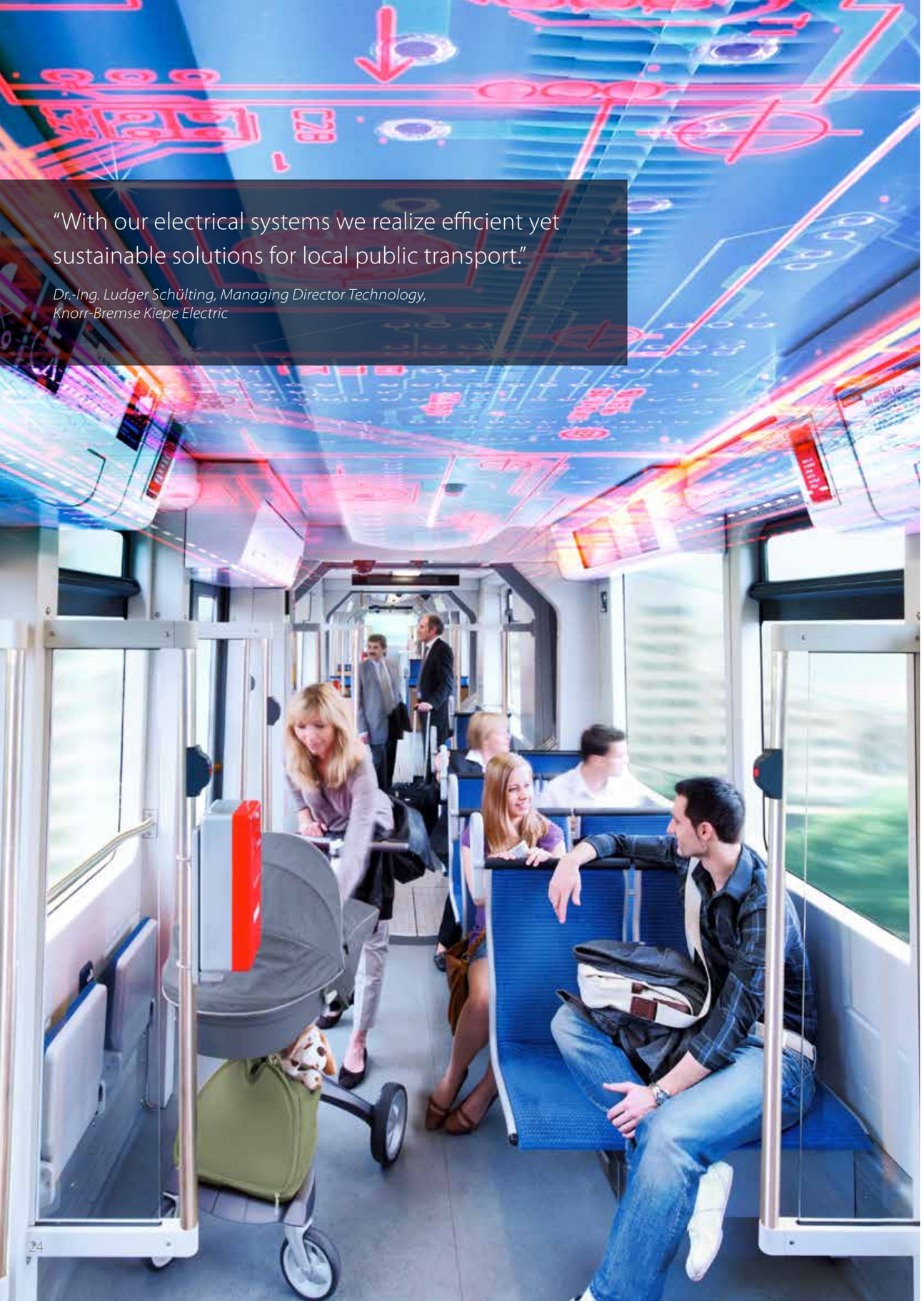
Modernization. RailServices maintains a worldwide portfolio of new and used components for existing fleets with a view to extending their service life. A dedicated engineering team ensures that customer-specific solutions are ready for homologation and cross-product synergies can be used. Available are innovative new products, component upgrades and systems modernization for existing fleets.

Digitalization. The use of Generation 4.0 products in a vehicle maximizes operational safety and minimizes operating costs. The iCOM digital platform offers various applications – for example iCOM Monitor enables you to keep a precise eye on the condition of your fleet and use data from vehicle sub-systems to optimize their operation and maintenance. Another application – iCOM Assist – acts as a driver assistance system, reducing energy consumption and wear and tear of parts.

All these applications run on an open platform with the option of customer-specific analysis and evaluation in a state-of-the-art back office.

"Your partner RailServices provides through-life support for your rolling stock needs."

Dr. Johnny Leung, RailServices Director, Rail Asia Pacific



FORWARD-LOOKING: ELECTRICAL SYSTEMS AND TRACTION EQUIPMENT FROM KNORR-BREMSE

Knorr-Bremse is actively involved in designing modern, environmentally responsible transport concepts. One important aspect is the reduction of emissions from local public transport. With modern electrical traction systems for rail and commercial vehicles, manufacturers and fleet operators can benefit from technological advances and meet their social responsibilities at the same time. All over the world, sophisticated electrical systems for trains and buses reduce environmental impact and ensure quiet, clean and reliable local public transport.

Full range of traction technologies. Kiepe Electric GmbH is one of the global leaders in electrical traction technology for local public transport vehicles, including LRVs, metro trains and buses. With more than 100 years of experience, the company not only offers pioneering traction technologies for rail vehicles and buses but also a broad range of related maintenance services. Its comprehensive refurbishment offer for existing vehicles helps many vehicle operators cope with financial pressures.

Clean operation. Kiepe Electric optimizes the entire system by integrating various sub-systems, including an effective on-board power supply and energy-efficient HVAC technology. The company offers CO_2 air conditioning systems with an energy-saving heat recovery function – groundbreaking technology for the rail sector. And electric buses with In Motion Charging (IMC®) are able to operate round the clock, thanks to their powerful battery charging concept.

Extended service life and minimum maintenance. Products from Kiepe Electric are designed to be low-maintenance. Powerful diagnostic tools and a worldwide service network ensure that life-cycle costs are kept to a minimum. This is the result of closely connected sub-systems, whose data is collected by Kiepe Systems Diagnostics (KSD) and Kiepe Fleet Management (KFD). These diagnostic and maintenance programs provide operators and service personnel with an overview of the operational and diagnostic data of installed components and reduce downtimes to a minimum.

More than just rail vehicles and electric buses. The Company is also a leading manufacturer of equipment for the monitoring and control of conveyor systems in the bulk goods sector. Despite the harsh operating conditions in primary industries, these components have a reputation for reliability and quality.

TAKING ON RESPONSIBILITY – A PRIORITY FOR US

For Knorr-Bremse, acting entrepreneurially with an eye to the future is all about taking on responsibility – for our products, our employees, the environment and the society in which we live. As a family-owned business with more than 110 years of history behind it, Knorr-Bremse has an active corporate culture that combines environmental, economic and social goals.

Sustainable business. What does corporate responsibility actually mean for us? On the one hand we work on developing products and technologies that are designed to make mobility safer, more future-proof and more environmentally compatible. With our energy-efficient and low-emission products for the rail sector we contribute towards developing forms of mobility that save fuel and reduce noise emissions. At the same time we are careful to make sparing use of resources, to use energy efficiently, to utilize environmentally friendly materials and to operate an optimized logistics chain. Our global energy efficiency initiative $ECCO_2$ (Efficient Cut of CO_2) has enabled us to increase our energy efficiency by 38% since 2010 and to reduce specific CO_2 emissions by 17%. In addition, Knorr-Bremse has joined with other companies to form the 'Railsponsible' initiative, which aims to promote a common understanding of sustainable procurement processes, exchange information and experience, and jointly utilize instruments, for example for assessing sustainability performance.

Involvement in society. As an international company, it goes without saying that our responsibility goes well beyond our products and production processes: We are determined to offer our employees an atmosphere of fairness and respect, and a safe, attractive working environment. Outside the Company we also support social projects at local and global level. The charitable organization Knorr-Bremse Global Care was founded in 2005 and funds aid projects all over the world in the fields of education and WASH (water, sanitation and hygiene) as well as providing emergency aid where required. As part of the Local Care initiative, employees also support selected social projects in the vicinity of local sites.

Thus responsibility at Knorr-Bremse starts with individuals – and continues at global level to form an impressive whole.

OUR DEVELOPMENTS: CLOSE TO THE CUSTOMER

The better a train's brakes, the faster it can travel. Further development of braking technology calls for extensive systems competence. Knorr-Bremse networks all its components, including HVAC systems, power distribution units, driver assistance and maintenance systems as well as brakes. Whether we are talking about highly integrated control systems, materials testing or winter-proofing – in all cases our new and improved products keep customers ahead of their competitors in terms of safety, quality, environmental compatibility and resource efficiency.

Every customer benefits. Knorr-Bremse has focused its production plants and R&D facilities fully on meeting customer requirements and maximizing efficiency. Some €90 million was invested in the new Development Center in Munich that opened in 2016. At the same time the Company is steadily expanding engineering capacity at its international sites, for example in China and India. For Knorr-Bremse, staying ahead in terms of expertise, even at its local sites, is a competitive advantage that positively impacts the entire Company.

Employees benefit. The strength of Knorr-Bremse's research and development activities is reflected in the innovations it offers to customers. The Company's philosophy is to bring together engineers from a wide range of disciplines in the rail and truck divisions and foster a creative exchange of ideas. Such a center of competence drives forward development work – as do the Company's countless links with universities, sectoral and industry associations and government initiatives.

The rail sector benefits. Knorr-Bremse uses state-of-the-art measuring and testing equipment to validate new developments well before field testing takes place. This increases our understanding of the braking process, both within the system itself and where it interfaces with the infrastructure, enabling Knorr-Bremse to optimally configure every braking system to match the customers' needs. Train builders and operators themselves become technology leaders, with a profitable future providing safe mobility.

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